APPLICATION FOR CERTIFICATION

FOR THE

RUSSELL CITY ENERGY CENTER

HAYWARD, CALIFORNIA

VOLUME II: APPENDICES

Submitted to:

California Energy Commission
Sacramento, California

Submitted by:

Calpine/Bechtel Joint Development
Pleasanton, California

May 2001

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Placer Title Company
CLTA Preliminary Report
Order No. 804-8523

LEGAL DESCRIPTION

PARCEL ONE: PARCEL 1 OF PARCEL MAP 397, FILED APRIL 22, 1969, IN MAP BOOK 61, PAGE 1, OFFICIAL RECORDS OF SAID COUNTY.

EXCEPTING THEREFROM THAT PORTION DESCRIBED IN THE DEED TO THE CITY OF HAYWARD RECORDED OCTOBER 16, 1987, INSTRUMENT NO. 87-282649.

PARCEL TWO:

A NON-EXCLUSIVE EASEMENT FOR ALL PUBLIC I UTILITY PURPOSES IN, UNDER, OVER ALONG AND ACROSS THE FOLLOWING DESCRIBED PROPERTY:

A STRIP OF LAND LOCATED IN THE CITY OF HAYWARD, COUNTY OF ALAMEDA, STATE OF CALIFORNIA, AS FOLLOWS: THE NORTHERLY 0 FEET, RIGHT ANGLE MEASUREMENT, OF THE FOLLOWING DESCRIBED PARCEL OF LAND:

PARCEL 3 OF PARCEL MAP 397 FILED APRIL 22, 1969 IN MAP BOOK 61, PAGE 1, OFFICIAL RECORDS OF SAID COUNTY.

EXCEPTING THEREFROM THAT PORTION THEREOF LYING WITHIN ENTERPRISE AVENUE AND WHITESELL STREET.

PARCEL THREE:

A NON-EXCLUSIVE EASEMENT FOR INGRESS A EGRESS OVER, ALONG AND ACROSS THE FOLLOWING DESCRIBED PROPERTY:

A STRIP OF LAND LOCATED IN THE CITY OF HAYWARD, COUNTY OF ALAMEDA, STATE OF CALIFORNIA, AS FOLLOWS: THE NORTHERLY 0 FEET, RIGHT ANGLE MEASUREMENT, OF THE FOLLOWING DESCRIBED PROPERTY:

PARCEL 3 OF PARCEL MAP 397 FILED APRIL 22, 1969 IN MAP BOOK 61, PAGE 1, OFFICIAL RECORDS OF SAID COUNTY.

EXCEPTING THEREFROM THAT PORTION THEREOF LYING WITHIN ENTERPRISE AVENUE AND WHITESELL STREET.

PARCEL FOUR:

AN EXCLUSIVE EASEMENT FOR SEWER PURPOSES, IN, UNDER, ALONG AND ACROSS THE FOLLOWING PROPERTY:

A STRIP OF LAND LOCATED IN THE CITY OF HAYWARD, COUNTY OF ALAMEDA, STATE OF CALIFORNIA, AND BEING 10.00 IN WIDTH LYING 5.00 FEET ON EACH SIDE OF THE FOLLOWING DESCRIBED CENTERLINE:

COMMENCING AT A POINT ON THE SOUTHERN LINE OF THE 67.85 ACRE, MORE OR LESS, TRACT OF LAND DESCRIBED IN THE DEED FROM JOSE T. BAPTISTA TO M. B. BETTENCOURT AND TONY A. BETTENCOURT, DATED JANUAR15, 1924, AND RECORDED JANUARY 16, 1924,

LEGAL O CLTA Preliminory Report

Order No. 804-8523

LEGAL DESCRIPTION

IN BOOK 591 OF OFFICIAL RECORDS OF ALAMEDA COUNTY, PAGE 355, INSTRUMENT NO. T/88764, DISTANT ALONG SAID LINE NORTH 89 DEGREES 47 MINUTES 26 SECONDS WEST, (NORTH 89 DEGREES 47 MINUTES 26 SECONDS WEST BEING TAKEN AS THE BEARING OF SAID SOUTHERN LINE FOR THE PURPOSE OF MAKING THIS DESCRIPTION) 2904.34 FEET FROM THE WESTERN LINE OF CLAWITER ROAD OR COUNTY ROAD NO. 1649, 50 FEET IN WIDTH; AND RUNNING THENCE NORTH 1 DEGREES 57 MINUTES 58 SECONDS EAST 430.0 FEET TO A POINT, LAST SAID POINT BEING THE ACTUAL POINT OF BEGINNING OF THE PARCEL OF LAND TO BE DESCRIBED; THENCE NORTH 89 DEGREES 18 MINUTES 55 SECONDS WEST 74.0 FEET TO THE WESTERN LINE OF THE PARCEL OF LAND DESCRIBED IN THE AGREEMENT OF SALE TO C. E. FREEMAN COMPANY, A CALIFORNIA CORPORATION, DATED JANUARY 15, 1968, AND RECORDED APRIL 4, 1968, ON REEL 2156, IMAGE 834, INSTRUMENT NO. DA/36586, RECORDS OF ALAMEDA COUNTY.

A.P.N. 439-0099-036-02 AND 439-0099-035

EXCEPTIONS

At the date hereof exceptions to coverage in addition to the printed Exceptions and Exclusions in said policy form would be as follows: At the date hereof exceptions to coverage in addition to the printed Exceptions and Exclusions in said policy form would be as follows:

3. THE LIEN OF SUPPLEMENTAL TAXES, IF ANY, ASSESSED PURSUANT TO THE PROVISIONS OF CHAPTER 3.5, (COMMENCING WITH SECTION 75) OF THE REVENUE AND TAXATION CODE, OF THE STATE OF CALIFORNIA.

4. ANY ADVERSE CLAIM BASED UPON THE ASSERTION THAT SAID LAND OR ANY PART THEREOF IS NOW OR AT ANY TIME HAS BEEN INCLUDED WITHIN A RIVER, SLOUGH OR OTHER BODY OF WATER.

AFFECTS THAT PORTION LYING SOUTHWESTERLY OF THE SOUTHWESTERN BOUNDARY LINE
OF THE RANCHO ARROYO DE LA ALAMEDA (BOOK A OF PATENTS PAGE 62) (A.P.N. 439-99-35)

5. ANY RIGHTS BY THE UNION PACIFIC RAILROAD COMPANY, TO ANY PORTION OF THE HEREIN DESCRIBED PROPERTY, WHICH BOUNDARIES MAY BE DISCLOSED ON VARIOUS RAILROAD MAPS.

6. AN AGREEMENT RELATING TO BOUNDARY LINE, EXECUTED BY AND BETWEEN ANDRE PAPER BOX COMPANY, A CORPORATION, AND FRANCES MARSCANO HARRIS, ETAL UPON THE TERMS, COVENANTS, AND PROVISIONS CONTAINED THEREIN, RECORDED APRIL 20, 1962, SERIES NO. AT-52932, REEL 565, IMAGE 233, OFFICIAL RECORDS.

7. AN EASEMENT FOR THE PURPOSE SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS GRANTED IN A DOCUMENT IN FAVOR OF CITY OF HAYWARD FOR THE PURPOSE OF SEWER PIPE LINES. ALSO THE RIGHT OF INGRESS AND EGRESS. RECORDED OCTOBER 20, 1965, SERIES NO. AX-145329, REEL 1624, IMAGE 225, OFFICIAL RECORDS.

AFFECTS: PORTION OF PARCELS 2 AND 3

NO REPRESENTATION IS MADE AS TO THE CURRENT OWNERSHIP OF SAID EASEMENT.

8. AN EASEMENT FOR THE PURPOSE SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS RESERVED IN A DOCUMENT IN FAVOR OF DONALD E. FOSS, ET AL FOR THE PURPOSE OF PUBLIC UTILITY, RECORDED OCTOBER 24, 1968, SERIES NO. BA-115817, REEL 2276. IMAGE 665, OFFICIAL RECORDS.

AFFECTS: THE NORTHERN 10 FEET OF PARCEL 1

NO REPRESENTATION IS MADE AS TO THE CURRENT OWNERSHIP OF SAID EASEMENT.

9. AN EASEMENT FOR THE PURPOSE SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS RESERVED IN A DOCUMENT IN FAVOR OF DONALD E. FOSS, ET AL FOR THE PURPOSE OF INGRESS AND EGRESS, RECORDED OCTOBER 24, 1968, SERIES NO. BA-115817, REEL 2276, IMAGE 665, OFFICIAL RECORDS.

AFFECTS: THE NORTHERN 60 FEET OF PARCEL 1

NO REPRESENTATION IS MADE AS TO THE CURRENT OWNERSHIP OF SAID EASEMENT.

10. LEASE, DATED OCTOBER 31, 1968, BETWEEN NICK TOCCO, ET AL, AS LESSOR, AND ARGONAUT BROADCASTING CO., A CORPORATION, AS LESSEE, ON THE TERMS AND CONDITIONS CONTAINED THEREIN, RECORDED DECEMBER 10, 1968, REEL 2307, IMAGE 329 , OFFICIAL RECORDS.

TERM: 99 YEARS
WITH RENEWAL PROVISION: YES
WITH OPTION TO PURCHASE: YES

THE PRESENT OWNERSHIP OF THE LEASEHOLD CREATED BY SAID LEASE AND OTHER MATTERS AFFECTING THE INTEREST OF THE LESSEE ARE NOT SHOWN HEREIN.

11. DEED OF TRUST TO SECURE AN INDEBTEDNESS OF $1,750,000.00, DATED NOVEMBER
17, 1987, RECORDED DECEMBER 04, 1987, SERIES NO. 87-324120, OFFICIAL RECORDS.

TRUSTOR: SALEM BROADCASTING COMPANY, A CALIFORNIA GENERAL PARTNERSHIP
TRUSTEE: TRANSAMERICA TITLE INSURANCE COMPANY BENEFICIARY: VENTURA COUNTY NATIONAL BANK LOAN NO.: NONE SHOWN

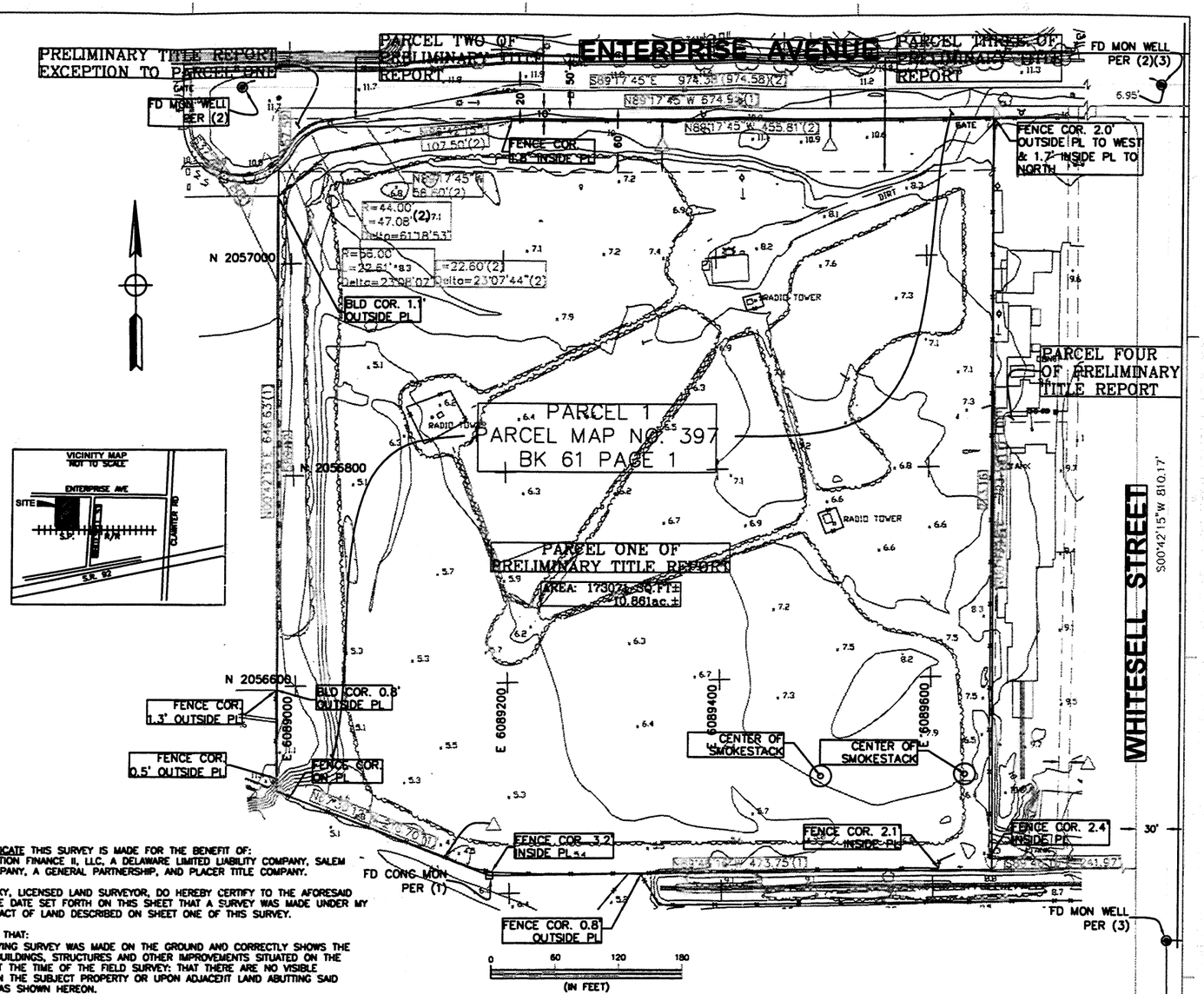
12. MATTERS WHICH MAY BE DISCLOSED BY AN INSPECTION OR BY A SURVEY OF SAID LAND THAT IS SATISFACTORY TO THIS COMPANY, OR BY INQUIRY OF THE PARTIES IN POSSESSION THEREOF.

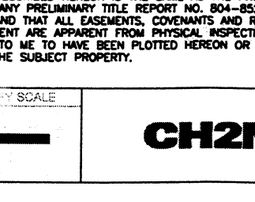
REFERENCES

(1) PARCEL MAP NO. 397 BOOK 61 - PAGE 1 A.C.R.

(2) CITY OF HAYWARD "SURVEY MONUMENTATION PLAT - ENTERPRISE AVENUE" FILE NO. I-138

(3) CITY OF HAYWARD "SURVEY MONUMENTATION PLAT - WHITESELL STREET EXTENSION" FILE NO. I-139





LEGEND:

BUILDING LINE	
PROPERTY LINE	
CENTERLINE/MONUMENTLINE	
EASEMENT LINE	
FENCE LINE	
MAP REFERENCE	(1)
EXCEPTION REFERENCE	△
FOUND CONCRETE MONUMENT AS NOTED	⊡
FOUND MONUMENT IN WELL AS NOTED	◉
ALAMEDA COUNTY RECORDS	A.C.R.
EXISTING DRAIN INLET	■
EXISTING FIRE HYDRANT	⊅
EXISTING POWER POLE	-o-

SURVEYOR'S CERTIFICATE THIS SURVEY IS MADE FOR THE BENEFIT OF: CALPINE CONSTRUCTION FINANCE II, LLC, A DELAWARE LIMITED LIABILITY COMPANY, SALEM BROADCASTING COMPANY, A GENERAL PARTNERSHIP, AND PLACER TITLE COMPANY.

I, SCOTT R. TIKALSKY, LICENSED LAND SURVEYOR, DO HEREBY CERTIFY TO THE AFORESAID PARTIES, AS OF THE DATE SET FORTH ON THIS SHEET THAT A SURVEY WAS MADE UNDER MY DIRECTION OF A TRACT OF LAND DESCRIBED ON SHEET ONE OF THIS SURVEY.

I FURTHER CERTIFY THAT:
1.) THE ACCOMPANYING SURVEY WAS MADE ON THE GROUND AND CORRECTLY SHOWS THE LOCATION OF ALL BUILDINGS, STRUCTURES AND OTHER IMPROVEMENTS SITUATED ON THE ABOVE PREMISES AT THE TIME OF THE FIELD SURVEY; THAT THERE ARE NO VISIBLE ENCROACHMENTS ON THE SUBJECT PROPERTY OR UPON ADJACENT LAND ABUTTING SAID PROPERTY EXCEPT AS SHOWN HEREON.

2.) THIS MAP OR PLAT AND THE SURVEY ON WHICH IT WAS BASED WERE MADE IN ACCORDANCE WITH "MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS", JOINTLY ESTABLISHED AND ADOPTED BY ALTA, ACSM AND NSPS IN 1999 AND INCLUDING ITEMS 2-4, 7(A), 7(B1), 8, 10, 11 (A), 13 AND 16 OF TABLE A THEREOF. PURSUANT TO THE ACCURACY STANDARDS AS ADOPTED BY ALTA, NSPS AND ACSM AND IN EFFECT ON THE DATE OF THIS CERTIFICATION, UNDERSIGNED FURTHER CERTIFIES THAT PROPER FIELD PROCEDURES, INSTRUMENTATION AND ADEQUATE SURVEY PERSONNEL WERE EMPLOYED IN ORDER TO ACHIEVE RESULTS COMPARABLE TO THOSE OUTLINED IN THE "MINIMUM ANGLE, DISTANCE AND CLOSURE REQUIREMENTS FOR SURVEY MEASUREMENTS WHICH CONTROL LAND BOUNDARIES FOR ALTA/ACSM LAND TITLE SURVEYS."

3. THE PROPERTY DESCRIBED HEREON IS THE SAME AS THE PROPERTY DESCRIBED IN PLACER TITLE COMPANY PRELIMINARY TITLE REPORT NO. 804-8523, ISSUED DECEMBER 22, 2000, AT 7:30AM, AND THAT ALL EASEMENTS, COVENANTS AND RESTRICTIONS REFERENCED IN SAID TITLE COMMITMENT ARE APPARENT FROM PHYSICAL INSPECTION OF THE SITE OR OTHERWISE KNOWN TO ME TO HAVE BEEN PLOTTED HEREON OR OTHERWISE NOTED AS TO THEIR EFFECT ON THE SUBJECT PROPERTY.

4. THE PROPERTY DESCRIBED HEREON IS LOCATED IN FLOOD MAP DESIGNATION ZONE C, AREAS OF MINIMAL FLOODING, AS SHOWN ON PANEL NO. 065033 0018 D OF THE FLOOD INSURANCE RATE MAPS, REVISED, FEBRUARY 19, 1986.

5. THE PROPERTY HAS DIRECT ACCESS TO A PUBLIC STREET OR HIGHWAY.

6. EXCEPT AS SHOWN, ALL UTILITIES SERVING THE THE SUBJECT PROPERTY ENTER THROUGH ADJOINING PUBLIC STREETS AND/OR EASEMENTS OF RECORD.

DATE:_____

SCOTT R. TIKALSKY LS 7608
EXPIRES 12/31/04

NOTES:

BENCH MARK: N 1370 - BRASS DISK SET IN THE N/E CORNER OF A CATCH BASIN AT THE N/E CORNER OF THE INTERSECTION OF CLAWITER ROAD AND WINTON AVENUE. THE ELEVATIONS ARE BASED ON THE NGVD DATUM OF 1929 AS PUBLISHED IN THE NGS DATA SHEET PID NO. HT2400. ELEVATION: 33.41 FEET NGVD29

BASIS OF BEARING: BEARINGS ON THIS MAP ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM, 1983, ZONE III (EPOCH 1991.35). THE BEARING, N89°17'45"W, IS A GRID INVERSE BETWEEN COORDINATES FOR THE TWO MONUMENTS FOUND ON ENTERPRISE AVENUE AS SHOWN ON THE CITY OF HAYWARD MAP TITLED "SURVEY MONUMENTATION PLAT - ENTERPRISE AVENUE" FILE NO. I-138. ALL COORDINATES AND DISTANCES ARE GRID VALUES. TO OBTAIN GROUND VALUES, DIVIDE THE GRID DISTANCES BY 0.99993069.

PRELIMINARY

VERIFY SCALE

CH2MHILL

ALTA/ACSM LAND TITLE SURVEY OF THE LANDS
DESCRIBED IN THE PRELIMINARY TITLE REPORT, ORDER No. 804-8523
ISSUED DECEMBER 22, 2000 BY PLACER TITLE COMPANY
CITY OF HAYWARD ALAMEDA COUNTY CALIFORNIA

Placer Title Company
CLTA Preliminary Report
Order No. 804-8525
Issued December 22, 2000, AT 7:30AM

The form of policy of title insurance contemplated by this report is:

ALTA Owners Policy
ALTA Lenders Policy 1992 Form

The estate or interest in the land hereinafter described or referred to covered by this Report is:

A FEE SIMPLE

Title to said estate or interest at the date hereof is vested in:

RUNNELS INDUSTRIES INC., A CALIFORNIA CORPORATION

The land referred to herein is described as follows:

THE LAND DESCRIBED HEREIN IS SITUATED IN THE STATE OF CALIFORNIA, COUNTY OF ALAMEDA, CITY OF HAYWARD, AND IS DESCRIBED AS FOLLOWS:

PARCEL ONE:

LOT 3, AS SHOWN ON PARCEL MAP NO. 397, FILED APRIL 22, 1969, SERIES NO. 69-44450 IN BOOK 61 OF PARCEL MAPS, PAGE 1.

EXCEPTING THEREFROM THAT PORTION THEREOF DESCRIBED IN THE DEED TO THE CITY OF HAYWARD, RECORDED APRIL 28, 1972, SERIES NO. 55813, REEL 3118, OR IMAGE 689.

PARCEL TWO:

A NON-EXCLUSIVE EASEMENT FOR ALL PUBLIC UTILITY PURPOSES OVER THE NORTHERN 10 FEET OF PROPERTY ADJOINING ON THE WEST, AND A NON-EXCLUSIVE EASEMENT FOR INGRESS AND EGRESS OVER THE NORTHERN 60 FEET OF SAID PROPERTY ADJOINING ON THE WEST, AS RESERVED IN THE DEED FROM DONALD E. FOSS, ET AL, RECORDED OCTOBER 21, 1968, REEL 2276, OFFICIAL RECORDS, IMAGE 655.

A.P.N.439-0099-003-07

EXCEPTIONS

At the date hereof exceptions to coverage in addition to the printed Exceptions and Exclusions in said policy form would be as follows:

3. RIGHTS OF THE PUBLIC AND OF THE COUNTY OF ALAMEDA, AS TO THAT PORTION OF THE HEREIN DESCRIBED PROPERTY LYING WITHIN ENTERPRISE AVENUE, A PUBLIC ROAD.

4. AN AGREEMENT RELATING TO BOUNDARY LINE, EXECUTED BY AND BETWEEN ANDRE PAPER BOX COMPANY, A CORPORATION, AND FRANCES MARSICANO HARRIS, ETAL, UPON THE TERMS, COVENANTS, AND PROVISIONS CONTAINED THEREIN, RECORDED APRIL 20, 1962, SERIES NO. AT-52932, REEL 565, IMAGE 233, OFFICIAL RECORDS.

5. AN EASEMENT FOR THE PURPOSE SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS GRANTED IN A DOCUMENT IN FAVOR OF CITY OF HAYWARD, A MUNICIPAL CORPORATION FOR THE PURPOSE OF SANITARY SEWER PIPE LINES AND INGRESS AND EGRESS, RECORDED OCTOBER 20, 1965, SERIES NO. AX-145329, REEL 1624, IMAGE 225, OFFICIAL RECORDS.

AFFECTS: A PORTION OF PREMISES

NO REPRESENTATION IS MADE AS TO THE CURRENT OWNERSHIP OF SAID EASEMENT.

6. AN EASEMENT FOR THE PURPOSE SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS GRANTED IN A DOCUMENT IN FAVOR OF CITY OF HAYWARD, A MUNICIPAL CORPORATION FOR THE PURPOSE OF PERPETUAL EASEMENT AND RIGHT-OF-WAY FOR THE PURPOSES OF A PUBLIC STREET, HIGHWAY OR SIDEWALK, OR FOR PUBLIC OR MUNICIPAL UTILITIES, NECESSITIES, FACILITIES, CONVENIENCES OR APPURTENANCES, RECORDED APRIL 12, 1966, SERIES NO. AY-47113, REEL 1747, IMAGE 109, OFFICIAL RECORDS.

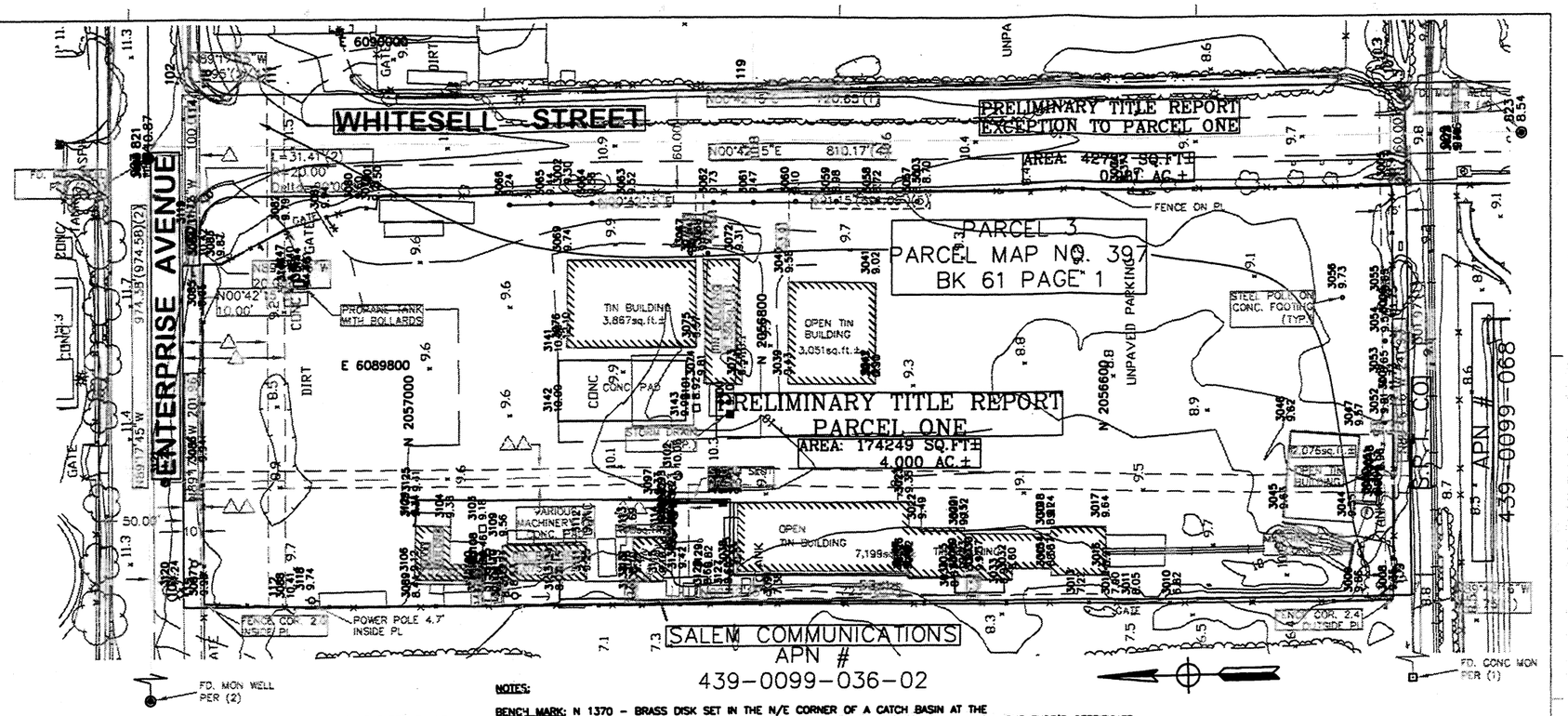
AFFECTS: NORTHERLY PORTION

NO REPRESENTATION IS MADE AS TO THE CURRENT OWNERSHIP OF SAID EASEMENT.

7. THE FOLLOWING AS DISCLOSED BY AGREEMENT RECORDED APRIL 4, 1968, REEL 2156, IMAGE 834

BUYER AGREES TO GRANT PROPOSED 15 FOOT EASEMENT TO SOUTHERN PACIFIC RAILWAY ALONG SOUTHERN BOUNDARY OF PARCEL FOR RAIL CONSTRUCTION.

BUYER AGREES TO GRANT 50 FOOT RIGHT-OF-WAY ALONG NORTHERN BOUNDARY OF PROPERTY AND 10 FOOT WIDE SANITARY SEWER EASEMENT.



NOTES:

BENCH MARK: N 1370 - BRASS DISK SET IN THE N/E CORNER OF A CATCH BASIN AT THE N/E CORNER OF THE INTERSECTION OF CLAWITER ROAD AND WINTON AVENUE. THE ELEVATIONS ARE BASED ON THE NGVD DATUM OF 1929 AS PUBLISHED IN THE NGS DATA SHEET PID NO. HT2400.
ELEVATION: 33.41 FEET NGVD29

BASIS OF BEARING: BEARINGS ON THIS MAP ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM, 1983, ZONE III (EPOCH 1991.35). THE BEARING, N89°17'45"W, IS A GRID INVERSE BETWEEN COORDINATES FOR THE TWO MONUMENTS FOUND ON ENTERPRISE AVENUE AS SHOWN ON THE CITY OF HAYWARD MAP TITLED "SURVEY MONUMENTATION PLAT - ENTERPRISE AVENUE" FILE NO. I-138. ALL COORDINATES AND DISTANCES ARE GRID VALUES. TO OBTAIN GROUND VALUES, DIVIDE THE GRID DISTANCES BY 0.99993069.

LEGEND:

BUILDING LINE
PROPERTY LINE
CENTERLINE/MONUMENTLINE
EASEMENT LINE
FENCE LINE
MAP REFERENCE (1)
EXCEPTION REFERENCE △
FOUND CONCRETE MONUMENT AS NOTED ⊡
FOUND MONUMENT IN WELL AS NOTED ◉
ALAMEDA COUNTY RECORDS A.C.R.
EXISTING DRAIN INLET ■
EXISTING FIRE HYDRANT
EXISTING POWER POLE
EXISTING SEWER MANHOLE

0 40 80 120
(IN FEET)

REFERENCES

(1) PARCEL MAP NO. 397 BOOK 61 - PAGE 1 A.C.R.

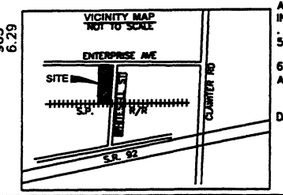
(2) CITY OF HAYWARD "SURVEY MONUMENTATION PLAT - WHITESELL STREET EXTENSION" FILE NO. I-139

(3) PARCEL MAP NO. 3189 BOOK 121 - PAGE 22 A.C.R.

(4) CITY OF HAYWARD "SURVEY MONUMENTATION PLAT - WHITESELL STREET EXTENSION" FILE NO. I-138

(5) REAL: 3118 OFFICIAL RECORDS, IMAGE: 692, A.C.R.

VICINITY MAP
NOT TO SCALE



905
6.29

△ UNRECORDED LEASE AGREEMENT DATED DECEMBER 10, 1965 UPON THE TERMS AND PROVISIONS CONTAINED THEREIN AS DISCLOSED BY INSTRUMENT RECORDED APRIL 4, 1968, REEL 2156, IMAGE 834.

△ AN EASEMENT FOR THE PURPOSE SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS GRANTED IN A DOCUMENT IN FAVOR OF ALICE F. LANE, ETAL FOR THE PURPOSE OF PUBLIC UTILITY, RECORDED APRIL 09, 1969, SERIES NO. 69-38936, REEL 2379, IMAGE 582, OFFICIAL RECORDS.

AFFECTS: THE NORTH 10 FEET OF PREMISES

NO REPRESENTATION IS MADE AS TO THE CURRENT OWNERSHIP OF SAID EASEMENT.

△10 AN EASEMENT FOR THE PURPOSE SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS GRANTED IN A DOCUMENT IN FAVOR OF ALICE F. LANE, ET AL FOR THE PURPOSE OF INGRESS AND EGRESS, RECORDED APRIL 09, 1969, SERIES NO. 69-38937, REEL 2379, IMAGE 585, OFFICIAL RECORDS.

AFFECTS: THE NORTH 60 FEET OF PREMISES

NO REPRESENTATION IS MADE AS TO THE CURRENT OWNERSHIP OF SAID EASEMENT.

△11 AN EASEMENT FOR THE PURPOSE SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS GRANTED IN A DOCUMENT IN FAVOR OF ALICE F. LANE, ET AL FOR THE PURPOSE OF SEWER, RECORDED APRIL 09, 1969, SERIES NO. 69-38938, REEL 2379, IMAGE 588, OFFICIAL RECORDS.

AFFECTS: PORTION OF PREMISES

NO REPRESENTATION IS MADE AS TO THE CURRENT OWNERSHIP OF SAID EASEMENT.

△12 MANHOLE EASEMENT AS SHOWN ON THE MAP OF RECORD. (AFFECTS A PORTION OF PREMISES)

13. TERMS AND PROVISIONS OF AN UNRECORDED DECLARATION FOR THE EXTENSION OF ENTERPRISE AVENUE 968 FEET WESTERLY FROM ITS PRESENT TERMINUS AS DISCLOSED BY RESOLUTION RECORDED OCTOBER 16, 1987, INSTRUMENT NO. 87-282648.

14. MATTERS WHICH MAY BE DISCLOSED BY AN INSPECTION OR BY A SURVEY OF SAID LAND THAT IS SATISFACTORY TO THIS COMPANY, OR BY INQUIRY OF THE PARTIES IN POSSESSION THEREOF.

NOTE: THIS COMPANY WILL REQUIRE THE FOLLOWING TO INSURE A LOAN BY OR A CONVEYANCE FROM THE VESTEE CORPORATION NAMED HEREIN:

(A) A COPY OF THE CORPORATION BY-LAWS OR ARTICLES.
(B) AN ORIGINAL OR CERTIFIED COPY OF THE RESOLUTION AUTHORIZING THE SUBJECT TRANSACTION.

805
11.82

SURVEYOR'S CERTIFICATE

THIS SURVEY IS MADE FOR THE BENEFIT OF:
CALPINE CONSTRUCTION FINANCE II, LLC, A DELAWARE LIMITED LIABILITY COMPANY, RUNNELS INDUSTRIES, INC., A CALIFORNIA CORPORATION, AND PLACER TITLE COMPANY.

I, SCOTT R. TIKALSKY, LICENSED LAND SURVEYOR, DO HEREBY CERTIFY TO THE AFORESAID PARTIES, AS OF THE DATE SET FORTH ON THIS SHEET THAT A SURVEY WAS MADE UNDER MY DIRECTION OF A TRACT OF LAND DESCRIBED ON SHEET ONE OF THIS SURVEY.

I FURTHER CERTIFY THAT:
1.) THE ACCOMPANYING SURVEY WAS MADE ON THE GROUND AND CORRECTLY SHOWS THE LOCATION OF ALL BUILDINGS, STRUCTURES AND OTHER IMPROVEMENTS SITUATED ON THE ABOVE PREMISES AT THE TIME OF THE FIELD SURVEY; THAT THERE ARE NO VISIBLE ENCROACHMENTS ON THE SUBJECT PROPERTY OR UPON ADJACENT LAND ABUTTING SAID PROPERTY EXCEPT AS SHOWN HEREON.

2.) THIS MAP OR PLAT AND THE SURVEY ON WHICH IT WAS BASED WERE MADE IN ACCORDANCE WITH "MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS", JOINTLY ESTABLISHED AND ADOPTED BY ALTA, ACSM AND NSPS IN 1999 AND INCLUDING ITEMS 2-4, 7(A), 7(B1), 8, 10, 11 (A), 13 AND 16 OF TABLE A THEREOF. PURSUANT TO THE ACCURACY STANDARDS AS ADOPTED BY ALTA, NSPS AND ACSM AND IN EFFECT ON THE DATE OF THIS CERTIFICATION, UNDERSIGNED FURTHER CERTIFIES THAT PROPER FIELD PROCEDURES, INSTRUMENTATION AND ADEQUATE SURVEY PERSONNEL WERE EMPLOYED IN ORDER TO ACHIEVE RESULTS COMPARABLE TO THOSE OUTLINED IN THE "MINIMUM ANGLE, DISTANCE AND CLOSURE REQUIREMENTS FOR SURVEY MEASUREMENTS WHICH CONTROL LAND BOUNDARIES FOR ALTA/ACSM LAND TITLE SURVEYS."

3. THE PROPERTY DESCRIBED HEREON IS THE SAME AS THE PROPERTY DESCRIBED IN PLACER TITLE COMPANY PRELIMINARY TITLE REPORT NO. 804-8525, ISSUED DECEMBER 22, 2000, AT 7:30AM, BY PLACER TITLE COMPANY AND THAT ALL EASEMENTS, COVENANTS AND RESTRICTIONS REFERENCED IN SAID TITLE COMMITMENT ARE APPARENT FROM PHYSICAL INSPECTION OF THE SITE OR OTHERWISE KNOWN TO ME TO HAVE BEEN PLOTTED HEREON OR OTHERWISE NOTED AS TO THEIR EFFECT ON THE SUBJECT PROPERTY.

4. THE PROPERTY DESCRIBED HEREON IS LOCATED IN FLOOD MAP DESIGNATION ZONE C, AREAS OF MINIMAL FLOODING, AS SHOWN ON PANEL NO. 065033 0018 D OF THE FLOOD INSURANCE RATE MAPS, REVISED, FEBRUARY 19, 1986.

5. THE PROPERTY HAS DIRECT ACCESS TO A PUBLIC STREET OR HIGHWAY.

6. EXCEPT AS SHOWN, ALL UTILITIES SERVING THE THE SUBJECT PROPERTY ENTER THROUGH ADJOINING PUBLIC STREETS AND/OR EASEMENTS OF RECORD.

DATE:_____

SCOTT R. TIKALSKY LS 7608
EXPIRES 12/31/04

PRELIMINARY

62

VERIFY SCALE

CH2MHILL

ALTA/ACSM LAND TITLE SURVEY OF THE LANDS
DESCRIBED IN THE PRELIMINARY TITLE REPORT, ORDER No. 804-8525
ISSUED JANUARY 08, 2001 BY PLACER TITLE COMPANY
CITY OF HAYWARD ALAMEDA COUNTY CALIFORNIA

Russell City Energy Center

Appendix 1-A
Legal Description of the RCEC Site

May 2001

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 1-B
Owners Adjacent to the Site and Linear Corridors

May 2001

Russell City Energy Center AFC

May 2001

Property Owners Adjacent to the Site and Linear Corridors

438 0080 006 02
CITY OF HAYWARD
22300 FOOTHILL BLVD
HAYWARD, CA 94541

438 0080 006 03
CITY OF HAYWARD
22300 FOOTHILL BLVD
HAYWARD, CA 94541

438 0080 013 04
WASTE MANAGEMENT OF CALIFORNIA
19600 FAIRCHILD #350
IRVINE, CA 92612

438 0080 013 06
CITY OF HAYWARD
22300 FOOTHILL BLVD
HAYWARD, CA 94541

438 0080 013 07
CITY OF HAYWARD
22300 FOOTHILL BLVD
HAYWARD, CA 94541

438 0080 013 08
STATE OF CALIFORNIA & CITY OF
BUSH LN
HAYWARD, CA 94545

439 0070 001 01
Hans Kruger
22958 SAKLAN RD
HAYWARD, CA 94545

439 0070 002 00
Hans Kruger
22958 SAKLAN RD
HAYWARD, CA 94545

439 0070 003 00
Ruben P Dorris
3696 DEPOT RD
HAYWARD, CA 94545

439 0070 004 00
Paul R Dorris
3720 DEPOT RD
HAYWARD, CA 94545

439 0070 005 01
Baryalan;Feroz Masood Feroz
3744 DEPOT RD
HAYWARD, CA 94545

439 0070 005 02
Ghulam & Najeeba N Rabani
3090 WOLSEY PL
FREMONT, CA 94555

439 0070 006 00
Ethel J Lutschan
19157 PARSONS AVE
CASTRO VALLEY, CA 94546

439 0070 008 04
J & M INC
PO BOX 128
HAYWARD, CA 94543

439 0070 008 06
Robert L & Thomas W Spinardi
23294 CONNECTICUT ST
HAYWARD, CA 94545

439 0070 009 00
Jon R Eash
3862 DEPOT RD
HAYWARD, CA 94545

439 0075 009 02
Institutional Alliance Fund I Amb
2235 FARADAY AVE #O
CARLSBAD, CA 92008

439 0075 010 02
Linda M & Judith Mullens
3508 DEPOT RD
HAYWARD, CA 94545

439 0075 012 00
Barry M Gallagher
1 KAISER PLZ #480
OAKLAND, CA 94612

439 0075 013 02
Barry M Gallagher
1 KAISER PLZ #480
OAKLAND, CA 94612

439 0075 069 02
Institutional Alliance Fund I Amb
2235 FARADAY AVE #O
CARLSBAD, CA 92008

439 0080 003 07
GILLIG CORPORATION
25800 CLAWITER RD
HAYWARD, CA 94545

439 0080 003 09
GILLIG CORPORATION
25800 CLAWITER RD
HAYWARD, CA 94545

439 0080 003 10
GILLIG CORPORATION
25800 CLAWITER RD
HAYWARD, CA 94545

439 0080 003 12
GILLIG CORPORATION
25800 CLAWITER RD
HAYWARD, CA 94545

439 0080 003 14
BERKELEY FARM INC
4550 SAN PABLO AVE
EMERYVILLE, CA 94608

439 0080 013 02
PRUDENTIAL INSURANCE COMPANY
505 14TH ST #460
OAKLAND, CA 94612

439 0080 014 02
PRUDENTIAL INSURANCE COMPANY
505 14TH ST #460
OAKLAND, CA 94612

439 0080 015 02
PRUDENTIAL INSURANCE COMPANY
505 14TH ST #460
OAKLAND, CA 94612

439 0080 016 00
PRUDENTIAL INSURANCE COMPANY
505 14TH ST #460
OAKLAND, CA 94612

439 0080 017 00
PRUDENTIAL INSURANCE COMPANY
505 14TH ST #460
OAKLAND, CA 94612

439 0080 018 00
PRUDENTIAL INSURANCE COMPANY
505 14TH ST #460
OAKLAND, CA 94612

439 0080 019 00
PRUDENTIAL INSURANCE COMPANY
505 14TH ST #460
OAKLAND, CA 94612

439 0080 020 00
Ann M Nejasmich
3108 DIABLO AVE
HAYWARD, CA 94545

439 0098 001 00
R A & Alissa L Haderer
3449 ENTERPRISE AVE
HAYWARD, CA 94545

439 0098 002 00
Oscar & Lydia Bueno
25589 SEABOARD LN
HAYWARD, CA 94545

439 0098 003 00
DPA ASSOCIATES
90 TOBIN CLARK DR
HILLSBOROUGH, CA 94010

439 0098 004 00
Steven R Allington
4348 HEYER AVE
CASTRO VALLEY, CA 94546

439 0098 005 00
Ehud & Eileen V Kirschner
528 OAKSHIRE PL
ALAMO, CA 94507

439 0098 006 00
Dorothy M Foster
25546 SEABOARD LN
HAYWARD, CA 94545

439 0098 007 00
Sheila H Siegel
25568 Seaboard Lane
Hayward, CA 94545

439 0098 008 00
Ronald L;Kilpatrick Kathryn Stern
20 WARMWOOD WAY
HILLSBOROUGH, CA 94010

439 0098 009 00
Gary Patigler
2164 BLUEJAY CIR
PINOLE, CA 94564

439 0098 010 00
MANUFACTURERS EQUIPMENT COMPAN
1313 SANDERLING IS
POINT RICHMOND, CA 94801

439 0098 011 00
Lillian & Schneider David Freeman
208 BELHAVEN CIR
SANTA ROSA, CA 95409

439 0098 012 00
Gerard W Dowd
1835 PORTOLA RD
WOODSIDE, CA 94062

439 0099 001 06
YELLOW FREIGHT SYSTEM INC
10990 ROE AVE
OVERLAND PARK, KS 66211

439 0099 002 00
CITY OF HAYWARD
22300 FOOTHILL BLVD
HAYWARD, CA 94541

439 0099 003 07
RUNNELS INDUSTRIES INC
3590 ENTERPRISE AVE
HAYWARD, CA 94545

439 0099 004 14
TUSCARORA INCORPORATED
800 5TH AVE
NEW BRIGHTON, PA 15066

439 0099 004 15
TUSCARORA INCORPORATED
800 5TH AVE
NEW BRIGHTON, PA 15066

439 0099 004 19
Patrick J Monaghan
3440 ENTERPRISE AVE
HAYWARD, CA 94545

439 0099 005 07
Alfred D & Jean C Lawson
301 BRENTWOOD AVE
SAN FRANCISCO, CA 94127

439 0099 019 00
John M Malcom
3503 BREAKWATER CT
HAYWARD, CA 94545

439 0099 032 00
CRANBROOK REALTY
INVESTMENT FU
2020 STANDIFORD AVE #E2
MODESTO, CA 95350

439 0099 034 02
PARKER VENTURES LTD
LIABILITY
433 N CAMDEN DR #1070
BEVERLY HILLS, CA 90210

439 0099 035 00
SALEM BROADCASTING
COMPANY
4880 SANTA ROSA RD #300
CAMARILLO, CA 93012

439 0099 036 01
CITY OF HAYWARD
22300 FOOTHILL BLVD
HAYWARD, CA 94541

439 0099 036 02
SALEM BROADCASTING
COMPANY
4880 SANTA ROSA RD #300
CAMARILLO, CA 93012

439 0099 037 01
Manuel L Barbosa
PO BOX 56802
HAYWARD, CA 94545

439 0099 037 02
Manuel L & Phyllis J Barbosa
4520 VALLEY ST
FREMONT, CA 94538

439 0099 038 01
Patrick J Monaghan
3440 ENTERPRISE AVE
HAYWARD, CA 94545

439 0099 038 03
Patrick J Monaghan
3450 ENTERPRISE AVE
HAYWARD, CA 94545

439 0099 045 01
Carl E & Pamela Bowker
1212 MURCHISON DR
MILLBRAE, CA 94030

439 0099 046 00
PANRESOURCES
INTERNATIONAL INC
2462 WYANDOTTE ST
MOUNTAIN VIEW, CA 94043

439 0099 047 00
Sam & Terry M Portillo
4040 SUGAR MAPLE DR
DANVILLE, CA 94506

439 0099 051 00
Joe & Denis Vandera
3500 ENTERPRISE AVE
HAYWARD, CA 94545

439 0099 052 00
Joe & Denis Vandera
3500 ENTERPRISE AVE
HAYWARD, CA 94545

439 0099 064 01
R D Young
71 ATHERTON AVE
ATHERTON, CA 94027

439 0099 065 00
Robert J Jr Vanier
10345 CULL CANYON RD
CASTRO VALLEY, CA 94552

439 0099 066 00
Robert J Jr Vanier
3453 ENTERPRISE AVE
HAYWARD, CA 94545

439 0099 067 00
WXI/AJP REAL ESTATE LIMITED
PA
2235 FARADAY AVE #O
CARLSBAD, CA 92008

439 0099 068 00
WXI/AJP REAL ESTATE
LIMITED PA
2235 FARADAY AVE #O
CARLSBAD, CA 92008

439 0099 073 00
SPIEKER PROPERTIES
1255 TREAT BLVD #150
WALNUT CREEK, CA 94596

439 0099 075 00
SPIEKER PROPERTIES LP
1255 TREAT BLVD #150
WALNUT CREEK, CA 94596

439 0099 076 00
CRANBROOK REALTY
INVESTMENT FU
2020 STANDIFORD AVE #E2
MODESTO, CA 95350

439 0099 077 00
SPIEKER PROPERTIES
1255 TREAT BLVD #150
WALNUT CREEK, CA 94596

439 0100 001 00
ENTERPRISE AVENUE
ASSOCIATES L
27900 VIA VENTANA
LOS ALTOS HILLS, CA 94022

439 0100 002 00
Chiun M & George L Tong
48812 DEER VIEW TER
FREMONT, CA 94539

439 0100 003 00
Glenn Ullom
9 BRYN MAWR CT
SAN RAMON, CA 94583

439 0100 004 00
A M Daw
3559 GREENWOOD AVE
LOS ANGELES, CA 90040

439 0100 005 02
ORLIMAR GOLF COMPANY
30826 SANTANA ST
HAYWARD, CA 94544

439 0100 006 02
Dean L & Shirley A Schenone
5682 SAN LUIS CT
PLEASANTON, CA 94566

439 0100 007 00
Richard & Susan Mendell
25652 NICKEL PL
HAYWARD, CA 94545

439 0100 008 00
Mark Tr & Kenith A Goodman
5617 SLOAN PL
CALABASAS, CA 91302

439 0100 009 00
D J & Rhonda G Frank
25616 NICKEL PL
HAYWARD, CA 94545

439 0100 010 00
Steve K Sr & Doris S Owen
1530 VISTA GRAND DR
SAN LEANDRO, CA 94577

441 0045 005 04
MOUNT EDEN NURSERY
COMPANY
PO BOX 936
MOUNTAIN VIEW, CA 94042

461 0001 026 00
M Jr & Joyce C Hart
3486 INVESTMENT BLVD
HAYWARD, CA 94545

461 0001 027 00
Joachim & Johann Wiest
3122 JORDAN RD
OAKLAND, CA 94602

461 0001 028 00
FOSTER ENTERPRISES &
FOSTER RI
400 S EL CAMINO REAL #1400
SAN MATEO, CA 94402

461 0001 029 01
CUSTOM LABELS
INCORPORATED
3392 INVESTMENT BLVD
HAYWARD, CA 94545

461 0001 046 00
P G & E CO 135-1-58D-1
PO BOX 770000
SAN FRANCISCO, CA 94177

461 0001 048 00
P G & E CO 135-1-58C-1
PO BOX 770000
SAN FRANCISCO, CA 94177

461 0060 009 00
STATE OF CALIFORNIA
801 K ST #806
SACRAMENTO, CA 95814

461 0085 001 07
STATE OF CALIFORNIA
EDEN LANDING RD
HAYWARD, CA 94545

461 0085 001 08
Rajinderpal S & Maskeen K
Sabharwal
3550 MOWRY AVE #102
FREMONT, CA 94538

461 0085 016 00
PACIFIC GULF PROPERTIES
INC
2235 FARADAY AVE #O
CARLSBAD, CA 92008

461 0085 017 00
PACIFIC GULF PROPERTIES INC
2235 FARADAY AVE #O
CARLSBAD, CA 92008

461 0085 018 03
CALWEST INDUSTRIAL
PROPERTIES
3521 Investment Bl
Hayward, CA 94545

461 0085 021 00
Thomas R & Kathleen A White
2023 OAKLAND AVE
PIEDMONT, CA 94611

461 0085 025 00
HAYWARD POINT EDEN I
LIMITED P
1939 HARRISON ST #715
OAKLAND, CA 94612

Russell City Energy Center

Appendix 1-C
City of Hayward Letter Regarding RCEC Architectural Design Concept

May 2001

Russell City Energy Center AFC

May 2001

CITY OF
HAYWARD
HEART OF THE BAY

May 14, 2001

Mr. William I. Toman
Calpine-Bechtel Joint Development
6700 Koll Center Parkway
Suite 200
Pleasanton, California 94566

SUBJECT: RUSSELL CITY ENERGY CENTER ARCHITECTURAL TREATMENT

Dear Mr. Toman:

Thank you for presenting Calpine-Bechtel's proposed architectural treatment for the Russell City Energy Center to the citizens and City Council of Hayward at the workshop held on April 17, 2001. The architectural designs for the power plant that the Hillier Group developed each reflect a very creative approach to building screen design.

The general consensus at the meeting was that some kind of architectural treatment is both desirable and appropriate for the Russell City Energy Center and that Calpine-Bechtel is moving in the right direction with your plans for architectural treatment. The specific design that you have indicated you wish to propose as the preferred treatment, and known as the "wave" design, was endorsed by several members of the City Council and the public at the meeting. The City is supportive of Calpine-Bechtel's efforts in this direction. We are also very appreciative of the collaborative approach that you have taken during the project development process. The architectural screening workshop was an example of Calpine-Bechtel informing and involving the Hayward community in a key project decision.

The City will continue to work with Calpine-Bechtel to develop the best possible architectural design for all concerned.

Sincerely,

Jesús Armas
City Manager

OFFICE OF THE CITY MANAGER
777 B STREET, HAYWARD, CA 94541-5007
TEL: 510/583-4300 • FAX: 510/583-3601 • TDD: 510/247-3340

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 1-D
Persons who Prepared the AFC

May 2001

Russell City Energy Center AFC

May 2001

APPENDIX 1D
LIST OF CONTRIBUTORS

Affiliation	Name	Responsibility
Calpine-Bechtel Joint Development	James R. Leahy	Development Manager
	James M. Dunstan, P.E.	Senior Technical Advisor
	Peter Mason, Ph.D., CEP	Senior Project Engineer
	Wayne Icenhower	Senior Project Engineer
	Chak Srinivasan	Senior Project Engineer
	Richard R. Stanley, P.E.	Senior Project Engineer
Argonaut Consulting	Andrea Grenier	Environmental Manager
Foster Wheeler Environmental Corporation	Douglas Davy, Ph.D.	AFC Project Manager
	Thomas Adams	Noise
	Jennifer Amdursky, P.E.	Waste Management, Hazardous Materials Handling, Phase I Assessment
	Monica Caravati	Public Health
	Dean Carrier	Wildlife Biology
	Chris DiDio	Geographic Information Systems
	David Dirkin	Geological Resources, Soils
	Andrew Gorman	Cultural Resources
	Brett Hartman	Wetlands and Botanical Resources
	Wendy Hill	Technical Editor
	Tamer Kirac	Traffic and Transportation
	Roger Margotto	Worker Health and Safety
	Brent Moore	Traffic and Transportation
	Court Morgan	Land Use, Traffic and Transportation
	Jennifer Nachmanoff	Cultural Resources
	Craig Rice	Water Resources
	Dean Sedlachek	Phase I Assessment
	Tom Stewart, Ph.D.	Paleontology
	Josh Teigiser	Land Use, Traffic and Transportation
	Douglas Urry	Assistant Project Manager, Waste Management, Hazardous Materials Handling
	Bradley Wheeler	Geographic Information Systems
CH2M Hill	David Richardson	Water supply
	Laura Harnish	Water supply
	Priya Patel	Water Supply
Commonwealth Associates Incorporated	Steve Miller	Transmission Engineering
	Joel Schaeffer	Transmission Engineering

APPENDIX 1D
LIST OF CONTRIBUTORS

Affiliation	Name	Responsibility
Ellison, Schneider, and Harris	Jeff Harris, Esq. Gregg Wheatland, Esq.	Attorney Attorney
Environmental Vision	Marsha Gale Chuck Cornwall	Visual simulation Visual simulation
Harza Engineering	Thomas Priestley, Ph.D., AICP	Visual Resources
The Hillier Group	David Finci, AIA Paul Stocks	Architectural Design Architectural Design
Kris Helm	Kris Helm	Water Supply
Hessler Associates, Inc.	David Hessler	Noise modeling
RTP Environmental	Greg Darvin Rick Booth Bill Corbin Rick Graw	Air Quality
Sierra Research	Mark Valdez	Air Quality
Trident Engineering	John Rich	Natural Gas Transmission
Utility System Efficiency	Dan Wood	Transmission Engineering

Russell City Energy Center

Appendix 5-A
PG&E Route Evaluation Study for the Natural Gas Pipeline

May 2001

Russell City Energy Center AFC

May 2001

Pacific Gas and Electric Company
77 Beale Street
San Francisco, CA 94105
Mailing Address
Mail Code B16A
P.O. Box 770000
San Francisco, CA 94177
415/973-7000

Via Mail & Fax

March 29, 2001

Mr. Chad Driskill
Calpine Corporation
6700 Koll Center Parkway, Suite 200
Pleasanton, CA 94566

Subject: Calpine/Bechtel Joint Venture – Russell Energy Center

Dear Mr. Driskill:

On March 1, 2001, Pacific Gas and Electric Company (PG&E) received from Calpine Corporation and Bechtel (Applicant) a request for Preliminary Application for Service for gas service for the proposed Russell Energy Center (Facility) to be located near the intersection of Whitsell Street and Enterprise Avenue, in Hayward, California. PG&E now provides Applicant with results of its Preliminary Application for Service. For the purpose of this study, PG&E based its review upon natural gas service for a maximum load of 4000 MMBtu/hr at the requested Facility. It is assumed that the proposed Facility will require natural gas service throughout the year, and that gas will be required by June of 2003.

Any future changes to the service requirements for the Facility or PG&E's system prior to commencement of service to the currently proposed Facility may impact these results.

Gas Service from PG&E's Line 153

PG&E's Standard Facility Design for prevailing service delivery pressure is to tap PG&E's Line 153 near the intersection of Depot Road and Clawiter Road and install approximately 4,800 feet of 10-inch service line to Applicant's proposed Facility. PG&E estimates a prevailing service delivery pressure of approximately 120 psig downstream of the meter set. PG&E will provide an elevated delivery pressure of approximately 250 psig by installing 4,800 feet of 16-inch gas service pipeline from PG&E's Line 153 to the proposed Facility.

Route Descriptions:

PG&E's preferred route would tap into PG&E's Line 153 near the intersection of Depot Road and Clawiter Road, and proceed west to the X-Tra Lease property at 3600 Depot Road. The route would then turn south across private property along the east property line to Enterprise Avenue, and then proceed west to Whitsell Drive, then south approximately 600 feet on Whitsell Drive to the Facility.

PG&E has identified several possible alternatives to this preferred option, which are included on the attached map. Please be aware that as PG&E proceeds with engineering this project, PG&E's preferred route may change.

Costs:

PG&E has determined that cost allocation for this project will be under the provisions of PG&E's Rules 2, 15 and 16. Costs are order of magnitude estimates of +/- 50%. A summary table is provided below, and a brief description follows:

Applicant's Estimated Costs for Standard Facilities Design:

Standard Facilities at prevailing service delivery pressure from PG&E's Line 153	**Total**
a. 200 feet of 10-inch steel service pipe extension	$39,000
b. Ultrasonic meter set	$801,000
f. ITCC (35% of a., and b.)	$294,000
Total cost to Applicant for Standard Delivery Service:	**$1,134,000**

Applicant's Estimated Costs for Elevated Service Delivery Pressure

Special Facilities costs for Elevated Service Delivery Pressure from PG&E's Line 153:	**Total**
a. 4,800 feet of 16-inch steel service pipe (incremental)	$386,000
b. ITCC (35% of a.)	$135,000
c. Cost-of-Ownership charges, Equivalent One-Time Payment option (on a.)	$254,000
Total Special Facilities costs for service at Elevated Service Delivery Pressure:	**$775,000**
Total Cost to Applicant for Standard plus Special Facilities costs for service at Elevated Service Delivery Pressure:	**$1,909,000**

Standard Facilities at Prevailing Service Delivery pressure from PG&E's Line 153:

The costs do not include land right acquisition.

Allocation of costs to Applicant to provide Standard Facilities at Prevailing Service Delivery pressure to the Facility from PG&E's Line 153 are estimated to be $840,000. ITCC is estimated to be $294,000, for a total cost of $1,134,000.

Special Facilities at Elevated Delivery Pressure.

Allocation of costs to Applicant to provide Elevated Service Delivery pressure to the Facility from PG&E's Line 153 are estimated to be $386,000 for incremental costs. ITCC is estimated to be $135,000, Cost-of-Ownership of $254,000 for a total Special Facilities cost of $775,000. The total cost for Special Facilities elevated service delivery pressure option is $1,909,000.

Next Steps:

PG&E now provides Applicant with requirements for the next step in the gas connection process.

Applicant should submit to PG&E a Final Application for Gas Service. The application should include the following:

- A written request for Final Application for Gas Service
- An updated Cogen / Power Plant Interconnection Information Sheet
- The gas service delivery option selected
- The estimated annual gas usage of proposed Facility
- A site map of the Facility with the meter set location identified
- Confirmation of Applicant's preferred gas service pipeline connection option to include route and diameter of pipeline
- A cash advance of $100,000 for a Standard Delivery Pressure Option, or $125,000 for an Elevated Service Delivery Pressure Option

This cash advance is to initiate, not complete, the engineering required to develop the project to a point where PG&E can proceed with construction. The total costs for this phase will be determined as PG&E proceeds with detailed engineering and land work; however, based on previous projects of this

magnitude, PG&E estimates the cost to be approximately 7 ½ percent of the total project cost, but does not include the cost of long lead-time material. This does not include purchase of long lead-time items, nor land acquisition for easements and rights-of-way.

The work that is required prior to construction is to:

- Survey and develop the selected route
- Develop construction drawings
- Negotiate easements and rights-of-way
- Finalize pipeline route
- Develop detailed job estimate, including meter set design
- Obtain final job approval
- Identify and order long lead-time material

PG&E will request additional funds to continue this phase of work as the job progresses by providing Applicant with a cost advance payment schedule as the engineering progresses. Should Applicant fail to provide cost advances as requested, PG&E will stop work. If the work does not proceed, the unused balance of the cash advance, if any, will be returned to Applicant.

Please forward the cash advance made out to PG&E to:

Pacific Gas and Electric Company
Attn: Rod Boschee
Mail Code: B16A
P.O. Box 770000
San Francisco, CA 94177

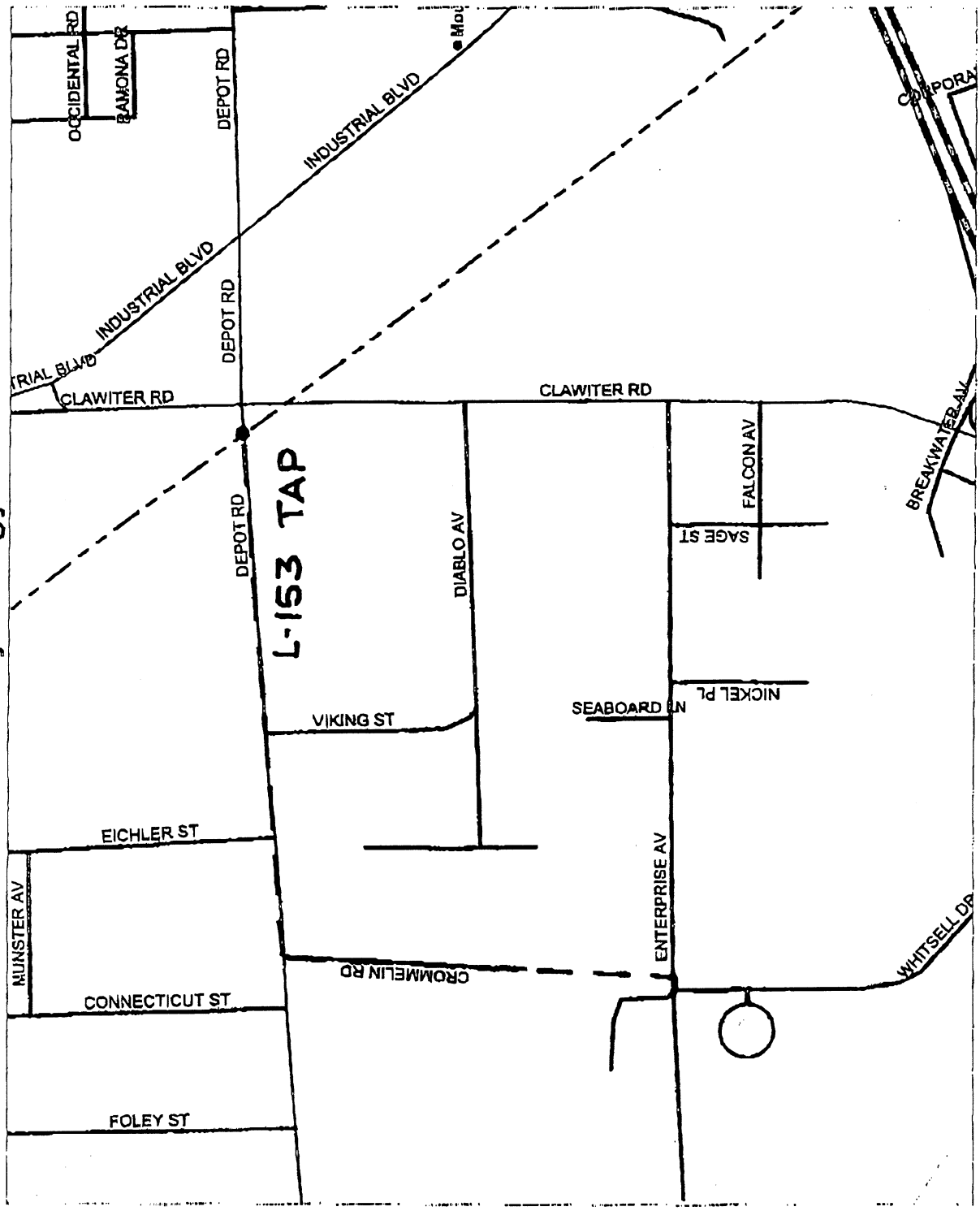
If you have any questions about this information, please call me at 415-973-2908 or Mike O'Brien at 415-973-5652.

Sincerely,

Rod Boschee

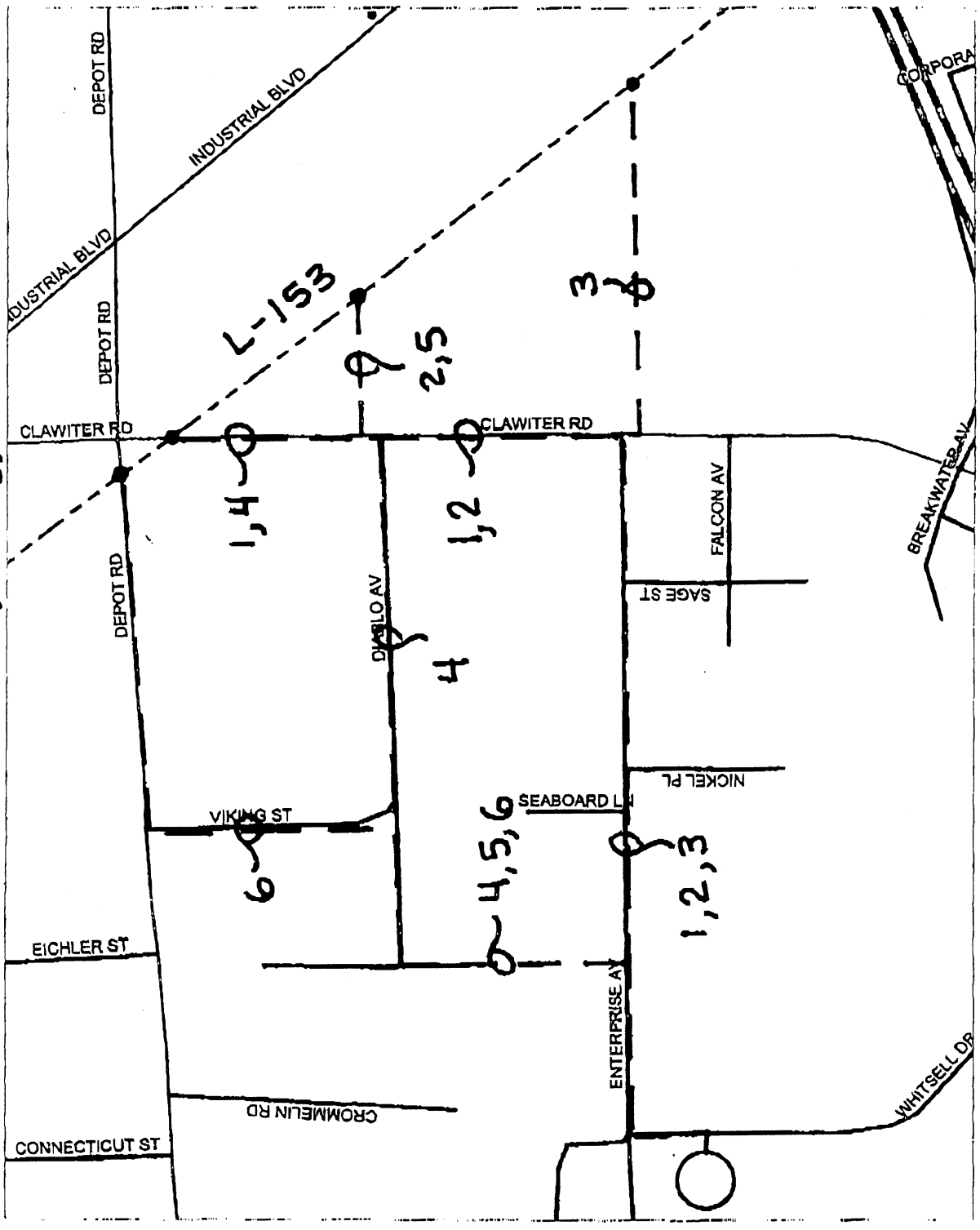
Rod Boschee
Manager, Contracts Development and Management

PG&E Confidential Data - Russell City Energy Center - PG&E's Preferred Route



http://www20/mwf/control_ver5.mwf

PG&E Confidential Data - Russell City Energy Center - Alternative Routes



http://www20/mwf/control_ver5.mwf

Russell City Energy Center

Appendix 6-A
Generator Interconnection Data Sheet

May 2001

Russell City Energy Center AFC

May 2001

Pacific Gas and Electric Company™

WE DELIVER ENERGY.℠

Generator Interconnection Data Sheet

For Wholesale Generators Connected

to the PG&E Electric System

at Voltages 60 kV and Above

Generator Interconnection Data Sheet

Note: Generators who are submitting a Completed Application pursuant to PG&E's Transmission Owners Tariff must completely fill out this Generator Interconnection Data Sheet as an integral part of their application.

1. General Project Information

A.	Project Name	Russel City Energy Center
	Street Address	3636 Enterprize Avenue
	City, State	Hayward, CA
	Zip Code	94548
	Phone Number	925.600.2074
	Fax Number	925.600.8926
	Email Address	billt@calpine.com
B.	Developer Name	Calpine/Bechtel
	Street Address	6700 Koll Center Parkway, Suite 200
	City, State	Pleasanton, CA
	Zip Code	94566
	Phone Number	925.600.2074
	Fax Number	925.600.8926
	Email Address	billt@calpine.com
C.	Site Owner Name	Calpine/Bechtel
	Street Address	3636 Enterprize Avenue
	City, State	Hayward, CA
	Zip Code	94545
	Phone Number	925.600.2074
	Fax Number	925.600.8926
	Email Address	billt@calpine.com

D. The anticipated operation date: July 01, 2004

2. Type of Project (select one)

Cogeneration	_____	Reciprocating. Engine	_____
Biomass	_____	Steam Turbine	_____
Gas Turbine	_____	Wind	_____
Hydro	_____	Other Describe: 2 x 2 x 1 Combined Cycle Wholesale Generator	_____
Photovoltaic	_____		

3. Maximum generator power delivered to PG&E grid at Point of Interconnection

Generator rated output	+	635,000	kW
Less generator auxiliary load:	-	15,000	kW
Maximum net power delivered to PG&E Grid:	=	620,000	kW
Standby load to be served when generator is OFF:	-	1,000	kW

4. Generator Information

			CTGs (2)	STG
A.	Manufacturer	Siemens Westinghouse		
B.	Year Manufactured	2002		
C.	Rated Size:	kW:	214,200	235,000
		KVA:	252,000	277,000
		Terminal Voltage	15,000	18,000
		Power Factor (%):	.85	.85
D.	Type: (select one)	Induction:	_____	_____
		Synchronous:	X	X
		D.C. with Inverter:	_____	_____
E.	Synchronizing			
		Auto	X	X
		Manual	X	X
		Relay Supervision (y/n)	Yes	Yes
F.	Voltage:			
		Output	15	18
		Interconnection	230	230

G.	Phase: (select one)	1ϕ	_____	_____
		3ϕ	X	X
H.	Connection (select one)	Delta	_____	_____
		Grounded WYE	X	X
		Ungrounded	_____	_____
I.	Inertia Constant (if known)	CTG: 129,440 Generator + Exciter WR^2 (lbf x ft^2) STG: To be provided later		
J.	Generator Voltage Regulation Range	± 5%		
K.	Generator Power Factor Regulation Range	0.85 lagging to 0.95 leading		

5. Generating Grounding

If the generator output is greater than 40kW (individually or as an aggregate group), ground protection will be required. If grounding will be required, please indicate type of ground detection below:

Wye Grounded/Delta Ground Bank with Overcurrent Relay	_____
Wye Grounded/Broken Delta[1]: Ground Bank with Low Pick-up Overvoltage Relay	_____
Current Transformer with Overcurrent Relay: In Neutral of Dedicated Transformer	_____
Potential Transformer with Voltage Relay[1]: In Neutral of Dedicated Transformer	X
Other: _____	_____

[1] This is PG&E's preferred ground detection.

6. Step-Up Transformer Data (Note: these transformer ratings are preliminary&estimated)

A. Rated MVA 252 MVA

B. Cooling Type OA/FA/FA

C. Impedance - Z 10 5 % Impedance

D. Primary Voltage 236 ~~KW~~ KV

Secondary Voltage 15___ ~~KW~~ KV

E. Available H.V. Taps

		Available L.V. Taps	
247.8	kV		_____ kV
241.9	kV		_____ kV
236.0	kV		_____ kV
230.1	kV		_____ kV
224.2	kV		_____ kV
_____	kV		_____ kV

F. Please indicate present tap settings: H.V Tap: 236 kV kV

L.V Tap: _____ kV

G. Does transformer have tap changing under load? ___No_____

H. Is transformer a regulating-type transformer? No

If yes, please indicate regulating voltage range and the number of steps.

_____ kV to _____ kV Number of steps _____

I. Please indicate how the transformer windings are connected:

H.V. Side:	____	Wye	L.V. Side:	____	Wye
	__X	Grounded Wye		____	Grounded Wye
	____	Delta		__X	Delta

J. Transformer Fuse Type: ___Later Size ___Later

K. If the transformer test report is not available, please provide the following impedances using the MVA base given in (10.A) above:

R_T	per unit resistance	.15%	pu
X_T	per unit reactance	10 % LATER	pu
B_T	per unit magnetizing susceptance	LATER	pu
G_T	per unit core loss conductance		pu

L. Other comments regarding the transformer?

_____

_____

M Desired transformer connection:

Delta Grounded Wye Ungrounded Wye

PG&E Side	_____	X	_____
Generator Side	X	_____	_____

7. Please provide two original prints and one reproducible copy (no larger than 36" x 24") of the following:

A. SITE DRAWING to scale, showing generator location and point of interconnection with PG&E.

B. For generation greater than 1000 kW provide the following:
   1) Substation grounding drawings showing all ground connections.
   2) A list of the amount and location of the shunt capacitor compensation that will be provided (induction generators only).

C. SINGLE LINE DIAGRAM, showing switches/disconnects of the proposed interconnection, including the required protection devices and breakers.

D. THREE LINE DIAGRAM, showing the proposed CTS and PTs as they are connected to the relays and meters.

E. DESCRIPTION of operation and elementary drawings, showing the synchronization (if appropriate), and tripping of breakers by the required relays. (If not provided, they may be requested after approval of the single and three line diagrams.) LATER

F. LIST of relays, switches and revenue meters (if customer provided), disconnects, etc., specified to meet the requirements of PG&E's Interconnection Handbook and include the following information:.
   1) Manufacturer's name and model number, with each device listed. LATER
   2) Range of available settings. LATER
   3) Proposed settings. LATER
   4) Ratio of associated current and potential transformers. If multi-ratio, state the available ratios and which one is proposed. LATER

8. Proposed breaker(s) will be equipped with[2]:

Undervoltage Release	_____
D.C. Trip	X

9. The following information is required for Induction Generators only.

Do you wish reclose blocking? Yes ___, No ___ (N/A)

Note: we test automatically. Sufficient capacitance may be on the line now, or in the future, and your generator may self-excite unexpectedly.

[2] Capacitor Trip is not acceptable.

Information contained in Sections 10 through 15 is required only for Synchronous Generators. It is acceptable to provide IEEE block diagrams for the dynamic data specified in Sections 10 through 15.

(IEEE Block Diagrams have been provided in lieu of completing Sections 10 through 15 in "ATTACHMENT 2")

10. Synchronous Generator – General Data:

A.	Rated Generator speed	_____	rpm
B.	Number of Poles	_____	
C.	Rated Generator Power Factor	_____	
D.	Generator Efficiency at Rated Load	_____	%
E.	Moment of Inertia (Turbine plus Generator) ωR^2	_____	lb-ft^2
F.	Inertia Time Constant (on machine base) H:	_____	sec or MJ/MVA
G.	SCR (Short-Circuit Ratio - the ratio of the field current required for rated open-circuit voltage to the field current required for rated short-circuit current.	_____	
H.	Typical Generator Auxiliary Load	_____	MW
I.	Maximum Power Output	_____	MW
J.	Please attach generator reactive capability curves. If these curves are not available, provide the maximum and minimum reactive limits	Q_{MAX}: _____	MVAR, lagging
		Q_{MIN}: _____	MVAR, leading
K.	Rated Hydrogen Cooling Pressure (Steam Units only)	_____	psig
L.	Please attach a simple one-line diagram that includes the generator step-up transformer bank, plant load, meter, and transmission-level bus.		
M.	Please attach a plot of generator terminal voltage versus field current that shows the air gap line, the open-circuit saturation curve, and the saturation curve at full load and rated power factor.		

11. Synchronous Generator – Impedence:

A.	X_d	direct-axis unsaturated synchronous reactance	_____	pu
B.	X_q	quadrature-axis unsaturated synchronous reactance	_____	pu
C.	X'_d	direct-axis unsaturated transient reactance	_____	pu
D.	X'_{ds}	direct-axis saturated transient reactance	_____	pu
E.	X'_q	quadrature-axis unsaturated transient reactance	_____	pu
F.	X'_{qs}	quadrature-axis saturated transient reactance	_____	pu

G.	X''_d	direct-axis unsaturated subtransient reactance	_____	pu
H.	X''_{ds}	direct-axis saturated subtransient reactance	_____	pu
I.	X''_q	quadrature-axis unsaturated subtransient reactance	_____	pu
J.	X''_{qs}	quadrature-axis saturated subtransient reactance	_____	pu
K.	X_L	stator leakage reactance or Potier reactance	_____	pu
L.	R_a	armature resistance	_____	pu
M.	X_2	negative sequence reactance (saturated/unsaturated)	_____/_____	pu
N.	X_0	zero sequence reactance (saturated/unsaturated)	_____/_____	pu

12. Synchronous Generator – Time Constants:

A.	T_{q0}	direct-axis transient open-circuit time constant	_____	sec
B.	T'_{q0}	quadrature-axis open-circuit time constant	_____	sec
C.	T''_{q0}	direct-axis subtransient open-circuit time constant	_____	sec
D.	T''_{q0}	quadrature-axis subtransient open-circuit time constant	_____	sec
E.	$T_{A\,GEN}$	armature short-circuit time constant	_____	sec
F.	T'_D	direct-axis transient short-circuit time constant	_____	sec
G.	T'_Q	quadrature-axis transient short-circuit time constant	_____	sec
H.	T''_D	direct-axis subtransient short-circuit time constant	_____	sec
I.	T''_Q	quadrature-axis subtransient short-circuit time constant	_____	sec

13. Excitation System Information

Please indicate, in the space provided on the left, the excitation system used for your generator.

A. Rotating DC commutator exciter with continuously acting regulator. The regulator power source is independent of the generator terminal voltage and current.

Manufacturer _____, Type _____

B. Rotating DC commentator exciter with continuously acting regulator. The regulator power source is bus fed from the generator terminal voltage.

Manufacturer _____, Type _____

C. Rotating DC commutator exciter with non-continuously acting regulator (i.e., regulator adjustments are made in discrete increments).

Manufacturer _____, Type _____

D. Rotating AC Alternator Exciter with non-controlled (diode) rectifiers. The regulator power source is independent of the generator terminal voltage and current (not bus-fed).

Manufacturer _____, Type _____

E. Rotating AC Alternator Exciter with controlled (thyristor) rectifiers. The regulator power source is fed from the exciter output voltage.

Manufacturer _____, Type _____

F. Rotating AC Alternator Exciter with controlled (thyristor) rectifiers.

Manufacturer _____, Type _____

G. Static Exciter with controlled (thyristor) rectifiers. The regulator power source is bus-fed from the generator terminal voltage.

Manufacturer _____, Type _____

H. Static Exciter with controlled (thyristor) rectifiers. The regulator power source is bus-fed from a combination of generator terminal voltage and current (compound-source controlled rectifiers system.

Manufacturer _____, Type _____

I. Please attach a copy of the instruction manual for your excitation system. Make sure that a block diagram or schematic of the excitation system is included in the manual. The diagram should show the input, output, and all feedback loops of the excitation system.

J. If the manufacturer's data for the excitation system (i.e., time constants, gains, and saturation curves) are available, please attach these also.

K. What is the excitation system response ratio (ASA)?

L. What is the rated exciter output voltage at full load? _____ volts

M. What is the maximum exciter output voltage (ceiling voltage)? _____ volts

N. Other comments regarding the excitation system?

_____

_____

_____

_____

_____

_____

_____

14. Power System Stabilizer Information (supplementary excitation system)

(Note: Complete this section only if your machine has PSS control.)

A. Manufacturer: _____

B. Is your PSS digital or analog? _____

C. What is the actuating signal (the input signal) for your PSS?

_____ Bus frequency _____ Shaft slip _____ Accelerating power
_____Other

If "Other", indicate signal _____.

D. Please attach a copy of the instruction manual for your PSS. The manual should include a block diagram or schematic of the PSS and the correspondence between dial settings and the time constants or PSS gain.

E. Please attach a copy of the test report for your PSS. This report should contain the dial settings or time constants and PSS gain. If this report is not available, write the dial settings below:

1.)	T_1	washout or reset time constant dial setting	_____
2.)	T_2	first lead time constant dial setting	_____
3.)	T_3	first lag time constant dial setting	_____
4.)	T_4	second lead time constant dial setting	_____
5.)	T_5	second lag time constant dial setting	_____
6.)	K	PSS gain dial setting	_____
7.)	V_{max}	maximum PSS output dial setting	_____
8.)	V_{cut}	dial setting for which PSS is set to zero when generator terminal voltage deviation is too large	_____
9.)	Other	_____	_____
10.)	Other	_____	_____

F: Other comments regarding the PSS?

_____

_____

_____

_____

_____

_____

15. Turbine-Governor Information

Please complete Part A for steam, gas or combined-cycle turbines, Part B for hydro turbines, and

Part C for both.

A. Steam, gas or combined-cycle turbines:

1.) Steam turbine, Gas turbine, or Combined-cycle _____

2.) If steam or combined-cycle, does the turbine system have a reheat process (i.e., both high- and low-pressure turbines)? _____

3.) If steam with reheat process, or if combined-cycle, indicate, in the space provided, the percent of full load power produced by each turbine:

by low pressure turbine or gas turbine: _____ %

by high pressure turbine or steam turbine: _____ %

B. Hydro turbines:

1.) What is the turbine efficiency at rated load? _____ %

2.) What is the length of the penstock? _____ ft

3.) What is the average cross-sectional area of the penstock _____ ft^2

4.) What is the typical maximum head (vertical distance from the bottom of the penstock, at the gate, to the water level)? _____ ft

5.) Is the water supply run-of-the-river or reservoir? _____

6.) What is the water flow rate at the typical maximum head? _____ ft^3/sec

7.) What is the average energy rate? _____ kW-hrs/acre-ft

8.) What is the estimated yearly energy production? _____ kW-hrs

C. Complete this section for each machine, independent of the turbine type.

1.) Turbine manufacturer _____

2.) Maximum turbine power output _____ MW

3.) Minimum turbine power output (while on line) _____ MW

4.) Governor information:

a: Droop setting (speed regulation) _____

b: Is the governor mechanical-hydraulic or electro-hydraulic? (Electro-hydraulic governors have an electronic speed sensor and transducer.) _____

c: Please provide below any time constants you have from the manufacturer describing the speed response of the governor. Be sure to identify each time constant.

_____ _____ sec

_____ _____ sec

_____ _____ sec

d: Other comments regarding the turbine governor system?

_____

_____

_____

_____

Completed By: Wayne Icenhower , Date: February 13, 2001

Phone Number: 916-608-3817 , Fax Number: 916-985-5655, Email address: waynei@calpine.com

Russell City Energy Center

Appendix 6-B
System Impact Study
Study Plan
Final

May 2001

Russell City Energy Center AFC

May 2001

System Impact Study

Study Plan

FINAL

Calpine /Bechtel Joint Development
Russell City Energy Center

Pacific Gas and Electric Company

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Introduction and Project Description

Calpine/Bechtel Joint Development (Applicant) is evaluating the feasibility of a 635 MW (nominal rating) generating facility and substation in Pacific Gas and Electric Company's (PG&E's) East Bay Division. The project will be called the Russell City Energy Center Project (RCEC). The proposed project site is located at 3636 Enterprise Avenue, Hayward, CA 94545 and near PG&E's Grant - East Shore 115 kV lines.

Figure 1 provides an overview of the vicinity of the proposed project, as well as the transmission facilities in the area. The Applicant has requested that PG&E conduct a Systems Impact Study(SIS) for this project. The planned operational date of the proposed project is July 1, 2003. The SIS will determine:

1. The transmission system impacts caused solely by the addition of RCEC and

2. The system reinforcement necessary to mitigate the adverse impact of RCEC under various system conditions, if any.

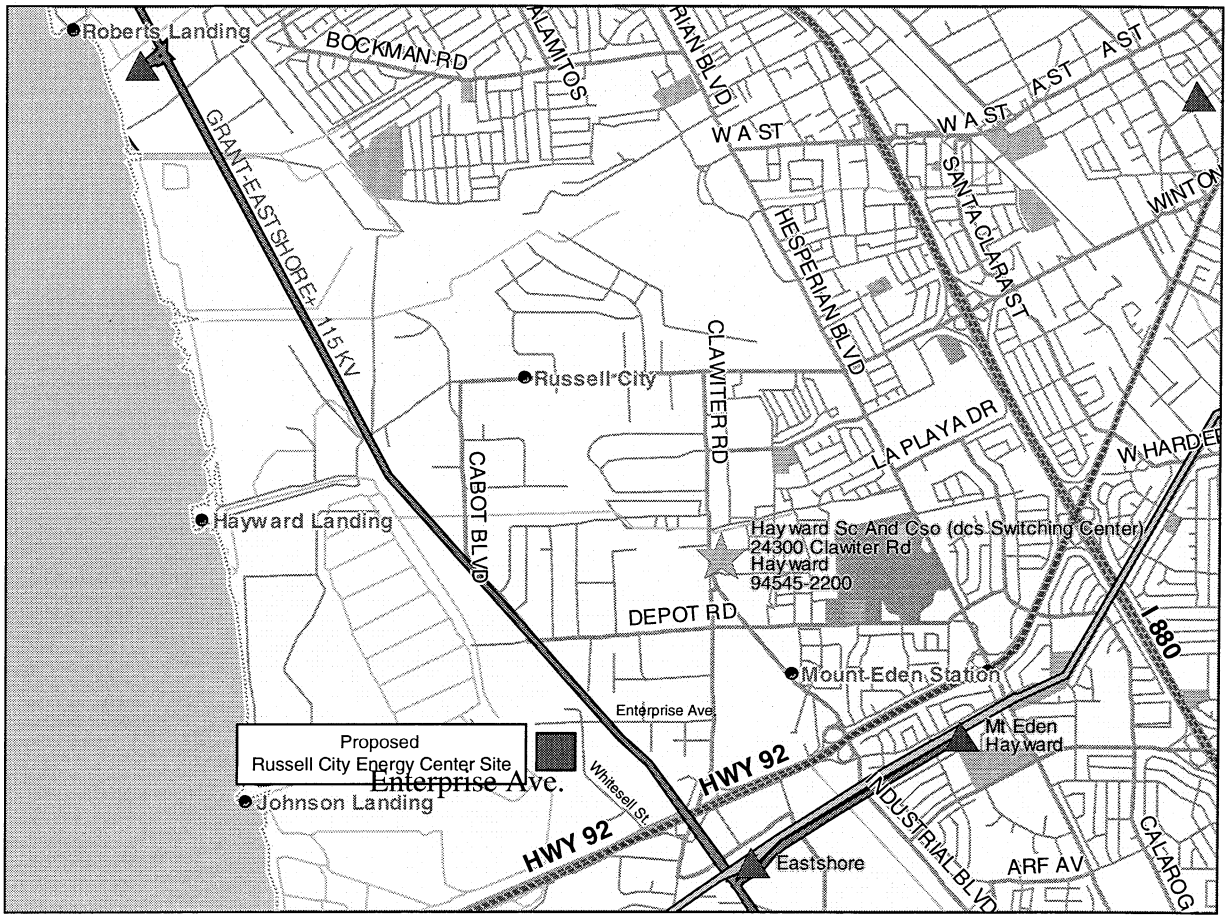

Figure 1: Vicinity Map – Russell City Energy Center Project

This Study Plan will form the basis for the SIS Agreement by defining the scope, content, assumptions, and terms of reference of the SIS.

Study Fee

The applicant must pay a one-time study fee for performing the SIS is $100,000. $50,000 is due with the submittal of SISA, and the balance of $50,000 will be due on June 1, 2001. If the Applicant chooses not to continue with the study after receiving this Study Plan, a fee of $5,000 shall be assessed to reimburse PG&E for the cost of processing the Study Request.[1]

Schedule

The following schedule shows the milestones associated with the study.

Task	Milestone Description	Target Date
1	Establish study commencement date based on receipt of study fee	4/13/01
2	Send draft report to Applicant and Cal-ISO for review and comments	7/9/01
3	Receive comments from Applicant and Cal-ISO	7/23/01
4	Issue Final SIS	8/6/01

PG&E must receive a completed System Impact Study Agreement from the Applicant (including the study fee) by April 13, 2001. If PG&E does not receive the completed Study Agreement by this date, the Interconnection Application will be considered as withdrawn and the Applicant's project position in the generation interconnection queue shall be lost.

Cost Estimates

No cost estimates will be provided in System Impact Study. Cost estimates will be provided when the project progresses to the Facilities Study.

Project Information and Interconnection Plan

The proposed RCEC will consist of a 635 MW (nominal) generating facility and a 230 kV swtichyard inside a new substation. The study plan will refer to this new substation as Russel Enterprise Substation.

The RCEC generating facility will have a maximum rated output of 635 MW with a plant load of 15 MW. Therefore, the maximum net generating capacity delivered to PG&E's transmission system will be 620 MW. REC will be a 2 X 1 combined cycle generating facility using the following turbine/generators:

- Two - gas-fired combustion turbine/generators (CTG) rated at 190 MW (nominal) each.
- One - steam turbine/generator (STG) rated at 255 MW (nominal).

Each turbine/generator unit will have a dedicated 15/230 kV step-up transformer connecting the unit to the RCEC Switchyard.

[1] Refer to PG&E's Transmission Owner Tariff TO4 Terms and Conditions.

The RCEC will be connected at the 230 kV voltage level to the PG&E transmission grid via two new 230 kV generation tie lines (about 4600 feet each) into the East Shore 230 kV bus. The turbine/generator units and the 230 kV transmission lines will be arranged in a ring bus configuration.

East Shore Substation currently has a single 230 kV bus configuration. For the System Impact Study, East Shore Substation will be modeled with six 230 kV lines (two from San Mateo, two from Pittsburg, and two from RCEC). The cost and feasibility of this arrangement will be addressed when the study progresses to the Facilities Study phase.

Calpine/Bechtel Joint Development has proposed that the two 230 kV circuits share the same route as PG&E's existing Grant-East Shore 115 kV lines. Calpine/Bechtel Joint Development has also proposed that for the portion of the route between RCEC and Eastshore Substation, they would replace the existing 115 kV towers with double circuit 230 kV towers, under hung with 115 kV as appropriate.

A single-line diagram for Russell Enterprise Substation is shown in Figure 2.

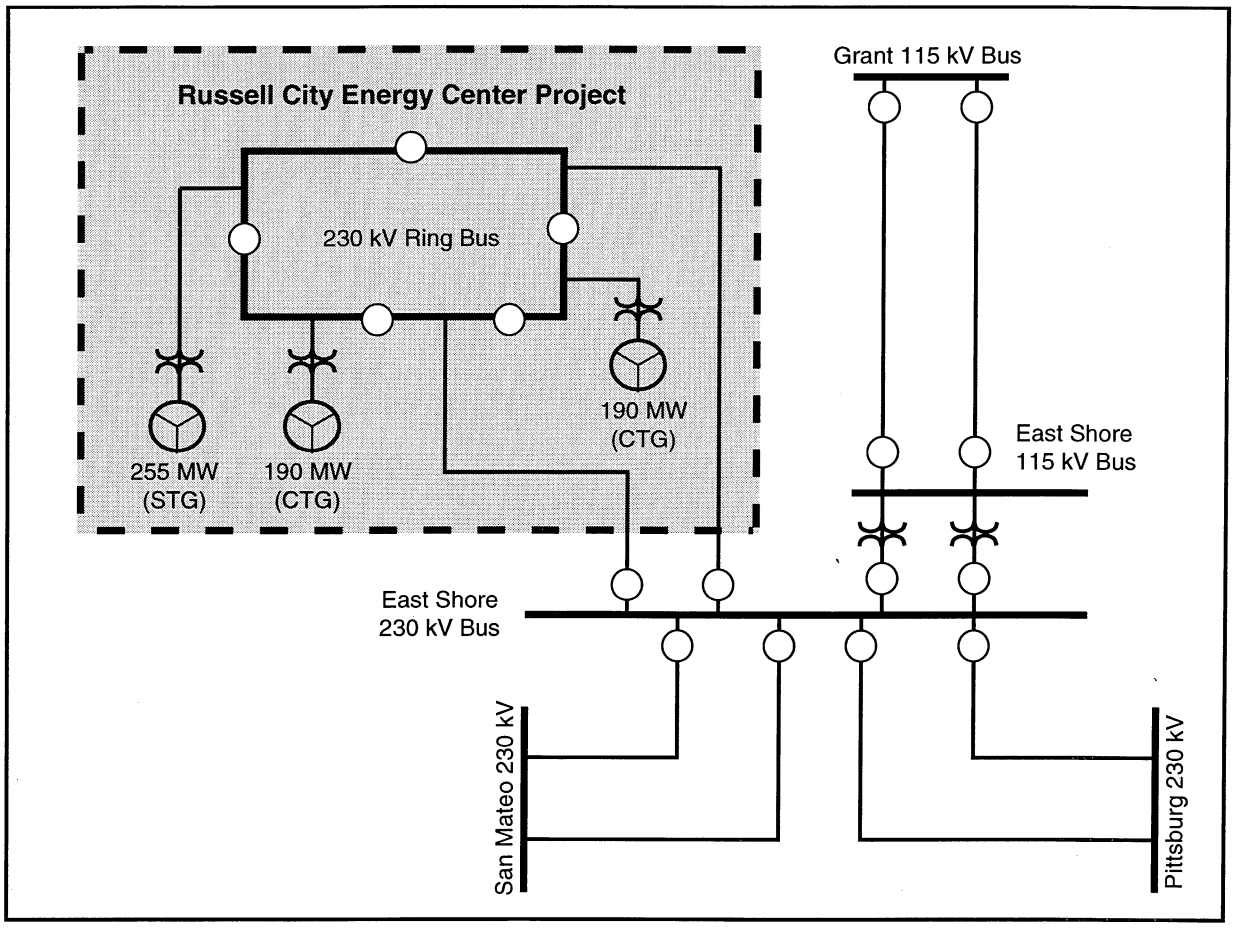

Figure 2: Single Line Diagram - Area Transmission facilities and RCEC

Study Assumptions

PG&E will conduct the SIS under the following assumptions:

1) The maximum delivery from the proposed project to the PG&E transmission grid will be 620 MW modeled at 0.85 lagging power factor; and it will be on line at this capacity by July 1, 2003.

2) A power plant load of 15 MW will be modeled.

3) The generator ties from Russell Enterprise Substation to East Shore Substation will be modeled as sharing the right-of-way with PG&E's existing Grant - East Shore 115 kV lines.

4) As part of the transmission system mitigation plan for the Delta Energy Center, the existing San Mateo - Contra Costa 230 kV line will be converted to the San Mateo - Pittsubrg 230 kV line and the East Shore - Contra Costa 230 kV line will be converted to the East Shore - Pittsburg 230 kV line.

5) As requested by Calpine/Bechtel Joint Development, this study will also assume that the Pittsburg - San Mateo 230 kV Line (to be operational by 2002) will be looped into East Shore Substation as part of the Russell City Energy Center Project.

6) East Shore Substation will be modeled as having and six 230 kV transmission lines (San Mateo - East Shore #1 and #2, Pittsburg - East Shore #1 and #2, Russell Enterprise - East Shore #1 and #2). The required 230 kV bus configuration at East Shore Substation will be determined when the project progresses forward to the Facilities Study phase.

7) The study will take into account the planned generating facilities in Northern California whose schedules are concurrent with or precede RCEC's schedule. These facilities are described in the section discussing the power flow base cases.

8) The study will take into account all the approved PG&E transmission reliability projects that will be operational by summer 2003.

Note: These assumptions and any changes thereto must be confirmed before the SIS can commence.

Power Flow Base Case Assumptions

Two power flow cases will be used to evaluate the transmission system impact of the RCEC.

1) **2003 Summer Peak Full Loop Base Case:**

Power flow analysis will be performed using PG&E's 2003 Summer Peak Full Loop Base Case (in General Electric Power Flow format). This base case was developed from PG&E's 2001 base case series and has a 1-in-10 year extreme weather load level for the Greater Bay Area.

2) **2003 Partial Peak Base Case:**

Power flow analysis will also be performed using the 2003 Summer Partial Peak Base Case. The Greater Bay Area load levels are reduced approximately 22% from the levels shown in the Summer Peak Base Case which is representative of a typical morning of a summer peak day.

Base Case Key Generation Assumptions

These two base cases will model all the approved PG&E transmission reliability projects that will be operational by summer 2003. The following major reliability projects will be included:

- Install a third 500/230 kV, 1120 MVA transformer at Tesla Substation
- Install a second 500/230 kV, 850 MVA transformer at Tracy Substation
- Install a third 500/230 kV, 1120 MVA transformer at Metcalf Substation
- A new Tesla-Newark 230 kV line
- Newark - San Mateo 230 kV line loop into Ravenswood Substation
- Static Capacitors (350 MVAR) at Metcalf 500 kV
- Static Capacitors (150 MVAR) at Martin 115 kV
- Newark Substation Bank #7, 9, and 11 TCAP
- Grant-Eastshore 115 kV Transmission Project
- Los Esteros Substation Project
- Tri-Valley Project - Phase I
- Pittsburg - Tassajara 230 kV Line Reconductoring
- Newark 230 230 kV - 100 to 200 MVAR Static VAR Compensator

The base case will also include the following major proposed generating facilities in Northern California:

1) Calpine/Bechtel - 880 MW Delta Energy Center (DEC), interconnecting with the 230 kV bus at the Pittsburg Power Plant switchyard.

2) Calpine/Bechtel - 600 MW Metcalf Energy Center (MEC), interconnecting with the Metcalf - Monta Vista #4 230 kV line, through the MEC switchyard.

3) PG&E NEG - La Paloma generation facility interconnecting at Midway 230 kV bus section D; La Paloma generation facility will be will be modeled at 1110 MW in summer and 1160 MW in spring and winter.

4) Calpine - 500 MW Los Medanos Energy Center (LMEC), interconnecting with the 115 kV bus at the Pittsburg Power Plant switchyard.

5) Texaco - 338 MW Sunrise Generation Facility interconnecting at La Paloma Switching Station.

6) Three Mountain Power Company - 530 MW project interconnecting to PG&E's Pit 1 – Pit 3 and Pit 1 – Cottonwood 230 kV lines.

7) GWF - 130 MW Hanford, interconnecting to Kingxburg - Henrietta 115 kV line in Fresno area.

8) Duke Energy North America Corporation (DENA) - 1080 MW Moss Landing project (MLPP), interconnecting with the existing 230 kV bus at the Moss Landing Power Plant.

9) Southern Energy Company of California - 530 MW Contra Costa Power Plant Capacity Increase Project, interconnecting to Contra Costa PP 230 kV bus.

10) Central Reliability Energy Center - 45 MW project in San Jose/San Clara area.

11) The Midway-Sunset generation facility will be 500 MW in summer, 540 MW in spring, and 540 MW winter. Midway-Sunset generation facility will be interconnected at Midway 230 kV bus section E.

12) Sempra - 500 MW Elk Hills Power Project, interconnecting at Midway 230 kV bus.

13) FPLE - 150 MW High Wind, tapping off the Vaca -Contra Costa #2 230 kV line.

14) United Golden Gate PP - 595 MW generating facilities, interconnecting with the San Mateo - Martin #5 and #6 115 kV lines.

15) Project A - 692 MW Tesla Generation Project , interconnecting near Tesla Substation.

16) Project B – 580 MW Fremont Generating Project interconnecting to the 230 kV bus at Newark Substation.

17) Project C – 581 MW Los Esteros Generating Project interconnecting to the 115 kV bus at Los Esteros Substation.

18) Wellhead Electric - 22 MW Stockton Cogen Project, interconnecting with Newark Sierra Paper Board 60 kV Tap on the Stockton "A" #1 60 kV line.

19) Morro Bay Modernization Project replacing the existing Morro Bay Power Plant with 1,200 MW of generation.

20) Panda - 150 MW West 1-3, interconnecting with Vaca Dixon - Contra Costa #1 230 kV line.

21) Mirant - 600 MW Potrero Unit 7 Project, interconnecting Potrero and Hunters Point Switching Stations.

22) Calpine Corporation - 500 MW Sutter facility, interconnecting with WAPA's Elverta - Olinda and Elverta - Keswick 230 kV.

23) FPLE - 560 MW Elverta Project, , interconnecting with WAPA system.

24) Calpine – 1,070 MW East Altamont Generating Project interconnecting at loop the Tracy - Westley 230 kV circuit near Tracy Substation.

25) Project D - 1000 MW in the Fresno area.

26) Project E - 630 MW in Glenn and Colusa counties.

27) Project F - 1350 MW in Solano county.

Study Scope

The SIS will study the impact of RCEC's added generation on PG&E's transmission system. The specific studies conducted by the SIS are outlined in this section.

Steady State Power Flow Analysis

The two base cases will be used to simulate the impact of the new facility during normal operating conditions, as well as, single and selected multiple (ISO Categories "B" and "C") outages. The study will cover the transmission facilities within PG&E's East Bay, Diablo, San Francisco, Peninsula, Mission, De Anza, and San Jose planning areas.

The single (ISO Category "B") and selected multiple (ISO Category "C") contingencies include the following outages[2]:

ISO Category "B"

- All single generator outages within the study area.
- All single (60-230 kV) transmission circuit outages within the study area.
- All single transformer outages within the study area.
- Overlapping single generator and transmission circuit outages for the transmission lines and generators within the study area.

ISO Category "C"

- Selected bus outages (115 and 230 kV) within the study area.
- Outages caused by breaker failures (excluding bus tie and sectionalizing breakers) at the same bus section above.
- Combination of any two-generator/transmission line/transformer outages (except ones included above in Category "B") within the study area.
- Outages of double circuit tower lines (115 and 230 kV) within the study area.
- Overlapping loss of the two largest available generation units in addition to any generation unavailable due to regular overhaul schedules. (ISO Grid Criteria Level C)

System Protection Analysis

Short circuit studies will be performed to determine the impact of increased fault duty resulting from the added generation. The study will determine the maximum fault currents in the vicinity of the proposed project and it will identify equipment that becomes overstressed as a result of the added generation. New protection requirements together with protection modification at the nearby transmission substations, if needed, would also be identified.

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[2] As soon as the "B" and "C" outage list is put together, PG&E will send it to Cal-ISO and the developer for review and comment prior to running the outage evaluation.

Dynamic Stability Analysis

Dynamic stability studies will be conducted using the 2003 Summer Peak Full Loop Base Case with the addition of the Russell City Energy Center Project to ensure that the transmission system remains in operating equilibrium through abnormal operating conditions after the new facility begins operation. This full loop base case was developed from PG&E's 2001 base case series. Other PG&E approved transmission projects and new generation projects in the Bay Area that will be operational by Summer 2003 will also be modeled in this 2003 case.

Disturbance simulations will be performed for a study period of 20 seconds to determine whether the new facility will create any system instability during the following line and generator outages:

NERC/CAISO Category "B" Contingencies:

a) Full load rejection of the proposed 635 MW (nominal) generating facility.

b) A three-phase fault with the normal 6 cycles clearing time at the Russell Enterprise Substation 230 kV bus, followed by loss of one of the Russell Enterprise - East Shore 230 kV lines.

c) A three-phase fault with the normal 6 cycles clearing time at the Russell Enterprise Substation 230 kV bus, followed by loss of the 255 MW (nominal) STG.

d) A three-phase fault with the normal 6 cycles clearing time at the East Shore 230 kV bus, followed by loss of one of the East Shore - San Mateo 230 kV lines.

e) A three-phase fault with the normal 6 cycles clearing time at the East Shore 230 kV bus, followed by loss of one of the East Shore - Pittsburg 230 kV lines.

f) A three-phase fault with the normal 6 cycles clearing time at the East Shore 230 kV bus, followed by loss of East Shore Bank #1 (230/115 kV bank).

g) A three-phase fault with the normal 6 cycles clearing time at the East Shore 115 kV bus, followed by loss of one of the Grant - East Shore 115 kV lines.

h) A three-phase fault with the normal 6 cycles clearing time at the East Shore 115 kV bus, followed by loss of one of the East Shore - Mt. Eden 115 kV lines.

i) A three-phase fault with the normal 6 cycles clearing time at the East Shore 115 kV bus, followed by loss of the East Shore - Dumbarton 115 kV line.

j) A three-phase fault with the normal 6 cycles clearing time at the San Mateo 230 kV bus, followed by loss of one of the San Mateo - Ravenswood 230 kV lines.

k) A three-phase fault with the normal 6 cycles clearing time at the Pittsburg 230 kV bus, followed by loss of one of the Pittsburg - Tesla 230 kV lines.

l) A three-phase fault with the normal 6 cycles clearing time at the San Mateo 230 kV bus, followed by loss of San Mateo Bank #5 (230/115 kV bank).

NERC/CAISO Category "C" Contingencies:

a) A three-phase fault with the normal 6 cycles clearing time on East Shore 230 kV buses #1 and #2.

b) A three-phase fault with the normal 6 cycles clearing time at the East Shore 230 kV bus, followed by simultaneous loss of both East Shore - San Mateo #1 and #2 230 kV lines.

c) A three-phase fault with the normal 6 cycles clearing time at the East Shore 230 kV bus, followed by simultaneous loss of both East Shore - Pittsburg #1 and #2 230 kV lines.

d) A three-phase fault with the normal 6 cycles clearing time at the East Shore 230 kV bus, followed by simultaneous loss of both East Shore - Pittsburg #1 and East Shore - San Mateo #1 230 kV lines.

e) A three-phase fault with the normal 6 cycles clearing time on San Mateo 230 kV buses (Bus 1, Section D; Bus 2, Section D; Bus 1, Section E; Bus 2, Section E).

f) A three-phase fault with the normal 6 cycles clearing time on Pittsburg 230 kV buses (Bus 1, Section D; Bus 2, Section D; Bus 1, Section E; Bus 2, Section E).

g) A three-phase fault with the normal 6 cycles clearing time on East Shore 115 kV bus.

h) A three-phase fault with the normal 6 cycles clearing time on San Mateo 115 kV buses (Bus 1, Section D; Bus 2, Section D; Bus 1, Section E; Bus 2, Section E).

i) A three-phase fault with the normal 6 cycles clearing time at the San Mateo 230 kV bus, followed by simultaneous loss of both San Mateo - Ravenswood 230 kV lines.

Post Transient Analysis

Post transient study will be performed on outages that cause greater than 5% bus voltage drops as indicated in the power flow analysis.

Transmission Line Evaluation

The transmission line evaluation will identify existing transmission line requiring upgrades in order to mitigate overloading due to the new generation, if any.

Substation Evaluation

The Substation evaluation will identify any existing equipment, if any, requiring upgrades to mitigate problems caused by overstress or overload.

Permitting

Calpine/Bechtel Joint Development will be responsible for including the two new overhead 230 kV lines, the new 635 MW generating facility, the new 230 kV substation,

and work at existing transmission facilities as part of the project's Application For Certification (AFC) filing to the California Energy Commission (CEC). Calpine/Bechtel Joint Development will own and operate the generating facility. PG&E will not apply for any permits from the CPUC for these works. PG&E will submit an advice letter to CPCU in the form of a Notice of Construction (NOC), as required by General Order (GO) 131-D. The environmental impact component of these substation and transmission line work will be addressed in a broader-scope California Environmental Quality Act (CEQA) analysis that is part of the project's AFC filing.

Stand-by Power

This study does not address any requirements for stand-by power that the project may require. The Applicant should contact their local PG&E service office regarding this service.

Note: The developer is urged to contact their local service office promptly regarding stand-by service in order to ensure its availability for the project's start-up date.

Pacific Gas and Electric Company

WE DELIVER ENERGY.

System Impact Study Agreement

_____ (Applicant) has reviewed the study plan for the interconnection of Applicant's electric generating plant with PG&E's system at [3], State of California and agrees with the proposed plan.

Applicant agrees to pay the proposed study fee.

Dated this _____ day of _____, 2001

APPLICANT:

BY: _____
(Signature)

_____
(Type or Print Name)

TITLE: _____

MAILING ADDRESS:

_____

_____

_____

_____

_____

[3] Enter city and county location of proposed facility.

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 6-C
Power Flow Contingencies

May 2001

Russell City Energy Center AFC

May 2001

RCEC System Impact Study
Study Plan Case

5/7/01

No.	Contingency		Ckt	Base kV	Area	Zone
1	B2 LINE Tassajara - Newark			230	30	308-316
	obranch 30562 30631 1	line from TES JCT 230.00 (3) to BRKR NEWARK E 230.00	1	230	30	308-316
	obranch 30562 30563 1	line from TES JCT 230.00 (3) to (1) TES SUB 230.00	1	230	30	308
	setpload 30563: 0.0	LOAD-DROP TES SUB 230.00 LOAD==39.18(8.93)				
	setqload 30563: 0.0	LOAD-DROP TES SUB 230.00 LOAD==39.18(8.93)				
	obranch 30561 30562 1	line from TASSAJAR 230.00 BRKR to (3) TES JCT 230.00	1	230	30	308
2	B2 LINE Contra Costa - San Mateo		1			
	obranch 30525 30700 1	line from C.COSTA 230.00 BRKR to BRKR S. MATEO 230.00	1			
2A	B2 LINE Pittsburg - San Mateo		1			
	obranch 30526 30700 1	line from PITTSBURG 230.00 BRKR to BRKR SANMATEO 230	1			
3	B2 LINE Moraga - Vaca Dixon			230	30	
	obranch 30467 30460 1	line from PARKWAY 230.00 (2) to BRKR VACA-DIX 230.00	1	230	30	304-306
	setpload 30467: 0.0	LOAD-DROP PARKWAY 230.00 LOAD==12.9577(1.846371)				
	obranch 30467 30550 1	line from PARKWAY 230.00 (2) to BRKR MORAGA 230.00	1	230	30	306-308
	setqload 30467: 0.0	LOAD-DROP PARKWAY 230.00 LOAD==12.9577(1.846371)				
4	B2 LINE Fosterw2 - Tosco		1	12.47	30	338-396
	obranch 33151 33150 1	line from FOSTERW 12.47 (1) to BRKR TOSCO 12.47	1	12.47	30	338-396
5	B2 LINE Pittsburg - Posco			115	30	308-338
	obranch 32952 33037 1	line from POSCO 115.00 BRKR to (3) LINDETP2 115.00	1	115	30	308-338
	obranch 33037 33031 1	line from LINDETP2 115.00 (3) to (2) COLSTJT2 115.00	1	115	30	308
	obranch 33031 33033 1	line from COLSTJT2 115.00 (2) to (3) KIRKTAP2 115.00	1	115	30	308
	obranch 33033 32951 1	line from KIRKTAP2 115.00 (3) to BRKR KIRKER 115.00	1	115	30	308
	obranch 33033 32950 1	line from KIRKTAP2 115.00 (3) to BRKR PITSBURG 115.00	1	115	30	308
	rbranch 32951 33032 1	SWITCH KIRKER TO TAP 1 IF TAP 2 IS LOST				
6	B2 LINE Pittsburg - Tassajara		1	230	30	308
	obranch 30526 30561 1	line from PITSBURG 230.00 BRKR to BRKR TASSAJAR 230.00	1	230	30	308
7	B2 LINE Contra Costa - East Shore		1			
	obranch 30525 30560 1	line from C.COSTA 230.00 BRKR to BRKR E. SHORE 230.00	1			
7A	B2 LINE Pittsburg - East Shore		1	230	30	308-316
	obranch 30526 30560 1	line from PITSBURG 230.00 BRKR to BRKR E. SHORE 230.00	1	230	30	308-316
7B	B2 LINE Pittsburg - East Shore		2	230	30	308-316
	obranch 30526 30560 2	line from PITSBURG 230.00 BRKR to BRKR E. SHORE 230.00	2	230	30	308-316
8	B2 LINE Fiber Junction - Contra Costa Sub			13.8-115	30	
	obranch 33046 33001 1	line from FIBRJCT2 115.00 (3) to (1) DOMTAR 115.00	1	115	30	308-338
	obranch 33044 33002 1	line from FIBRBJCT 115.00 (2) to (4) CROWN Z 115.00	1	115	30	308
	obranch 33044 33046 1	line from FIBRBJCT 115.00 (2) to (3) FIBRJCT2 115.00	1	115	30	308
	obranch 33002 33003 1	line from CROWN Z 115.00 (4) to (1) FIBREBRD 115.00	1	115	30	338-308
	obranch 33002 33133 1	TRAN from CROWN Z 115.00 (4) to (1) GWF #3 13.80	1	13.8-115	30	396-308
	obranch 33002 33145 1	TRAN from CROWN Z 115.00 (4) to (1) CROWN.Z. 13.80	1	13.8-115	30	396-308
	obranch 33046 33000 1	line from FIBRJCT2 115.00 (3) to BRKR CC SUB 115.00	1	115	30	308
9	B2 LINE Contra Costa Jct.- Contra Costa Sub.			115	30	308
	obranch 33047 33045 1	line from CC JCT 115.00 (2) to (1) FIBRJCT1 115.00	1	115	30	308
	obranch 33047 33000 1	line from CC JCT 115.00 (2) to BRKR CC SUB 115.00	1	115	30	308
11	B2 LINE Columbia St. - Pittsburg			115-13.8	30	
	obranch 32955 32953 1	line from DOW TAP2 115.00 (2) to BRKR CLMBA ST 115.00	1	115	30	308-338
	obranch 33160 33163 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM3 13.80	1	13.8	30	338-396
	obranch 33160 33162 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM2 13.80	1	13.8	30	338-396
	obranch 33160 33161 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM1 13.80	1	13.8	30	338-396

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 32956 33160 1	TRAN from DOW MTR 115.00 (2) to (4) DOW CHEM 13.80	1	13.8-115	30	338-308
	obranch 32960 33132 1	TRAN from GWF#2 HS 115.00 (2) to (1) GWF %2 13.80	1	13.8-115	30	396-308
	obranch 32961 32960 1	line from GWF2 TAP 115.00 (2) to (2) GWF%2 HS 115.00	1	115	30	308
	obranch 33038 32961 1	line from LINDEJCT 115.00 (3) to (2) GWF2 TAP 115.00	1	115	30	308
	obranch 33038 32957 1	line from LINDEJCT 115.00 (3) to BRKR PRAXAIR 115.00	1	115	30	308-338
	obranch 32954 32956 1	line from DOW TAP1 115.00 (3) to (2) DOW MTR 115.00	1	115	30	308
	obranch 32954 32953 1	line from DOW TAP1 115.00 (3) to BRKR CLMBA ST 115.00	1	115	30	308-338
	obranch 33036 32961 1	line from LINDETP1 115.00 (2) to (3) GWF2 TAP 115.00	1	115	30	308
	obranch 33036 32954 1	line from LINDETP1 115.00 (2) to (3) DOW TAP1 115.00	1	115	30	308
	obranch 33036 33030 1	line from LINDETP1 115.00 (2) to (2) COLSTJT1 115.00	1	115	30	308
	obranch 33030 32950 1	line from COLSTJT1 115.00 (2) to BRKR PITSBURG 115.00	1	115	30	308
	obranch 32955 32952 1	line from DOW TAP2 115.00 (2) to BRKR POSCO 115.00	1	115	30	338-308
12	B2 LINE Lakeville - Sobrante		1	230	30	302-308
	obranch 30435 30540 1	line from LAKEVILE 230.00 BRKR to BRKR SOBRANTE 230.00	1	230	30	302-308
13	B2 LINE Sobrante - Ignacio			230-18	30	
	obranch 30437 30438 1	line from CROCKETT 230.00 (3) to (2) C&H 230.00	1	230	30	307
	obranch 30437 30445 1	line from CROCKETT 230.00 (3) to BRKR IGNACIO 230.00	1	230	30	307-306
	obranch 30437 30540 1	line from CROCKETT 230.00 (3) to BRKR SOBRANTE 230.00	1	230	30	307-308
	obranch 30438 32900 1	TRAN from C&H 230.00 (2) to (1) CRCKTCOG 18.00	1	18-230	30	396-307
14	B2 LINE Bahia - Moraga		1	230	30	306-308
	obranch 30465 30550 1	line from BAHIA 230.00 BRKR to BRKR MORAGA 230.00	1	230	30	306-308
15	B2 LINE Contra Costa - Vaca Dixon			230	30	304-308
	setqload 30472: 0.0	LOAD-DROP PEABDY A 230.00 LOAD==8.823(-1.791586)				
	obranch 30529 30525 1	line from HIWD TAP 230.00 (3) to BRKR C.COSTA 230.00	1	230	30	308
	obranch 30472 30460 1	line from PBDY TPA 230.00 (3) to BRKR VACA-DIX 230.00	1	230	30	304
	obranch 30529 30472 1	line from HIWD TAP 230.00 (3) to BRKR PEABDY A 230.00	1	230	30	304-308
	setpload 30472: 0.0	LOAD-DROP PEABDY A 230.00 LOAD==8.823(-1.791586)				
16	B2 LINE Contra Costa Sub - Vaca Dixon				30	
	obranch 30478 30475 1	line from LAMBIE 230.00 (3) to (3) PBDY TPB 230.00	1	230	30	304
	obranch 30480 32168 1	TRAN from USWP-RUS 230.00 (3) to (1) USWINDPW 9.11	1	9.11-230	30	398-304
	obranch 30475 30460 1	line from PBDY TPB 230.00 (3) to BRKR VACA-DIX 230.00	1	230	30	304
	obranch 30480 30523 1	line from USWP-RUS 230.00 (3) to BRKR CC SUB 230.00	1	230	30	304-308
	obranch 30480 30478 1	line from USWP-RUS 230.00 (3) to BRKR LAMBIE 230.00	1	230	30	304
	obranch 32117 30478 1	line from LAMBIE69 230.00 (3) to BRKR LAMBIE 230.00	1	69-230	30	304
17	B2 LINE Contra Costa Sub - Contra Costa		1	230	30	308
	obranch 30523 30525 1	line from CC SUB 230.00 BRKR to BRKR C.COSTA 230.00	1	230	30	308
18	B2 LINE Contra Costa - Brentwood		1	230	30	308
	obranch 30525 30565 1	line from C.COSTA 230.00 BRKR to BRKR BRENTWOD 230.0	1	230	30	308
19	B2 LINE Contra Costa - Delta Pump			230-9.11	30	
	obranch 30575 33170 1	TRAN from WND MSTR 230.00 (3) to (1) WINDMSTR 9.11	1	9.11-230	30	399-308
	obranch 30525 30575 1	line from C.COSTA 230.00 BRKR to (3) WND MSTR 230.00	1	230	30	308
	obranch 30575 38610 1	line from WND MSTR 230.00 (3) to BRKR DELTAPMP 230.00	1	230	30	308-327
20	B2 LINE Contra Costa - Los Positas		1	230	30	308-316
	obranch 30525 30585 1	line from C.COSTA 230.00 BRKR to BRKR LS PSTAS 230.0	1	230	30	308-316
21	B2 LINE Contra Costa - Newark D			230-9.11	30	
	obranch 30590 33838 1	TRAN from USWP-JRW 230.00 (3) to (1) USWP_#3 9.11	1	9.11-230	30	399-316
	obranch 30590 30537 1	line from USWP-JRW 230.00 (3) to (3) DUBLIN 230.00	1	230	30	316
	obranch 30537 30527 1	line from DUBLIN 230.00 (3) to (3) N_LVMRE 230.00	1	230	30	316
	obranch 30527 35224 1	line from N_LVMRE 230.00 (3) to VINEYD D 230.00	1	230	30	316
	obranch 35224 35219 1	line from VINEYD D 230.00 (3) to VINEYARD 230.00	1	230	30	316
	obranch 35219 30630 1	line from VINEYARD 230.00 (3) to BRKR NEWARK D 230.00	1	230	30	316
	obranch 30525 30590 1	line from C.COSTA 230.00 BRKR to (3) USWP-JRW 230.00	1	230	30	308-316
22	B2 LINE Pittsburg - Tidewater		1	230	30	308
	obranch 30526 30535 1	line from PITSBURG 230.00 BRKR to BRKR TIDEWATR 230.00	1	230	30	308

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No.	Contingency		Ckt	Base kV	Area	Zone
23	B2 LINE Pittsburg - Sobrante		1	230	30	308
	obranch 30526 30540 1	line from PITSBURG 230.00 BRKR to BRKR SOBRANTE 230.0	1	230	30	308
24	B2 LINE Pittsburg - Rossmoor			230	30	308
	obranch 30526 30543 1	line from PITSBURG 230.00 BRKR to ROSSTAP1 230.00	1			
	obranch 30543 30545 1	line from ROSSTAP1 230.00 to BRKR ROSSMOOR 230.00	1	230	30	308
	obranch 30543 30550 1	line from ROSSMOOR 230.00 BRKR to BRKR MORAGA 230.0	1	230	30	308
24	B2 LINE Contra Costa - Rossmoor			230	30	308
	obranch 30525 30543 1	line from PITSBURG 230.00 BRKR to ROSSTAP1 230.00	1	230	30	308
	obranch 30543 30545 1	line from ROSSTAP1 230.00 to BRKR ROSSMOOR 230.00	1	230	30	308
	obranch 30543 30550 1	line from ROSSMOOR 230.00 BRKR to BRKR MORAGA 230.0	1	230	30	308
25	B2 LINE Pittsburg - Moraga			230	30	308
	obranch 30544 30550 1	line from ROSSTAP2 230.00 to BRKR MORAGA 230.00	1	230	30	308
	obranch 30526 30544 1	line from PITSBURG 230.00 BRKR to ROSSTAP2 230.00	1			
25	B2 LINE Contra Costa - Moraga			230	30	308
	obranch 30525 30544 1	line from PITSBURG 230.00 BRKR to ROSSTAP2 230.00	1	230	30	308
	obranch 30544 30550 1	line from ROSSTAP2 230.00 to BRKR MORAGA 230.00	1	230	30	308
26	B2 LINE Pittsburg - San Ramon		1	230	30	308-316
	obranch 30526 30555 1	line from PITSBURG 230.00 BRKR to BRKR SANRAMON 230.0	1	230	30	308-316
27	B2 LINE Pittburg - FlowInd2 - Tesla D			230-9.11	30	
	obranch 30526 30595 1	line from PITSBURG 230.00 BRKR to (3) FLOWIND2 230.00	1	230	30	308-311
	obranch 30595 30640 1	line from FLOWIND2 230.00 (3) to BRKR TESLA D 230.00	1	230	30	311
	obranch 30595 33840 1	TRAN from FLOWIND2 230.00 (3) to (1) FLOWD3-6 9.11	1	9.11-230	30	399-311
28	B2 LINE Pittburg - JV Enterprises - Tesla D			230-9.11	30	
	obranch 30526 30600 1	line from PITSBURG 230.00 BRKR to (3) JV ENTER 230.00	1	230	30	308
	obranch 30600 30640 1	line from JV ENTER 230.00 (3) to BRKR TESLA D 230.00	1	230	30	308-311
	obranch 30600 33171 1	TRAN from JV ENTER 230.00 (3) to (1) JVE&HOWD 9.11	1	9.11-230	30	399-308
29	B2 LINE Tidewater - Sobrante		1	230	30	308
	obranch 30535 30540 1	line from TIDEWATR 230.00 BRKR to BRKR SOBRANTE 230.0	1	230	30	308
31	B2 LINE Moraga - Castro Valley		1	230	30	308-316
	obranch 30550 30554 1	line from MORAGA 230.00 BRKR to BRKR CASTROVL 230.00	1	230	30	308-316
32	B2 LINE Moraga - San Ramon		1	230	30	308-316
	obranch 30550 30555 1	line from MORAGA 230.00 BRKR to BRKR SANRAMON 230.0	1	230	30	308-316
33	B2 LINE Brentwood - Kelso		1	230	30	308-341
	obranch 30565 30569 1	line from BRENTWOD 230.00 BRKR to BRKR KELSO 230.00	1	230	30	308-341
34	B2 LINE Kelso - Telsa D			230-9.11	30	
	obranch 30569 30570 1	line from KELSO 230.00 BRKR to (4) USWP-RLF 230.00	1	230	30	341-311
	obranch 30570 30571 1	line from USWP-RLF 230.00 (4) to (2) ALTALAND 230.00	1	230	30	311
	obranch 30570 30625 1	line from USWP-RLF 230.00 (4) to BRKR TESLA D 230.00	1	230	30	311
	obranch 30570 33836 1	TRAN from USWP-RLF 230.00 (4) to (1) USWP_#4 9.11	1	9.11-230	30	399-311
	obranch 30571 33832 1	TRAN from ALTALAND 230.00 (2) to (1) COG.CAPT 9.11	1	9.11-230	30	396-311
35	B2 LINE Tesla D - Delta Pump			230-9.11	30	
	obranch 30580 38610 1	line from ALTM MDW 230.00 (3) to BRKR DELTAPMP 230.00	1	230	30	327-311
	obranch 30580 33175 1	TRAN from ALTM MDW 230.00 (3) to (1) ALTAMONT 9.11	1	9.11-230	30	399-311
	obranch 30580 30625 1	line from ALTM MDW 230.00 (3) to BRKR TESLA D 230.00	1	230	30	311
36	B2 LINE Oleum - Matinez D			115	30	308-307
	obranch 33016 32990 1	line from ALHAMTP2 115.00 to BRKR MARTNZ D 115.00	1	115	30	308
	obranch 32754 33016 1	line from OLEUM 115.00 BRKR to ALHAMTP2 115.00	1	115	30	308-307
37	B2 LINE Christie - Sobrante		1	115	30	307-308
	obranch 32756 33010 1	line from CHRISTIE 115.00 BRKR to BRKR SOBRANTE 115.00	1	115	30	307-308
39	B2 LINE El Crrto - Sobrante #1		1	115	30	307-308
	obranch 32766 33010 1	line from EL CRRTO 115.00 BRKR to BRKR SOBRANTE 115.0	1	115	30	307-308
40	B2 LINE El Crrto - Sobrante #2		2	115	30	307-308

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 32766 33010 2	line from EL CRRTO 115.00 BRKR to BRKR SOBRANTE 115.0	2	115	30	307-308
41	B2 LINE Richmond - Sobrante #1		1	115	30	307-308
	obranch 32768 33010 1	line from RICHMOND 115.00 BRKR to BRKR SOBRANTE 115.0	1	115	30	307-308
42	B2 LINE Richmond - Sobrante #2		2	115	30	307-308
	obranch 32768 33010 2	line from RICHMOND 115.00 BRKR to BRKR SOBRANTE 115.0	2	115	30	307-308
43	B2 LINE Sobrante - Claremont #1			115	30	
	obranch 33012 32780 1	line from EST PRTL 115.00 (2) to BRKR CLAREMNT 115.00	1	115	30	338-307
	setpload 33012: 0.0	LOAD-DROP EST PRTL 115.00 LOAD==8(4.96)				
	setqload 33012: 0.0	LOAD-DROP EST PRTL 115.00 LOAD==8(4.96)				
	obranch 33006 33010 1	line from GRIZLYJ1 115.00 (3) to BRKR SOBRANTE 115.00	1	115	30	308
	obranch 32770 32742 1	line from GRIZZLY2 115.00 BRKR to (3) UCB JCT1 115.00	1	115	30	307
	obranch 32742 33006 1	line from UCB JCT1 115.00 (3) to (3) GRIZLYJ1 115.00	1	115	30	307-308
	obranch 33006 33012 1	line from GRIZLYJ1 115.00 (3) to (2) EST PRTL 115.00	1	115	30	308-338
44	B2 LINE Claremont - Sobrante #2			115	30	307-308
	obranch 32770 32744 2	line from GRIZZLY2 115.00 BRKR to (3) UCB JCT2 115.00	2	115	30	307
	obranch 32744 33008 2	line from UCB JCT2 115.00 (3) to (3) GRIZLYJ2 115.00	2	115	30	307-308
	obranch 33008 32780 1	line from GRIZLYJ2 115.00 (3) to BRKR CLAREMNT 115.00	1	115	30	308-307
	obranch 33008 33010 1	line from GRIZLYJ2 115.00 (3) to BRKR SOBRANTE 115.00	1	115	30	308
45	B2 LINE Sobrante - Std. Oil			115	30	
	obranch 32750 32760 1	line from PPSTLTAP 115.00 (3) to (1) PT PINLE 115.00	1	115	30	307
	setqload 32760: 0.0	LOAD-DROP PT PINLE 115.00 LOAD==17.831501(1.1305)				
	setpload 32760: 0.0	LOAD-DROP PT PINLE 115.00 LOAD==17.831501(1.1305)				
	obranch 32750 32748 1	line from PPSTLTAP 115.00 (3) to (1) PP STEEL 115.00	1	115	30	337-307
	obranch 32774 32750 1	line from PTPNLTAP 115.00 (3) to (1) PPSTLTAP 115.00	1	115	30	307
	obranch 32808 33010 1	line from SNPBLTP2 115.00 (3) to BRKR SOBRANTE 115.00	1	115	30	307-308
	obranch 32774 32808 1	line from PTPNLTAP 115.00 (3) to SNPBLTP2 115.00	1	115	30	307
	obranch 32774 32762 1	line from PTPNLTAP 115.00 (3) to BRKR STD. OIL 115.00	1	115	30	337-307
46	B2 LINE Christie - TAP GWF5				30	
	obranch 33067 32854 1	line from PCBRICK 60.00 (3) to (1) PRT CSTA 60.00	1	60	30	337-308
	setqload 32854: 0.0	LOAD-DROP PRT CSTA 60.00 LOAD==1.14(0.9785)				
	setpload 33064: 0.0	LOAD-DROP SFPP CNC 60.00 LOAD==12.8(7.6)				
	setqload 33139: 0.0	LOAD-DROP STAUFER 9.11 LOAD==3.6(0.82)				
	setqload 33064: 0.0	LOAD-DROP SFPP CNC 60.00 LOAD==12.8(7.6)				
	setpload 33139: 0.0	LOAD-DROP STAUFER 9.11 LOAD==3.6(0.82)				
	setqload 33065: 0.0	LOAD-DROP URICH 60.00 LOAD==2.2(1.65)				
	setpload 33065: 0.0	LOAD-DROP URICH 60.00 LOAD==2.2(1.65)				
	setpload 32854: 0.0	LOAD-DROP PRT CSTA 60.00 LOAD==1.14(0.9785)				
	obranch 33091 33135 1	TRAN from TAP GWF5 60.00 (2) to (1) GWF #5 13.80	1	13.8-60	30	396-308
	obranch 33064 33091 1	line from SFPP CNC 60.00 (2) to (2) TAP GWF5 60.00	1	60	30	338-308
	obranch 33065 33064 1	line from URICH 60.00 (2) to (2) SFPP CNC 60.00	1	60	30	338
	obranch 33066 33139 1	TRAN from STAUFFER 60.00 (3) to (1) STAUFER 9.11	1	9.11-60	30	396-308
	obranch 33067 33066 1	line from PCBRICK 60.00 (3) to (3) STAUFFER 60.00	1	60	30	308
	obranch 32852 33067 1	line from CHRISTIE 60.00 BRKR to (3) PCBRICK 60.00	1	60	30	307-308
	obranch 33066 33065 1	line from STAUFFER 60.00 (3) to (2) URICH 60.00	1	60	30	308-338
47	B2 LINE Pittsburg - Clayton		1	115	30	308
	obranch 32950 32970 1	line from PITSBURG 115.00 BRKR to BRKR CLAYTON 115.00	1	115	30	308
48	B2 LINE Pittsburg - Bollman#2 - Martinez E			115	30	308-338
	setqload 32992: 0.0	LOAD-TRANSFER BOLLMAN2 115.00 TO BOLLMAN1 115.0				
	setqload 33040:3.62	LOAD-TRANSFER BOLLMAN2 115.00 TO BOLLMAN1 115.0				
	setpload 33040: 6.1	LOAD-TRANSFER BOLLMAN2 115.00 TO BOLLMAN1 115.0				
	obranch 33043 32991 1	line from IMHOFF_2 115.00 (2) to BRKR MARTNZ E 115.00	1	115	30	308
	obranch 32992 33043 1	line from BOLLMAN2 115.00 (2) to (2) IMHOFF_2 115.00	1	115	30	308-338
	obranch 32950 32992 1	line from PITSBURG 115.00 BRKR to (2) BOLLMAN2 115.00	1	115	30	308-338
	setpload 32992: 0.0	LOAD-TRANSFER BOLLMAN2 115.00 TO BOLLMAN1 115.0				

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No.	Contingency		Ckt	Base kV	Area	Zone
49	B2 Pittsburg - Bollman#1 - Martinez E			115	30-8	308-338
	obranch 33040 33042 1	line from BOLLMAN1 115.00 (2) to (3) IMHOFF_1 115.00	1	115	30	308-338
	setqload 32994: 0.0	LOAD-DROP CCCSD 12.47 LOAD==4(0.91)				
	setpload 32994: 0.0	LOAD-DROP CCCSD 12.47 LOAD==4(0.91)				
	setqload 32993: 0.0	LOAD-DROP W.P.BART 115.00 LOAD==12(1.71)				
	obranch 33042 32991 1	line from IMHOFF_1 115.00 (3) to BRKR MARTNZ E 115.00	1	115	30	308
	obranch 32994 33040 1	line from W.P.BART 115.00 (2) to (2) BOLLMAN1 115.00	1	115	8-30	338
	obranch 32993 33040 1	line from W.P.BART 115.00 (2) to (2) BOLLMAN1 115.00	1	115	30	338
	obranch 32950 32993 1	line from PITSBURG 115.00 BRKR to (2) W.P.BART 115.00	1	115	30	308-338
	setpload 32993: 0.0	LOAD-DROP W.P.BART 115.00 LOAD==12(1.71)				
50	B2 LINE Pittsburg - Kirker Tap - Clayton			115	30	308
	obranch 32950 33032 3	line from PITSBURG 115.00 BRKR to (2) KIRKTAP1 115.00	3	115	30	308
	obranch 33032 32970 3	line from KIRKTAP1 115.00 (2) to BRKR CLAYTON 115.00	3	115	30	308
50	B2 LINE Pittsburg - Clayton		4	115	30	308
	obranch 32950 32970 4	line from KIRKTAP1 115.00 (2) to BRKR CLAYTON 115.00	4	115	30	308
51	B2 LINE Clayton - Meadow Lane		1	115	30	308
	obranch 32970 32971 1	line from CLAYTON 115.00 BRKR to BRKR MEDW LNE 115.00	1	115	30	308
52	B2 LINE Clayton - Lakewood Jct - Meadow Lane			115	30	308-338
	obranch 33035 32972 1	line from LKWD_JCT 115.00 (3) to (2) EBMUDGRY 115.00	1	115	30	338-308
	obranch 33035 32973 1	line from LKWD_JCT 115.00 (3) to BRKR LAKEWD-C 115.00	1	115	30	308
	obranch 32972 32971 1	line from EBMUDGRY 115.00 (2) to BRKR MEDW LNE 115.00	1	115	30	308-338
	setpload 32972: 0.0	LOAD-DROP EBMUDGRY 115.00 LOAD==0.3(0.15)				
	setpload 32972: 0.0	LOAD-DROP EBMUDGRY 115.00 LOAD==0.3(0.15)				
	obranch 32970 33035 1	line from CLAYTON 115.00 BRKR to (3) LKWD_JCT 115.00	1	115	30	308
53	B2 LINE Lake WDM - Lake WD C		1	115	30	308
	obranch 32974 32973 1	line from LAKEWD-M 115.00 BRKR to BRKR LAKEWD-C 115.0	1	115	30	308
54	B2 LINE Lake WDM - Lake Reactor			115	30	308-338
	setqload 32975:0.0	LOAD-DROP LKWDBART 115.00 LOAD==7.2(1.03)				
	obranch 32974 32975 1	line from LAKEWD-M 115.00 BRKR to (1) LKWDBART 115.00	1	115	30	308-338
	setpload 32975:0.0	LOAD-DROP LKWDBART 115.00 LOAD==7.2(1.03)				
55	B2 LINE Sobrante - Moraga			115	30	308
	obranch 32974 32976 9	line from LAKEWD-M 115.00 BRKR to (2) LK_REACT 115.00	9	115	30	308
	obranch 32976 33048 1	line from LK_REACT 115.00 (2) to (3) MORAGAJT 115.00	1	115	30	308
	obranch 33048 33010 1	line from MORAGAJT 115.00 (3) to BRKR SOBRANTE 115.00	1	115	30	308
	obranch 33048 33020 1	line from MORAGAJT 115.00 (3) to BRKR MORAGA 115.00	1	115	30	308
56	B2 LINE Martinez D - Sobrante			115	30	308
	setqload 33011: 0.0	LOAD-DROP ALHAMBRA 115.00 LOAD==21.4(4)				
	setpload 33011: 0.0	LOAD-DROP ALHAMBRA 115.00 LOAD==21.4(4)				
	obranch 32990 33014 1	line from MARTNZ D 115.00 BRKR to (2) ALHAMTP1 115.00	1	115	30	308
	obranch 33014 33011 1	line from ALHAMTP1 115.00 (2) to (2) ALHAMBRA 115.00	1	115	30	308
	obranch 33014 33010 1	line from ALHAMTP1 115.00 (2) to BRKR SOBRANTE 115.00	1	115	30	308
57	B2 LINE Matinez E - Martinez D		1	115	30	308
	obranch 32991 32990 1	line from MARTNZ E 115.00 BRKR to BRKR MARTNZ D 115.00	1	115	30	308
58	B2 LINE Moraga - Claremont #1		1	115	30	308-307
	obranch 33020 32780 1	line from MORAGA 115.00 BRKR to BRKR CLAREMNT 115.0	1	115	30	308-307
59	B2 LINE Moraga - Claremont #2		2	115	30	308-307
	obranch 33020 32780 2	line from MORAGA 115.00 BRKR to BRKR CLAREMNT 115.0	2	115	30	308-307
60	B2 LINE Moraga - Station X #1		1	115	30	308-307
	obranch 33020 32790 1	line from MORAGA 115.00 BRKR to BRKR STATIN X 115.00	1	115	30	308-307
61	B2 LINE Moraga - Station X #2		2	115	30	308-307
	obranch 33020 32790 2	line from MORAGA 115.00 BRKR to BRKR STATIN X 115.00	2	115	30	308-307
62	B2 LINE Moraga - Station X #3		3	115	30	308-307
	obranch 33020 32790 3	line from MORAGA 115.00 BRKR to BRKR STATIN X 115.00	3	115	30	308-307

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No.	Contingency		Ckt	Base kV	Area	Zone
63	B2 LINE Moraga - Station X #4		4	115	30	308-307
	obranch 33020 32790 4	line from MORAGA 115.00 BRKR to BRKR STATIN X 115.00	4	115	30	308-307
64	B2 LINE Moraga - Station J		1	115	30	308-307
	obranch 33020 32792 1	line from MORAGA 115.00 BRKR to BRKR STATIN J 115.00	1	115	30	308-307
65	B2 LINE Moraga - San Leandro #1		1	115	30	308-316
	obranch 33020 35101 1	line from MORAGA 115.00 BRKR to BRKR SN LNDRO 115.00	1	115	30	308-316
66	B2 LINE Moraga - San Leandro #2		2	115	30	308-316
	obranch 33020 35101 2	line from MORAGA 115.00 BRKR to BRKR SN LNDRO 115.00	2	115	30	308-316
67	B2 LINE Moraga - San Leandro #3		3	115	30	308-316
	obranch 33020 35101 3	line from MORAGA 115.00 BRKR to BRKR SN LNDRO 115.00	3	115	30	308-316
68	B2 LINE Oak City - Oakland23		1	115	30	337-362
	obranch 32786 32904 1	line from OAK C115 115.00 BRKR to BRKR OADLND23 115.00	1	115	30	337-362
69	B2 LINE Oleum - Christie			115	30	307-306
	obranch 32778 32756 1	line from MRTNZJCT 115.00 (3) to BRKR CHRISTIE 115.00	1	115	30	307
	setpload 32602: 0.0	LOAD-DROP NRTH TWR 115.00 LOAD==29.86845(4.256021)				
	obranch 32620 32778 1	line from NTWRJCT2 115.00 BRKR to (3) MRTNZJCT 115.00	1	115	30	306-307
	obranch 32602 32620 1	line from NRTH TWR 115.00 BRKR to (3) NTWRJCT2 115.00	1	115	30	306
	obranch 32778 32754 1	line from MRTNZJCT 115.00 (3) to BRKR OLEUM 115.00	1	115	30	307
70	B2 Bart - El Cerrito			115	30	337-307
	setpload 32752: 0.0	LOAD-DROP E.C.BART 115.00 LOAD==7.56(4.685266)				
	setqload 32752: 0.0	LOAD-DROP E.C.BART 115.00 LOAD==7.56(4.685266)				
	obranch 32752 32766 1	line from E.C.BART 115.00 (1) to BRKR EL CRRTO 115.00	1	115	30	337-307
71	B2 LINE Oleum - Valley View - El Cerrito			115	30	307
	setpload 32764: 0.0	LOAD-TRANSFER VALLY VW 115.00 TO EL CRRTO 115.00				
	setqload 32766:19.269	LOAD-TRANSFER VALLY VW 115.00 TO EL CRRTO 115.00				
	setqload 32764: 0.0	LOAD-TRANSFER VALLY VW 115.00 TO EL CRRTO 115.00				
	obranch 32802 32766 1	line from VLYVWTP1 115.00 (2) to BRKR EL CRRTO 115.00	1	115	30	307
	obranch 32802 32764 1	line from VLYVWTP1 115.00 BRKR to (2) VALLY VW 115.00	1	115	30	307
	obranch 32754 32802 1	line from OLEUM 115.00 BRKR to (2) VLYVWTP1 115.00	1	115	30	307
	setpload 32766:103.515	LOAD-TRANSFER VALLY VW 115.00 TO EL CRRTO 115.00				
72	B2 LINE Oleum - El Cerrito			115	30	307
	obranch 32754 32804 1	line from OLEUM 115.00 BRKR to BRKR VLYVWTP2 115.00	1	115	30	307
	obranch 32804 32766 1	line from VLYVWTP2 115.00 BRKR to BRKR EL CRRTO 115.00	1	115	30	307
73	B2 LINE Oleum - Martinez D (Duplicate of 36)			115	30	308-307
	obranch 32754 33016 1	line from OLEUM 115.00 BRKR to ALHAMTP2 115.00	1	115	30	308-307
	obranch 33016 32990 1	line from ALHAMTP2 115.00 to BRKR MARTNZ D 115.00	1	115	30	308
74	B2 LINE Chrisitie - Sobrante		1	115	30	307-308
	obranch 32756 33010 1	line from CHRISTIE 115.00 BRKR to BRKR SOBRANTE 115.00	1	115	30	307-308
75	B2 LINE Standard Oil - San Pablo - Sobrante			115	30	
	setqload 32758: 0.0	LOAD-TRANSFER SAN PBLO 115.00 TO SOBRANTE 115.00				
	setqload 33010: 7.466	LOAD-TRANSFER SAN PBLO 115.00 TO SOBRANTE 115.00				
	setpload 33010:43.531	LOAD-TRANSFER SAN PBLO 115.00 TO SOBRANTE 115.00				
	obranch 32806 33010 1	line from SNPBLTP1 115.00 (2) to BRKR SOBRANTE 115.00	1	115	30	307-308
	obranch 32806 32762 1	line from SNPBLTP1 115.00 (2) to BRKR STD. OIL 115.00	1	115	30	307-337
	obranch 32758 32806 1	line from SAN PBLO 115.00 (2) to BRKR SNPBLTP1 115.00	1	115	30	307
	setpload 32758: 0.0	LOAD-TRANSFER SAN PBLO 115.00 TO SOBRANTE 115.00				
77	B2 LINE Claremont - Station D #1		1	115	30	307
	obranch 32780 32782 1	line from CLAREMNT 115.00 BRKR to BRKR STATIN D 115.00	1	115	30	307
78	B2 LINE Claremont - Station D #2		2	115	30	307
	obranch 32780 32782 2	line from CLAREMNT 115.00 BRKR to BRKR STATIN D 115.00	2	115	30	307
79	B2 LINE Station D - Station L		1	115	30	307
	obranch 32782 32788 1	line from STATIN D 115.00 BRKR to BRKR STATIN L 115.00	1	115	30	307
80	B2 LINE Oak C - Station L		1	115	30	337-307

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 32786 32788 1	line from OAK C115 115.00 BRKR to BRKR STATIN L 115.00	1	115	30	337-307
81	B2 LINE Oak C - Station X		1	115	30	337-307
	obranch 32786 32790 1	line from OAK C115 115.00 BRKR to BRKR STATIN X 115.00	1	115	30	337-307
82	B2 LINE Oak C - Maritime			115	30	337
	obranch 32786 32794 1	line from OAK C115 115.00 BRKR to (1) MARITIME 115.00	1	115	30	337
	setpload 32794: 0.0	LOAD-DROP MARITIME 115.00 LOAD==19.700001(12.208962				
	setqload 32794: 0.0	LOAD-DROP MARITIME 115.00 LOAD==19.700001(12.208962				
83	B2 LINE Oak City - Alameda		1	115	30	337-328
	obranch 32786 38026 1	line from OAK C115 115.00 BRKR to BRKR ALAMEDCT 115.00	1	115	30	337-328
86	B2 LINE Station J - Alameda (Jenny)		1	115	30	307-328
	obranch 32792 38024 1	line from STATIN J 115.00 BRKR to BRKR ALAMDA J 115.00	1	115	30	307-328
87	B2 LINE East Portal - Claremont		1	115	30	338-307
	obranch 33012 32780 1	line from EAST PRTL 115.00 BRKR to BRKR CLAREMNT 115.0	1	115	30	338-307
88	B2 LINE Los Positas - Newark D		1	230	30	316
	obranch 30585 30630 1	line from LOS POSITAS 230.00 BRKR to BRKR NEWARK D 23	1	230	30	316
89	B2 LINE East Shore - San Mateo #1		1	230	30	316-310
	obranch 30560 30700 1	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	1	230	30	316-310
89	B2 LINE East Shore - San Mateo #2		2	230	30	316-310
	obranch 30560 30700 2	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	2	230	30	316-310
90	B2 LINE Castro Valley - Newark E		1	230	30	316
	obranch 30554 30631 1	line from CASTROVL 230.00 BRKR to BRKR NEWARK E 230.0	1	230	30	316
91	B2 LINE Tesla E - Newark D		1	230	30	311-316
	obranch 30624 30630 1	line from TESLA E 230.00 BRKR to BRKR NEWARK D 230.00	1	230	30	311-316
92	B2 LINE Tesla E - Ravenswood		1	230	30	311-310
	obranch 30640 30703 1	line from TESLA F 230.00 BRKR to BRKR RAVENSWD 230.00	1	230	30	311-310
93	B2 LINE Ravenswood - San Mateo #1		1	230	30	310
	obranch 30703 30700 1	line from RAVENSWD 230.00 BRKR to BRKR SANMATEO 230.	1	230	30	310
93	B2 LINE Ravenswood - San Mateo #2		2	230	30	310
	obranch 30703 30700 2	line from RAVENSWD 230.00 BRKR to BRKR SANMATEO 230.	2	230	30	310
93	B2 LINE Newark - Ravenswood			230	30	316-310
	obranch 30630 30639 1	line from RAVENSWD 230.00 BRKR to BRKR FGP_TAP 230.00	1	230	30	316
	obranch 30639 30703 1	line from FGP_TAP 230.00 BRKR to BRKR RAVENSWD 230.0	1	230	30	316-310
94	B2 LINE Newark E - Los Esteros		1	230	30	316-318
	obranch 30635 30731 1	line from NEWARK E 230.00 BRKR to BRKR LS_ESTRS 230.0	1	230	30	316-318
95	B2 LINE Metcalf - Los Esteros		1	230	30	318
	obranch 30735 30731 1	line from LS_ESTRS 230.00 BRKR to BRKR METCALF 230.00	1	230	30	318
96	B2 LINE Tesla E - Newark D (ADCC)			230-9.11	30	
	obranch 30655 30630 1	TRAN from ADCC 230.00 (2) to (1) NEWARK D 230.00	1	230	30	311-316
	obranch 30640 30655 1	line from TESLA 2E 230.00 BRKR to (2) ADCC 230.00	1	230	30	311
	obranch 30655 35310 1	TRAN from ADCC 230.00 (2) to (1) LFC FIN+ 9.11	1	9.11-230	30	399-311
97	B2 LINE Dumbarton - Newark		1	115	30	316
	obranch 35107 35120 1	line from DUMBARTN 115.00 BRKR to BRKR NEWARK D 115.	1	115	30	316
98	B2 LINE East Shore - Dumbarton		1	115	30	316
	obranch 35105 35107 1	line from EASTSHRE 115.00 BRKR to BRKR DUMBARTN 115.	1	115	30	316
99	B2 LINE Russell City - East Shore #1		1			
	obranch 89950 30560 1	line from GRANT 115.00 BRKR to EASTSHORE 115.00	1			
99	B2 LINE Russell City - East Shore #2		2			
	obranch 89950 30560 2	line from GRANT 115.00 BRKR to EASTSHORE 115.00	2			
100	B2 LINE East Shore - Mt Eden #1		1	115	30	316
	obranch 35105 35106 1	line from EASTSHRE 115.00 BRKR to BRKR MT EDEN 115.00	1	115	30	316
101	B2 LINE East Shore - Mt Eden #2		2	115	30	316

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 35105 35106 2	line from EASTSHRE 115.00 BRKR to BRKR MT EDEN 115.00	2	115	30	316
102	B2 LINE Owens Tap - Station J			115	30	307-337
	obranch 32798 32792 1	line from OWENSTAP 115.00 (3) to BRKR STATIN J 115.00	1	115	30	307
	obranch 32798 32800 1	line from OWENSTAP 115.00 (3) to (1) OWNBRKWY 115.00	1	115	30	307-337
103	B2 LINE San Leandro - Station J			115	30	
	obranch 35101 35113 1	line from SN LNDRO 115.00 BRKR to (2) DMTAR_SL 115.00	1	115	30	316-346
	obranch 32814 32792 1	line from EDESTAP1 115.00 (2) to BRKR STATIN J 115.00	1	115	30	307
	obranch 32810 32814 1	line from EDES 115.00 (2) to (2) EDESTAP1 115.00	1	115	30	307
	obranch 35113 32814 1	line from DMTAR_SL 115.00 (2) to (2) EDESTAP1 115.00	1	115	30	307-346
104	B2 LINE Newark E - Freemont #1		1	115	30	316
	obranch 35121 35110 1	line from NEWARK E 115.00 BRKR to BRKR FREMNT 115.00	1	115	30	316
105	B2 LINE Newark E - Freemont #2		2	115	30	316
	obranch 35121 35110 2	line from NEWARK E 115.00 BRKR to BRKR FREMNT 115.00	2	115	30	316
106	B2 LINE Newark D - Jarvis #1		1	115	30	316
	obranch 35120 35111 1	line from NEWARK D 115.00 BRKR to BRKR JARVIS 115.00	1	115	30	316
108	B2 LINE Newark F - Nummi			115	30	316
	setqload 35126: 0.0	LOAD-TRANSFER NUMMI 115.00 TO JARVIS 115.00				
	setpload 35111:95.867	LOAD-TRANSFER NUMMI 115.00 TO JARVIS 115.00				
	setpload 35126: 0.0	LOAD-TRANSFER NUMMI 115.00 TO JARVIS 115.00				
	obranch 35126 35122 1	line from NUMI_TAP 115.00 BRKR to (1) NUMMI 115.00	1	115	30	316
	obranch 35122 35126 1	line from NEWARK F 115.00 BRKR to (1) NUMI_TAP 115.00	1	115	30	316
	setqload 35111:33.647	LOAD-TRANSFER NUMMI 115.00 TO JARVIS 115.00				
110	B2 LINE Newark D - Los Esteros #1		1	230	30	316-318
	obranch 30635 30731 1	line from NEWARK D 230.00 BRKR to BRKR LS_ESTRS 230.0	1	230	30	316-318
111	B2 LINE Newark E - Ames BS1 #1		1	115	30	316-317
	obranch 35121 35350 1	line from NEWARK E 115.00 BRKR to BRKR AMES BS1 115.00	1	115	30	316-317
112	B2 LINE Newark E - Ames BS1 #2		3	115	30	316-317
	obranch 35121 35350 3	line from NEWARK E 115.00 BRKR to BRKR AMES BS1 115.00	3	115	30	316-317
113	B2 LINE Newark E - Ames BS2 #1		2	115	30	316-317
	obranch 35121 35351 2	line from NEWARK E 115.00 BRKR to BRKR AMES BS2 115.00	2	115	30	316-317
115	B2 LINE Newark F - Lockheed			115	30	
	obranch 35358 35359 1	line from MFT.FD J 115.00 (3) to (1) MOFT.FLD 115.00	1	115	30	317-347
	setqload 35359: 0.0	LOAD-DROP MOFT.FLD 115.00 LOAD==4.4772(1.02459)				
	setpload 35361: 0.0	LOAD-DROP LOCKHD 1 115.00 LOAD==23.5914(5.37264)				
	setqload 35361: 0.0	LOAD-DROP LOCKHD 1 115.00 LOAD==23.5914(5.37264)				
	obranch 35357 35363 1	line from LCKHD J1 115.00 (3) to BRKR LAWRENCE 115.00	1	115	30	317
	obranch 35357 35358 1	line from LCKHD J1 115.00 (3) to (3) MFT.FD J 115.00	1	115	30	317
	obranch 35122 35357 1	line from NEWARK F 115.00 BRKR to (3) LCKHD J1 115.00	1	115	30	316-317
	obranch 35358 35361 1	line from MFT.FD J 115.00 (3) to BRKR LOCKHD 1 115.00	1	115	30	317-347
	setpload 35359: 0.0	LOAD-DROP MOFT.FLD 115.00 LOAD==4.4772(1.02459)				
116	B2 LINE Newark F - Britton			115	30	
	obranch 35365 35369 1	line from AMD JCT 115.00 (3) to (2) APP MAT 115.00	1	115	30	347-317
	setqload 35364: 0.0	LOAD-DROP A.M.D 115.00 LOAD==6.8019(4.3911)				
	setqload 35369: 0.0	LOAD-DROP APP MAT 115.00 LOAD==25.83(5.88924)				
	setqload 35362: 0.0	LOAD-DROP LOCKHD 2 115.00 LOAD==12.4845(2.8413)				
	setpload 35364: 0.0	LOAD-DROP A.M.D 115.00 LOAD==6.8019(4.3911)				
	setpload 35369: 0.0	LOAD-DROP APP MAT 115.00 LOAD==25.83(5.88924)				
	setpload 35362: 0.0	LOAD-DROP LOCKHD 2 115.00 LOAD==12.4845(2.8413)				
	obranch 35365 35364 1	line from AMD JCT 115.00 (3) to (1) A.M.D 115.00	1	115	30	347-317
	obranch 35360 35365 1	line from LCKHD J2 115.00 (3) to (3) AMD JCT 115.00	1	115	30	317
	obranch 35360 35362 1	line from LCKHD J2 115.00 (3) to (1) LOCKHD 2 115.00	1	115	30	317-347
	obranch 35122 35360 1	line from NEWARK F 115.00 BRKR to (3) LCKHD J2 115.00	1	115	30	316-317
	obranch 35369 35368 1	line from APP MAT 115.00 (2) to BRKR BRITTON 115.00	1	115	30	317-347

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No.	Contingency		Ckt	Base kV	Area	Zone
117	B2 LINE Newark F - Dixon		1	115	30	316-318
	obranch 35122 35600 1	line from NEWARK F 115.00 BRKR to BRKR DIXON LD 115.00	1	115	30	316-318
118	B2 LINE Newark F - Milpitas		1	115	30	316-318
	obranch 35122 35624 1	line from DIXON J1 115.00 (2) to BRKR MILPITAS 115.00	1	115	30	316-318
118	B2 LINE Newark F - Milpitas		2	115	30	316-318
	obranch 35122 35624 2	line from DIXON J1 115.00 (2) to BRKR MILPITAS 115.00	2	115	30	316-318
119	B2 LINE Newark F - Kiefer			115	30	
	obranch 35122 35602 1	line from NEWARK F 115.00 BRKR to (3) ZNKER J2 115.00	1	115	30	316-318
	obranch 35602 35604 1	line from ZNKER J2 115.00 (3) to (2) ZANKER 115.00	1	115	30	318-348
	obranch 35602 36850 1	line from ZNKER J2 115.00 (3) to BRKR KIFER 115.00	1	115	30	318-321
120	B2 LINE Newark F - Trimble			115	30	318-316
	obranch 35122 35603 1	line from NEWARK F 115.00 BRKR to (3) ZNKER J1 115.00	1	115	30	316-318
	obranch 35603 35605 1	line from ZNKER J1 115.00 (3) to (1) AGNEW J 115.00	1	115	30	318
	obranch 35603 35612 1	line from ZNKER J1 115.00 (3) to BRKR TRIMBLE 115.00	1	115	30	318
121	B2 LINE Newark F - Milpitas		1	115	30	316-318
	obranch 35122 35624 1	line from NEWARK F 115.00 BRKR to BRKR MILPITAS 115.00	1	115	30	316-318
122	B2 LINE Newark D - Scott #1		1	115	30	316-321
	obranch 35120 36852 1	line from NEWARK D 115.00 BRKR to BRKR SCOTT 115.00	1	115	30	316-321
123	B2 LINE Newark F - Scott #2		2	115	30	316-321
	obranch 35122 36852 2	line from NEWARK F 115.00 BRKR to BRKR SCOTT 115.00	2	115	30	316-321
124	B2 LINE Newark D - Tuolumn #1			115	30	
	obranch 35120 38432 1	line from NEWARK D 115.00 BRKR to (6) OAKDLTID 115.00	1	115	30	316-324
	obranch 38432 36962 1	line from OAKDLTID 115.00 (6) to BRKR MOCCASIN 115.00	1	115	30	324-300
	obranch 38432 38420 1	line from OAKDLTID 115.00 (6) to BRKR TUOLUMN 115.00	1	115	30	324
125	B2 LINE Newark D - Tuolumn #2			115	30	
	obranch 38432 35120 2	line from OAKDLTID 115.00 (6) to BRKR NEWARK D 115.00	2	115	30	316-324
	obranch 38432 36962 2	line from OAKDLTID 115.00 (6) to BRKR MOCCASIN 115.00	2	115	30	324-300
	obranch 38432 38420 2	line from OAKDLTID 115.00 (6) to BRKR TUOLUMN 115.00	2	115	30	324
126	B1 GENERATOR OUTAGE -- Contra Costa Unit 7					
	setpgen 33117: 0.0	C.COS 7 18.00 PGEN=320.00 QGEN=168.31				
	setqmin 33117: 0.0	C.COS 7 18.00 PGEN=320.00 QGEN=168.31				
	setqmax 33117: 0.0	C.COS 7 18.00 PGEN=320.00 QGEN=168.31				
126	B1 GENERATOR OUTAGE -- SECAL Unit 1					
	setpgen 30521: 0.0	SECAL_1 18.00 PGEN=320.00 QGEN=168.31				
	setqmin 30521: 0.0	SECAL_1 18.00 PGEN=320.00 QGEN=168.31				
	setqmax 30521: 0.0	SECAL_1 18.00 PGEN=320.00 QGEN=168.31				
127	B1 GENERATOR OUTAGE -- Pittsburg Unit 7					
	setqmax 30000: 0.0	PTS7SWNG 20.00 PGEN=650.00 QGEN=350.00				
	setqmin 30000: 0.0	PTS7SWNG 20.00 PGEN=650.00 QGEN=350.00				
	setpgen 30000: 0.0	PTS7SWNG 20.00 PGEN=650.00 QGEN=350.00				
127	B1 GENERATOR OUTAGE -- DEC Steam Unit					
	setpgen 33110: 0.0	DEC STG1 20.00 PGEN=650.00 QGEN=350.00				
	setqmin 33110: 0.0	DEC STG1 20.00 PGEN=650.00 QGEN=350.00				
	setqmax 33110: 0.0	DEC STG1 20.00 PGEN=650.00 QGEN=350.00				
128	B1 GENERATOR OUTAGE -- Potrero Unit 3					
	setqmax 33252: 0.0	POTRERO3 20.00 PGEN=205.00 QGEN=64.00				
	setqmin 33252: 0.0	POTRERO3 20.00 PGEN=205.00 QGEN=64.00				
	setpgen 33252: 0.0	POTRERO3 20.00 PGEN=205.00 QGEN=64.00				
128	B1 GENERATOR OUTAGE -- Potrero Unit 7C					
	setqmin 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setpgen 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setqmax 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
128	B1 GENERATOR OUTAGE -- Golden Gate Power Project Unit 4					

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No.	Contingency			Ckt	Base kV	Area	Zone
	setpgen 33222: 0.0	POTRERO7C 20.00	PGEN=200.00 QGEN=160.00				
	setqmin 33222: 0.0	POTRERO7C 20.00	PGEN=200.00 QGEN=160.00				
	setqmax 33222: 0.0	POTRERO7C 20.00	PGEN=200.00 QGEN=160.00				
128	B1 GENERATOR OUTAGE -- Tesla Steam Unit						
	setpgen 30629: 0.0	TESLA ST1 20.00	PGEN=340.00 QGEN=227.00				
	setqmin 30629: 0.0	TESLA ST1 20.00	PGEN=340.00 QGEN=227.00				
	setqmax 30629: 0.0	TESLA ST1 20.00	PGEN=340.00 QGEN=227.00				
128	B1 GENERATOR OUTAGE -- Los Esteros Steam Unit						
	setpgen 35872: 0.0	LEGP_ST1 20.00	PGEN=256.00 QGEN=149.00				
	setqmin 35872: 0.0	LEGP_ST1 20.00	PGEN=256.00 QGEN=149.00				
	setqmax 35872: 0.0	LEGP_ST1 20.00	PGEN=256.00 QGEN=149.00				
128	B1 GENERATOR OUTAGE -- Freemont Generating Project						
	setpgen 30638: 0.0	FGP_ST1 20.00	PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00	PGEN=256.50 QGEN=43.20				
	setqmax 30638: 0.0	FGP_ST1 20.00	PGEN=256.50 QGEN=43.20				
129	B3 TRANSFORMER Moraga 230/115 kV					30	308-368
	obranch 30551 33121 1	TRAN from MRAGA 1M 230.00 (3) to (1) MRAGA 1T 13.20		1	13.2-230	30	368-308
	obranch 30550 30551 1	TRAN from MORAGA 230.00 BRKR to (3) MRAGA 1M 230.00		1	230	30	308
	obranch 30551 33020 1	TRAN from MRAGA 1M 230.00 (3) to BRKR MORAGA 115.00		1	115-230	30	308
130	B3 TRANSFORMER Pittsburg 230-115 kV			12	115-230	30	308
	obranch 32950 30526 12	TRAN from PITSBURG 115.00 BRKR to BRKR PITSBURG 230.		12	115-230	30	308
131	B3 TRANSFORMER Pittsburg 230-115 kV			13	115-230	30	308
	obranch 32950 30526 13	TRAN from PITSBURG 115.00 BRKR to BRKR PITSBURG 230.		13	115-230	30	308
132	B3 TRANSFORMER Contra Costa Sub 230-115 kV			3	115-230	30	308
	obranch 33000 30523 3	TRAN from CC SUB 115.00 BRKR to BRKR CC SUB 230.00		3	115-230	30	308
133	B3 TRANSFORMER Sobrante 230-115 kV			1	115-230	30	308
	obranch 33010 30540 1	TRAN from SOBRANTE 115.00 BRKR to BRKR SOBRANTE 23		1	115-230	30	308
134	B3 TRANSFORMER Sobrante 230-115 kV			2	115-230	30	308
	obranch 33010 30540 2	TRAN from SOBRANTE 115.00 BRKR to BRKR SOBRANTE 23		2	115-230	30	308
135	B3 TRANSFORMER Contra Costa Sub 230-115 kV			1	60-115	30	308
	obranch 33050 33000 1	TRAN from CC SUB 60.00 BRKR to BRKR CC SUB 115.00		1	60-115	30	308
136	B3 TRANSFORMER East Shore 230-115 kV			1	115-230	30	316
	obranch 35105 30560 1	TRAN from EAST SHORE 115.00 BRKR to BRKR EAST SHORE		1	115-230	30	316
136	B3 TRANSFORMER East Shore 230-115 kV			2	115-230	30	316
	obranch 35105 30560 2	TRAN from EAST SHORE 115.00 BRKR to BRKR EAST SHORE		2	115-230	30	316
136	B3 TRANSFORMER Ravenswood 230-115 kV			1	115-230	30	310
	obranch 30703 33315 1	TRAN from EAST SHORE 115.00 BRKR to BRKR EAST SHORE		1	115-230	30	310
137	B3 TRANSFORMER Newark E 230-115 kV -- 3-WINDING TRANSFORMER 30			11			
	obranch 30631 35122 11	TRAN from NEWARK E 13.20 to (1) NEWARK F 115.00		11			
138	B3 TRANSFORMER Newark D 230-115 kV-- 3-WINDING TRANSFORMER 306			9			
	obranch 30630 35120 9	TRAN from NEWARK D 13.20 to (1) NEWARK D 115.00		9			
139	B3 TRANSFORMER Newark D 230-115 kV-- 3-WINDING TRANSFORMER 306			7			
	obranch 30630 35121 7	TRAN from NEWARK D 13.200 to (1) NEWARK E 115.00		7			
140	B3 TRANSFORMER Newark D 115-60 kV					30	316-368
	obranch 35109 35217 1	TRAN from NWRK 2M 115.00 (3) to BRKR NEWARK 60.00		1	60-115	30	316
	obranch 35109 35302 1	TRAN from NWRK 2M 115.00 (3) to (1) NWRK 2T 13.00		1	13-115	30	368-316
	obranch 35120 35109 1	TRAN from NEWARK D 115.00 BRKR to (3) NWRK sM 115.00		1	115	30	316
141	B3 TRANSFORMER San Ramon 230-60kV			1	60-230	30	316
	obranch 35209 30555 1	TRAN from SAN RAMON 60.00 BRKR to BRKR SAN RAMON		1	60-230	30	316
142	B3 TRANSFORMER Los Positas 230-60 kv			4	60-230	30	316
	obranch 35220 30585 4	TRAN from LOS POSITAS 60.00 BRKR to BRKR LOS POSITAS		4	60-230	30	316
143	B2 LINE Milbrae - San Paula - Martin C				115	30	

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 33309 33307 1	line from SANPAULA 115.00 (2) to BRKR MILLBRAE 115.00	1	115	30	340-310
	obranch 33307 33208 1	line from SANPAULA 115.00 (2) to BRKR MARTIN C 115.00	1	115	30	309-310
	setpload 33305:17	LOAD-TRANSFER SANPAULA 115.00 TO SHAWROAD 115.00				
	setqload 33305: 8	LOAD-TRANSFER SANPAULA 115.00 TO SHAWROAD 115.00				
144	B2 LINE East Grand - Mil SFIA - San Mateo 115 kV			115	30	310
	setqload 33306:18.631	LOAD-TRANSFER MIL-SFIA 115.00 TO AIRPORT 115.00				
	obranch 33308 33303 2	line from MIL-SFIA 115.00 (2) to BRKR EST GRNO 115.00	2	115	30	310
	obranch 33308 33310 2	line from MIL-SFIA 115.00 (2) to BRKR SANMATEO 115.00	2	115	30	310
	setpload 33308: 0.0	LOAD-TRANSFER MIL-SFIA 115.00 TO AIRPORT 115.00				
	setqload 33308: 0.0	LOAD-TRANSFER MIL-SFIA 115.00 TO AIRPORT 115.00				
	setpload 33306:49.025	LOAD-TRANSFER MIL-SFIA 115.00 TO AIRPORT 115.00				
145	B2 LINE San Mateo - ShawRoad - Martin C			115	30	340-310
	obranch 33305 33220 J6	line from SHAWRCAD 115.00 (2) to BRKR GGPP D 115.00	J6	115	30	340-310
	obranch 33310 33305 6	line from SANMATEO 115.00 BRKR to (2) SBAWROAD 115.00	6	115	30	310-340
146	B2 LINE Martin C - San Mateo 230 kV		1	230	30	310-309
	obranch 30695 30700 1	line from MARTIN C 230.00 BRKR to BRKR SANMATEO 230.00	1	230	30	310-309
147	B2 LINE Martin C - San Mateo 115 kV		3	115	30	309-310
	obranch 33208 33310 3	line from MARTIN C 115.00 BRKR to BRKR SANMATEO 115.00	3	115	30	309-310
148	B2 LINE San Mateo - Ravenswood		1	230	30	310
	obranch 30700 30703 1	line from SANMATEO 230.00 BRKR to BRKR RAVENSWD 230.0	1	230	30	310
149	B2 LINE Monta Vista - Jefferson		1			
	obranch 30705 30715 1	line from MONTAVIS 230.00 BRKR to BRKR JEFFERSN 230.00	1			
150	B2 LINE Martin C - Daly City		1	115	30	309-310
	obranch 33208 33300 1	line from MARTIN C 115.00 BRKR to BRKR DALY CTY 115.00	1	115	30	309-310
151	B2 LINE Martin C - Serona			115	30	309-310
	obranch 33301 33300 1	line from DLY CTYP 115.00 (3) to BRKR DALY CTY 115.00	1	115	30	310
	obranch 33301 33302 1	line from DLY CTYP 115.00 (3) to BRKR SERONA 115.00	1	115	30	310
	obranch 33208 33301 1	line from MARTIN C 115.00 BRKR to (3) OLY CTYP 115.00	1	115	30	309-310
152	B2 LINE Martin C - EBT		2	115	30	309-310
	obranch 33208 33303 2	line from MARTIN C 115.00 BRKR to BRKR EBT 115.00	2	115	30	309-310
153	B2 LINE Martin C - Airport			115	30	310-340
	obranch 33220 33306 5	line from GGPP D 115.00 (3) to BRKR AIRPORT 115.00	5	115	30	310-340
	obranch 33220 33322 5	line from GGPP D 115.00 (3) to UAL TAP 115.00	5	115	30	310
	obranch 33304 33322 1	TRAN from UAL COGN 115.00 BRKR to (1) UAL TAP 9.11	1	115	30	310
153	B2 LINE Martin C - GGPP		5	115	30	309-310
	obranch 33208 33220 5	line from MARTIN C 115.00 BRKR to (3) GGPP D 115.00	5	115	30	309-310
154	B2 LINE Martin C - San Mateo (Duplicate of 147)		3	115	30	309-310
	obranch 33208 33310 3	line from MARTIN C 115.00 BRKR to BRKR SANMATEO 115.00	3	115	30	309-310
155	B2 LINE Airport - San Mateo		5	115	30	340-310
	obranch 33306 33310 5	line from AIRPORT 115.00 BRKR to BRKR SANMATEO 115.00	5	115	30	340-310
156	B2 LINE Millbrae - San Mateo		1	115	30	310
	obranch 33307 33310 1	line from MILLBRAE 115.00 BRKR to BRKR SANMATEO 115.0	1	115	30	310
157	B2 LINE San Mateo - Bay Meadows Ckt 1		1	115	30	310
	obranch 33310 33311 1	lime from SANMATEO 115.00 BRKR to BRKR BAY MDWS 115.	1	115	30	310
158	B2 LINE San Mateo - Bay Meadows Ckt 2		2	115	30	310
	obranch 33310 33311 2	line from SANMATEO 115.00 BRKR to BRKR BAY MDWS 115.	2	115	30	310
159	B2 LINE San Mateo - Belmont		1	115	30	310
	obranch 33310 33312 1	line from SANMATEO 115.00 BRKR to BRKR BELMONT 115.0	1	115	30	310
160	B2 LINE San Mateo D - Ravenswood		1	115	30	310
	obranch 33310 33315 1	line from SANMATEO 115.00 BRKR to BRKR RAVENSWD 115.	1	115	30	310
161	52 LINE Belmont - Bair		1	115	30	310
	obranch 33312 33313 1	line from BELMONT 115.00 BRKR to BRKR BAIR 115.00	1	115	30	310

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No.	Contingency		Ckt	Base kV	Area	Zone
162	B2 LINE Bair - Ravenwood			115	30	310-340
	obranch 33313 33319 1	line from BAIR 115.00 BRKR to (3) SHREDJCT 115.00	1	115	30	310-340
	obranch 33319 33315 1	line from SHREDJCT 115.00 (3) to BRKR RAVENSWD 115.00	1	115	30	340-310
	setpload 33314:0.0	LOAD-DROP SHREDDER 115.00 LOAD==3.06(0.7)				
	setqload 33314:0.0	LOAD-DROP SHREDDER 115.00 LOAD==3.06(0.7)				
163	B2 LINE Ravenswood - Cooley Landing #1		1	115	30	310
	obranch 33315 33316 1	line from RAVENSWD 115.00 BRKR to BRKR CLY LNLG 115.0	1	115	30	310
164	52 LINE Ravenswood - Cooley Landing #2		2	115	30	310
	obranch 33315 33317 2	line from RAVENSWD 115.00 BRKR to BRKR CLY LNG2 115.0	2	115	30	310
165	B2 LINE Ravenswood - Ames		1	115	30	310-317
	obranch 33315 35350 1	line from RAVENSWD 115.00 BRKR to BRKR AMES BS1 115.0	1	115	30	310-317
166	B2 LINE Ravenswood - Palo Alto #1		1	115	30	310-328
	obranch 33315 38028 1	line from RAVENSWD 115.00 BRKR to BRKR PLO ALTO 115.0	1	115	30	310-328
167	52 LINE Ravenswood - Palo Alto #2		2	115	30	310-328
	obranch 33315 38028 2	line from RAVENSWD 115.00 BRKR to BRKR PLO ALTO 115.0	2	115	30	310-328
168	52 LINE Clay - Palo Alto		1	115	30	310-328
	obranch 33316 38028 1	line from CLY LNDG 115.00 BRKR to BRKR PLO ALTO 115.00	1	115	30	310-328
169	B2 LiNE East Shore - Mt Eden #2 (Duplicate of 101)		2	115	30	316
	obranch 35105 35106 2	line from EASTSHRE 115.00 BRKR to BRKR MT EDEN 115.00	2	115	30	316
170	B2 LINE Monta Vista - Jefferson			230	30	
	obranch 30705 30710 1	line from MONTAVIS 230.00 3RKR to (3) SLAC JCT 230.00	1	230	30	317-310
	obranch 30710 30711 1	line from SLAC JCT 230.00 (3) to (1) S.L.A.C. 230.00	1	230	30	310-340
	obranch 30710 30715 1	line from SLAC JCT 230.00 (3) to BRKR JEFFERSN 230.00	1	230	30	310
171	32 LINE Metcalf - Monta Vista Ckt 3		3	230	30	318-317
	obranch 30735 30705 3	line from METCALF 230.00 BRKR to BRKR MONTAVIS 230.00	3	230	30	318-317
172	B2 LINE Monta Vista - Saratoga		1	230	30	317
	obranch 30705 30720 1	line from MONTAVIS 230.00 BRKR to BRKR SARATOGA 230.0	1	230	30	317
173	32 LINE Saratoga - Vasona		1	230	30	317
	obranch 30720 30733 1	lime from SARATOGA 230.00 BRKR to (2) VASONA 230.00	1	230	30	317
174	B2 LINE Monta Vista - Hicks		1	230	30	317-318
	obranch 30705 30730 1	line from MONTAVIS 230.00 BRKR to BRKR HICKS 230.00	1	230	30	317-318
175	32 LINE Hicks - Metcalf			230	30	318
	obranch 30730 30734 1	line from HICKS 230.00 BRKR to BRKR CTYVLY 230.00	1	230	30	318
	obranch 30734 30735 1	line from CTYVLY 230.00 BRKR to BRKR METCALF 230.00	1	230	30	318
176	B2 LINE Metcalf - Moss Landing		1	230	30	318-319
	obranch 30735 30750 1	line from METCALF 230.00 BRKR to BRKR MOSSLND2 230.00	1	230	30	318-319
178	32 LINE Whisman - Monta Vista		1	115	30	317
	obranch 35352 35356 1	line from WHISMAN 115.00 BRKR to BRKR MNTA VSA 115.00	1	115	30	317
180	B2 LINE MT View - Monta Vista		1	115	30	317
	obranch 35353 35356 1	line from MT VIEW 115.00 BRKR to BRKR MNTA VSA 115.00	1	115	30	317
181	B2 LINE Ames BS1 - Ames BS2		1	115	30	317
	obranch 35350 35351 1	line from AMES BS1 115.00 BRKR to BEER AMES BS2 115.00	1	115	30	317
182	32 LINE Ravenswood - Ames BS2		1	115	30	310-317
	obranch 33315 35351 1	line from RAVENSWD 115.00 BRKR to BEER AMES BS2 115.0	1	115	30	310-317
183	B2 LINE VSA - Lawrence			115	30	317-347
	obranch 35367 35363 1	line from PHLPS-JT 115.00 (3) to BRKR LAWRENCE 115.00	1	115	30	317
	obranch 35356 35367 1	line from VSA 115.00 BRKR to (3) PHLPS_JT 115.00	1	115	30	317
	obranch 35367 35366 1	line from PHLPS-JT 15.03 (3) to (1) PHILL:PS 115.00	1	115	30	347-317
184	B2 LINE AMD - Lockheed			115	30	
	obranch 35365 35360 1	line from AiMD JCT 115.00 (3) to LCKHD J2 115.00	1	115	30	317
	obranch 35360 35362 1	line from LCKHD J2 115.00 (3) to (1) LOCKHD 2 115.00	1	115	30	317-347
	obranch 35365 35364 1	1ine from AMD JCT 115.00 (3) to (1) A.M.D 115.00	1	115	30	347-317

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 35369 35365 1	line from APP MAT 115.00 (2) to (3) AMD JCT 115.00	1	115	30	347-317
	obranch 35360 35122 1	line from LCKHD J2 115.00 (3) to BRKRNEWARK F 115.00	1	115	30	316-317
185	B2 LINE App Mat - Britton		1	115	30	317-347
	obranch 35369 35368 1	line from APP MAT 115.00 BRKR to BRKR BRITTON 115.00	1	115	30	317-347
186	B2 LINE Monta Vista - Britton		1	115	30	317
	obranch 35356 35368 1	line from MNTA VSA 115.00 BRKR to BRKR BRITTON 115.00	1	115	30	317
187	B2 LINE Stelling - Monta Vista		1	115	30	317
	obranch 35354 35356 1	line from STELLING 115.00 BRKR to BRKR MNTA VSA 115.00	1	115	30	317
188	B2 LINE Stelling - Wolfe		1	115	30	317
	obranch 35354 35355 1	line from STELLING 115.00 BRKR to BRKR WOLFE 115.00	1	115	30	317
189	B2 LINE Wolfe - Monta Vista		1	115	30	317
	obranch 35355 35356 1	line from WOLFE 115.00 BRKR to BRKR MNTA VSA 115.00	1	115	30	317
190	B2 LINE MEC - Metcalf Ckt 4		4	230	30	318
	obranch 30735 30741 4	lime from MONTAVIS 230.00 BRKR to BRKR METCALF 230.00	4	230	30	318
190	B2 LINE Monta Vista - MEC		4	230	30	318-317
	obranch 30705 30741 4	lime from MONTAVIS 230.00 BRKR to BRKR METCALF 230.00	4	230	30	318-317
191	B2 LINE Vasona - Metcalf		1	230	30	317-318
	obranch 30733 30735 1	line from VASONA 230.00 (2) to BRKR METCALF 230.00	1	230	30	317-318
192	B2 LINE Kiefer - Scott		1	115	30	321
	obranch 36850 36852 1	line from KIFER 115.00 BRKR to BRKR SCOTT 115.00	1	115	30	321
193	B2 LINE Kiefer - FMC			115	30	321-318
	obranch 35617 35615 1	line from FMC JCT 115.00 to BRKR FMC 115.00	1	115	30	318
	obranch 36850 35617 1	line from KIFER 115.00 BRKR to FMC JCT 115.00	1	115	30	321-318
194	B2 LINE FMC - San Jose B			115	30	318
	obranch 35617 35616 1	line from FMC JCT 115.00 to BRKR SJ B E 115.00	1	115	30	318
	obranch 35615 35617 1	line from FMC 115.00 BRKR to FMC JCT 115.00	1	115	30	318
195	B2 LINE Trimble - San Jose B		1	115	30	318
	obranch 35612 35616 1	line from GISH JCT 115.00 (3) to BRKR SJ B E 115.00	1	115	30	318
196	B2 LINE Los Esteros - Montague		1	115	30	318
	obranch 35658 35610 1	line from LOS ESTEROS 115.00 BRKR to BRKR MONTAGUE 1	1	115	30	318
197	B2 LINE Los Esteros - Trimble		1	115	30	318
	obranch 35658 35612 1	line from LS Esteros 115.00 BRKR to BRKR TRIMELE 115.00	1	115	30	318
198	B2 LINE Nortech - Los Esteros		1	115	30	318
	obranch 35659 35658 1	line from NORTECH 115.00 BRKR to BRKR LS ESTRS 115.00	1	115	30	318
199	B2 LINE Nortech - Kifer		1	115	30	318-321
	obranch 35659 36850 1	line from NORTECH 115.00 BRKR to BRKR KIFER 115.00	1	115	30	318-321
200	B2 LINE Los Esteros - Agnew			115-9.11	30	318-396
	obranch 35658 35606 1	line from LS ESTRS 115.00 BRKR to (2) AGNEW 115.00	1	115	30	318
	obranch 35606 35860 1	TRAN from AGNEW 115.00 (2) to (1)OLS-AGNE 9.11	1	9.11-115	30	396-318
201	B2 LINE Montague - Trimble		1	115	30	318
	obranch 35610 35612 1	line from MONTAGUE 115.00 BRKR to BRKR TRIMBLE 115.00	1	115	30	318
202	B2 Milpitas - Newark F		1	115	30	316-318
	obranch 35624 35122 1	line from DIXON JCT 115.00 (2) to BRKR NEWARK F 115.00	1	115	30	316-318
202	B2 Milpitas - Newark F		2	115	30	316-318
	obranch 35624 35122 2	line from DIXON JCT 115.00 (2) to BRKR NEWARK F 115.00	2	115	30	316-318
203	B2 LINE San Jose A - San Jose B		1	115	30	318
	obranch 35618 35619 1	line from SN JSE A 115.00 BRKR to BRKR SJ B F 115.00	1	115	30	318
204	B2 LINE San Jose A - El Patio		1	115	30	318
	obranch 35618 35620 1	line from SN SE A 115.00 BRKR to BRKR EL PATIO 115.00	1	115	30	318
205	B2 LINE Eal Patio - Metcalf			115	30	318
	obranch 35620 35621 1	line from EL PATIO 115.00 BRKR to (2) IBM-HR J 115.00	1	115	30	318

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 35621 35642 1	line from IBM-HR J 115.00 (2) to BRKR MTCALF 1 115.00	1	115	30	318
206	B2 LINE El Patio - Metcalf			115	30	318
	obranch 35651 35642 1	line from BAILY J3 115.00 (2) to BRKR MTCALF 1 115.00	1	115	30	318
	obranch 35620 35651 1	line from EL PATIO 115.00 BRKR to (2) BAILY J3 115.00	1	115	30	318
207	B2 LINE San Jose B - Evergreen			9.11-115	30	
	obranch 35631 35632 1	line from MARKHM J 115.00 (3) to (2) MARKHAM 115.00	1	115	30	318-348
	obranch 35631 35636 1	line from MAREHM J 115.00 (3) to BRKR EVRGRN 1 115.00	1	115	30	318
	obranch 35632 35863 1	TRAN from MARKHAM 115.00 (2) to (1) CATALYST 9.11	1	9.11-115	30	396-348
	obranch 35619 35631 1	line from SJ B F 115.00 BRKR to (3) MARKHM J 115.00	1	115	30	318
208	B2 LINE Evergreen - Metcalf			115	30	318
	obranch 35633 35645 1	line from EVRGRN 2 115.00 (3) to (3) EVRGRN J 115.00	1	115	30	318
	obranch 35645 35625 1	line from EVRGRN J 115.00 (3) to (2) MARKHMJ2 115.00	1	115	30	318
	obranch 35625 35634 1	line from MARKHMJ2 115.00 (3) to (2) STONE J 115.00	1	115	30	318
	obranch 35645 35643 1	line from EVRGRN J 115.00 (3) to BRKR MTCALF 2 115.00	1	115	30	318
209	52 LINE Evergreen - Metcalf		1	115	30	318
	obranch 35636 35643 1	line from EVRGRN 1 115.00 BRKR to BRKR MTCALF 2 115.00	1	115	30	318
210	B2 LINE Edenvale - Edenvale J3/J1 - Metcalf			115	30	318-348
	obranch 35649 35638 1	line from EDNVL 3 115.00 (3) to BRKR EDENVALE 115.00	1	115	30	318
	obranch 35641 35642 1	line from EDNVL JI 115.00 (3) to BRKR MTCALF 1 115.00	1	115	30	318
	obranch 35637 35649 1	line from IBM-CTLE 115.00 (1) to (3 EDNVL J3 115.00	1	115	30	348-318
	obranch 35641 35639 1	line from EDNVL 1 115.00 (3) to (1) IBM-HRRS 115.00	1	115	30	348-318
	obranch 35649 35641 1	line from EDNVL J3 115.00 (3) to (3) EDNVL Ji 115.00	1	115	30	318
211	B2 LINE Edenvale - Baily - Metcalf			115	30	318-348
	obranch 35638 35653 1	line from EDENVALE 115.00 BRKR to (3) BAILY J2 115.00	1	115	30	318
	obranch 35653 35642 1	line from BAILY 2 115.00 (3) to BRKR MTCALF 1 115.00	1	115	30	318
	obranch 35653 35652 1	line from BAILY 2 115.00 (3) to (2) BAILY Ji 115.00	1	115	30	318
	obranch 35652 35640 1	line from BAILY Ji 115.00 (2) to (1) IBM-BALY 115.00	1	115	30	348-318
212	B2 LINE Dixon Landing - McKee			115	30	318
	obranch 35629 35630 1	line from MABURY J 115.00 (3) to (1) MABURY 115.00	1	115	30	318
	obranch 35600 35629 1	line from DIXON LD 115.00 BRKR to (3) MABURY J 115.00	1	115	30	318
	obranch 35629 35626 1	line from MABURY J 115.00 (3) to BRKR MCKEE 115.00	1	115	30	318
213	B2 LINE McKee - Metcalf			115	30	318
	obranch 35626 35656 1	line from MCKEE 115.00 BRKR to (3) PIERCY 115.00	1	115	30	318
	obranch 35656 35643 1	line from PIERCY 115.00 (3) to BRKR MTCALF 2 115.00	1	115	30	318
214	B2 LINE Swift - Milpitas			115	30	318-348
	obranch 35624 35622 1	line from MILPITAS 115.00 to BRKR SWIFT 115.00	1	115	30	318
	obranch 35624 35628 1	line from MILPITAS 115.00 (2) to (IY FD.PCFIC 115.00	1	115	30	318-348
215	B2 LINE Swift - Metcalf		1	115	30	318
	obranch 35622 35643 1	line from SWIFT 115.00 BRKR to BRKR MTCALF 2 115.00	1	115	30	318
216	B2 LINE Metcalf - Morgan Hill			115	30	318
	obranch 35642 35646 1	line from MTCALF 1 115.00 BRKR to BRKR MRGN HIL 115.00	1	115	30	318
	rbranch 35654 35655 1	switch line MORG J1 115 MORG J2 115				
217	B2 LINE Morgan Hill - LLA Gas		1	115	30	318
	obranch 35646 35648 1	line from MRGN HIL 115.00 BRKR to BRKR LLAGAS 115.00	1	115	30	318
218	B2 LINE LLA Gas - Glory COG			115	30	318-348
	obranch 35650 35647 1	TRAN from GILROY F 115.00 (2) to (1) GLRY COG 13.80	1	115	30	348-318
	obranch 35648 35650 1	line from LLAGAS 115.00 BRKR to (2) GILROY F 115.00	1	115	30	318-348
219	B2 LINE LLA Gas - Metcalf			115	30	318
	obranch 35655 35654 1	line from MORGN J2 115.00 (2) to (4) MORGN J1 115.00	1	115	30	318
	obranch 35655 35642 1	line from MORGN J1 115.00 (2) to (4) METCALF 115.00	1			
	obranch 35648 35655 1	line from LLAGAS 115.00 BRKR to (2) MORGN J2 115.00	1	115	30	318
220	52 LINE Metcalf - Coyote Pump		1			
	obranch 356543 35644 1	line from MTCALF 2 115.00 BRKR to (1) CYTE PMP 115.00	1			

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No.	Contingency		Ckt	Base kV	Area	Zone
222	B2 LINE Monta Vista - Calpine MEC		4	230	30	318-317
	obranch 30705 30741 4	line from MONTAVIS 230.00 BRKR to (1) CAL_METC 230.00	4	230	30	318-317
223	B2 LINE Metcalf - Calpine MEC		4	230	30	318
	obranch 30735 30741 4	line from METCALF 230.00 BRKR to (1) CAL_METC 230.00	4	230	30	318
224	B2 LINE Table MT - Vaca Dixon		1	500	30	300
	obranch 30015 30030 1	lime from TABLE MT 500.00 BRKR to BRKR VACA-DIX 500.00	1	500	30	300
225	B2 LINE Table MT - Tesla		1	500	30	300
	obranch 30015 30040 1	line from TABLE MT 500.00 BRKR to BRKR TESLA 500.00	1	500	30	300
226	B2 LINE Vaca Dixon - Tesla		1	500	30	300
	obranch 30030 30040 1	1ine from VACA-DIX 500.00 BRKR to BRKR TESLA 500.00	1	500	30	300
227	B2 LINE Tracy - Tesla		1	500	30	300
	obranch 30035 30040 1	line from TRACY 500.00 BRKR to BRKR TESLA 500.00	1	500	30	300
228	B2 LINE Tracy - Los Banos		1	500	30	300
	obranch 30035 30050 1	0 4 line from TRACY 500.00 BRKR to BRKR LOSBANOS 500.0	1	500	30	300
229	B2 LINE Tesla - Metcalf		1	500	30	300
	obranch 30040 30042 1	line from TESLA 500.00 BRKR to BRKR METCALF 500.00	1	500	30	300
230	B2 LINE Tesla - Los Bonos		1	500	30	300
	obranch 30040 30050 1	line from TESLA 500.00 BRKR to BRKR LOSBANOS 500.00	1	500	30	300
231	B2 LINE Metcalf - Moss Landing		1	500	30	300
	obranch 30042 30045 1	line from METCALF 500.00 BRKR to BRKR MOSSLAND 500.0	1	500	30	300
232	B2 LINE Moss Landing - Los Bonos		1	500	30	300
	obranch 30045 30050 1	line from MOSSLAND 500.00 BRKR to BRKR LOSBANOS 500.	1	500	30	300
233	B2 LINE Los Banos - Gates		1	500	30	300
	obranch 30050 30055 1	line from LOSBANOS 500.00 BRKR to BRKR GATES 500.00	1	500	30	300
234	B2 LINE Los Banos - Midway		1	500	30	300
	obranch 30050 30060 1	line from LOSBANOS 500.00 BRKR to BRKR MIDWAY 500.00	1	500	30	300
235	B2 LINE Gates - Diablo		1	500	30	300
	obranch 30055 30057 1	line from GATES 500.00 BRKR to BRKR DIABLO 500.00	1	500	30	300
236	B2 LINE Gates - Midway		1	500	30	300
	obranch 30055 30060 1	line from GATES 500.00 BRKR to BRKR MIDWAY 500.00	1	500	30	300
237	TRANSFORMER Vaca-Dixon 500/230 kV				30	304-300
	obranch 30030 30067 1	TRAN from VACA-DIX 500.00 BRKR to (3) VC DX11M 500.00	1	500	30	300
	obranch 30067 32152 1	TRAN from VC DX11M 500.00 (3) to (1) VC DX11T 13.80	1	13.8-500	30	304-300
	obranch 30067 30460 1	TRAN from VC DXl1M 500.00 (3) to BRKR VACA-DIX 230.00	1	230-500	30	304-300
238	TRANSFORMER Tesla 500-230 kV		2			
	obranch 30040 30624 2	TRAN from TESLA 2M 13.80 (3) to BRKR TESLA E 230.00	2			
239	TRANSFORMER Tesla 500-230 kV		4	500-230	30	300-311
	obranch 30625 30040 4	TRAN from TESLA : 230.00 BRKR to BRKR TESLA 500.00	4	500-230	30	300-311
240	TRANSFORMER Los Banos 500-230 kV				30	313-300
	obranch 30050 30069 1	TRAN from LOSBANOS 500.00 BRKR to (3) L.BANS M 500.00	1	500	30	300
	obranch 30069 30765 1	TRAN from L.BANS M 500.00 (3) to BRKR LOSBANOS 230.00	1	230-500	30	313-300
	obranch 30069 34302 1	TRAN from L.BANS M 500.00 (3) to (1) L.BANS T 13.80	1	13.8-500	30	313-300
241	TRANSFORMER Gates 500-230 kV				30	300-314
	obranch 34607 30900 11	TRAN from GATES 13.80 BRKR to BRKR GATES 230.00	11	13.8-230	30	314
	obranch 34607 34606 11	TRAN from GATES 13.80 BRKR to BRKR GATES 13.80	11	13.8	30	314
	obranch 30055 34607 11	TRAN from GATES 500.00 BRKR to BRKR GATES 13.80	11	500-13.8	30	300-314
242	TRANSFORMER Metcalf 500-230 kV #1		11	230-500	30	318-300
	obranch 30735 30042 11	TRAN from METCALF 230.00 BRKR to BRKR METCALF 500.	11	230-500	30	318-300
243	TRANSFORMER Metcalf 500-230 kV #2		12	230-500	30	318-300
	obranch 30735 30042 12	TRAN from METCALF 230.00 BRKR to BRKR METCALF 500.	12	230-500	30	318-300
244	TRANSFORMER Mosslanding 500-230 kV		9	230-500	30	319-300

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 30750 30045 9	TEAK from M0SSLND2 230.00 BRKR to BRKR MOSSLAND 50	9	230-500	30	319-300
N1-1	OVERLAPPING LINE AND GENERATOR OUTAGE				30	308-361
	obranch 30526 30528 2	line from PITSBURG 230.00 BRKR to (6) DEC PTSG 230.00	2	230	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 30528 30526 1	line from DEC PTSG 230.00 (6) to BRKR PITSBURG 230.00	1	230	30	308
	obranch 30528 33109 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC STG2 18.00	1	230-18	30	308-361
	obranch 30528 33108 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC STG1 18.00	1	230-18	30	308-361
	obranch 30528 33107 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC CTG1 24.00	1	230-24	30	308-361
	obranch 30528 33110 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC STG3 18.00	1	230-18	30	308-361
N1-10	OVERLAPPING LINE AND GENERATOR OUTAGE					
	obranch 30525 30700 1	line from C.COSTA 230.00 BRKR to BRKR SANMATEO 230.00	1			
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
N1-11	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	obranch 30526 30535 1	line from PITSBURG 230.00 BRKR to BRKR TIDEWATR 230.00	1	230	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
N1-12	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	obranch 30526 30540 1	line from PITSBURG 230.00 BRKR to BRKR SOBRANTE 230.0	1	230	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
N1-13	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308-316
	obranch 30526 30560 1	line from PITSBURG 230.00 BRKR to BRKR EASTSHORE 230.	1	230	30	308-316
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
N1-14	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308-316
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 30526 30560 2	line from PITSBURG 230.00 BRKR to BRKR EASTSHORE 230.	2	230	30	308-316
N1-15	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308-316
	obranch 30526 30555 1	line from PITSBURG 230.00 BRKR to BRKR SANRAMON 230.0	1	230	30	308-316
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
N1-16	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 30526 30561 1	line from PITSBURG 230.00 BRKR to BRKR TASSAJAR 230.00	1	230	30	308
N1-17	OVERLAPPING LINE AND GENERATOR OUTAGE			9.11-230	30	
	obranch 30526 30595 1	line from PITSBURG 230.00 BRKR to (3) FLOWIND2 230.00	1	230	30	308-311
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 30595 30640 1	line from FLOWIND2 230.00 (3) to BRKR TESLA D 230.00	1	230	30	311
	obranch 30595 33840 1	TRAN from FLOWIND2 230.00 (3) to (1) FLOWD3-6 9.11	1	9.11-230	30	399-311
N1-18	OVERLAPPING LINE AND GENERATOR OUTAGE			230-9.11	30	
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 30526 30600 1	line from PITSBURG 230.00 BRKR to (3) JV ENTER 230.00	1	230	30	308
	obranch 30600 30640 1	line from JV ENTER 230.00 (3) to BRKR TESLA D 230.00	1	230	30	308-311
	obranch 30600 33171 1	TRAN from JV ENTER 230.00 (3) to (1) JVE&HOWD 9.11	1	9.11-230	30	399-308
N1-19	OVERLAPPING LINE AND GENERATOR OUTAGE			115	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 32950 32970 1	line from PITSBURG 115.00 BRKR to BRKR CLAYTON 115.00	1	115	30	308
N1-2	OVERLAPPING LINE AND GENERATOR OUTAGE			230-9.11	30	
	obranch 30590 33838 1	TRAN from USWP-JRW 230.00 (3) to (1) USWP_#3 9.11	1	9.11-230	30	399-316
	setpgen 33117: 0.0:	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
	obranch 30525 30590 1	line from C.COSTA 230.00 BRKR to (3) USWP-JRW 230.00	1	230	30	308-316
	obranch 30590 30537 1	line from USWP-JRW 230.00 (3) to (3) DUBLIN 230.00	1	230	30	316
	obranch 30537 30527 1	line from DUBLIN 230.00 (3) to (3) N_LVMRE 230.00	1	230	30	316
	obranch 30527 35224 1	line from N_LVMRE 230.00 (3) to VINEYD D 230.00	1	230	30	316
	obranch 35224 35219 1	line from VINEYD D 230.00 (3) to VINEYARD 230.00	1	230	30	316
	obranch 35219 30630 1	line from VINEYARD 230.00 (3) to BRKR NEWARK D 230.00	1	230	30	316
N1-20	OVERLAPPING LINE AND GENERATOR OUTAGE			115	30	308-338

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 33043 32991 1	line from IMHOFF_2 115.00 (2) to BRKR MARTNZ E 115.00	1	115	30	308
	obranch 32992 33043 1	line from BOLLMAN2 115.00 (2) to (2) IMHOFF_2 115.00	1	115	30	308-338
	obranch 32950 32992 1	line from PITSBURG 115.00 BRKR to (2) BOLLMAN2 115.00	1	115	30	308-338
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
N1-21	OVERLAPPING LINE AND GENERATOR OUTAGE			115	30-8	308-338
	obranch 33040 33042 1	line from BOLLMAN1 115.00 (2) to (3) IMHOFF_1 115.00	1	115	30	308-338
	obranch 33042 32991 1	line from IMHOFF_1 115.00 (3) to BRKR MARTNZ E 115.00	1	115	30	308
	obranch 32950 32993 1	line from PITSBURG 115.00 BRKR to (2) W.P.BART 115.00	1	115	30	308-338
	obranch 32993 33040 1	line from W.P.BART 115.00 (2) to (2) BOLLMAN1 115.00	1	115	30	338
	obranch 32994 33040 1	line from W.P.BART 115.00 (2) to (2) BOLLMAN1 115.00	1	115	8-30	338
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
N1-22	OVERLAPPING LINE AND GENERATOR OUTAGE			115-13.8	30	
	obranch 33036 32954 1	line from LINDETP1 115.00 (2) to (3) DOW TAP1 115.00	1	115	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 33030 33036 1	line from COLSTJT1 115.00 (2) to (2) LINDETP1 115.00	1	115	30	308
	obranch 32954 32953 1	line from DOW TAP1 115.00 (3) to BRKR CLMBA ST 115.00	1	115	30	308-338
	obranch 32954 32956 1	line from DOW TAP1 115.00 (3) to (2) DOW MTR 115.00	1	115	30	308
	obranch 32956 33160 1	TRAN from DOW MTR 115.00 (2) to (4) DOW CHEM 13.80	1	13.8-115	30	338-308
	obranch 33160 33162 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM2 13.80	1	13.8	30	338-396
	obranch 33160 33163 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM3 13.80	1	13.8	30	338-396
	obranch 33160 33161 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM1 13.80	1	13.8	30	338-396
	obranch 32950 33030 1	line from PITSBURG 115.00 BRKR to (2) COLSTJT1 115.00	1	115	30	308
N1-23	OVERLAPPING LINE AND GENERATOR OUTAGE			115	30	308
	obranch 33032 32970 3	line from KIRKTAP1 115.00 (2) to BRKR CLAYTON 115.00	3	115	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 32950 33032 3	line from PITSBURG 115.00 BRKR to (2) KIRKTAP1 115.00	3	115	30	308
N1-24	OVERLAPPING LINE AND GENERATOR OUTAGE			115-13.8	30	
	obranch 33038 32957 1	line from LINDEJCT 115.00 (3) to BRKR PRAXAIR 115.00	1	115	30	308-338
	obranch 33038 32961 1	line from LINDEJCT 115.00 (3) to (2) GWF2 TAP 115.00	1	115	30	308
	obranch 32961 32960 1	line from GWF2 TAP 115.00 (2) to (2) GWF%2 HS 115.00	1	115	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 32956 33160 1	TRAN from DOW MTR 115.00 (2) to (4) DOW CHEM 13.80	1	13.8-115	30	338-308
	obranch 33160 33163 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM3 13.80	1	13.8	30	338-396
	obranch 32955 32952 1	line from DOW TAP2 115.00 (2) to BRKR POSCO 115.00	1	115	30	338-308
	obranch 32960 33132 1	TRAN from GWF#2 HS 115.00 (2) to (1) GWF %2 13.80	1	13.8-115	30	396-308
	obranch 33160 33162 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM2 13.80	1	13.8	30	338-396
	obranch 33030 32950 1	line from COLSTJT1 115.00 (2) to BRKR PITSBURG 115.00	1	115	30	308
	obranch 32954 32956 1	line from DOW TAP1 115.00 (3) to (2) DOW MTR 115.00	1	115	30	308
	obranch 32954 32953 1	line from DOW TAP1 115.00 (3) to BRKR CLMBA ST 115.00	1	115	30	308-338
	obranch 33036 32961 1	line from LINDETP1 115.00 (2) to (3) GWF2 TAP 115.00	1	115	30	308
	obranch 33036 32954 1	line from LINDETP1 115.00 (2) to (3) DOW TAP1 115.00	1	115	30	308
	obranch 33036 33030 1	line from LINDETP1 115.00 (2) to (2) COLSTJT1 115.00	1	115	30	308
	obranch 32955 32953 1	line from DOW TAP2 115.00 (2) to BRKR CLMBA ST 115.00	1	115	30	308-338
	obranch 33160 33161 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM1 13.80	1	13.8	30	338-396
N1-25	B1 OVERLAPPING LINE AND GENERATOR OUTAGE			18-230	30	308
	obranch 30520 30521 1	TRAN from SECAL 230.00 (4) to (1) SECAL_1 18.00	1	18-230	30	308
	obranch 30520 30522 1	TRAN from SECAL 230.00 (4) to (1) SECAL_2 18.00	1	18-230	30	308
	obranch 30520 30524 1	TRAN from SECAL 230.00 (4) to (1) SECAL_3 18.00	1	18-230	30	308
	obranch 30520 30525 1	line from SECAL 230.00 (4) to BRKR C.COSTA 230.00	1	230	30	308
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
N1-26	B1 OVERLAPPING LINE AND GENERATOR OUTAGE				30	308-361
	obranch 30526 30528 2	line from PITSBURG 230.00 BRKR to (6) DEC PTSG 230.00	2	230	30	308
	obranch 30528 33107 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC CTG1 24.00	1	230-24	30	308-361
	obranch 30528 33110 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC STG3 18.00	1	230-18	30	308-361
	obranch 30528 30526 1	line from DEC PTSG 230.00 (6) to BRKR PITSBURG 230.00	1	230	30	308

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 30528 33109 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC STG2 18.00	1	230-18	30	308-361
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 30528 33108 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC STG1 18.00	1	230-18	30	308-361
N1-27	OVERLAPPING LINE AND GENERATOR OUTAGE -- Potrero Unit 7C			230	30	316-310
	setpgen 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setqmin 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setqmax 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	obranch 30560 30700 1	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	1	230	30	316-310
N1-27	OVERLAPPING LINE AND GENERATOR OUTAGE -- Potrero Unit 7C			230	30	316-310
	setpgen 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setqmin 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setqmax 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	obranch 30560 30700 2	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	2	230	30	316-310
N1-27	OVERLAPPING LINE AND GENERATOR OUTAGE -- Potrero Unit 7C			115	30	316
	obranch 35105 35107 1	line from EASTSHRE 115.00 BRKR to BRKR DUMBARTN 115.	1	115	30	316
	setqmax 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setqmin 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setpgen 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
N1-28	OVERLAPPING LINE AND GENERATOR OUTAGE -- Golden Gate Power Proj			230	30	316-310
	setqmin 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	setqmax 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	obranch 30560 30700 1	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	1	230	30	316-310
	setpgen 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
N1-28	OVERLAPPING LINE AND GENERATOR OUTAGE -- Golden Gate Power Proj			230	30	316-310
	setpgen 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	setqmin 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	setqmax 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	obranch 30560 30700 2	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	2	230	30	316-310
N1-28	OVERLAPPING LINE AND GENERATOR OUTAGE -- Golden Gate Power Proj			115	30	316
	setpgen 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	obranch 35105 35107 1	line from EASTSHRE 115.00 BRKR to BRKR DUMBARTN 115.	1	115	30	316
	setqmin 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	setqmax 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
N1-29	OVERLAPPING LINE AND GENERATOR OUTAGE -- Los Esteros Steam Unit			230	30	316-310
	setpgen 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmin 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmax 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	obranch 30560 30700 1	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	1	230	30	316-310
N1-29	OVERLAPPING LINE AND GENERATOR OUTAGE -- Los Esteros Steam Unit			230	30	316-310
	obranch 30560 30700 2	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	2	230	30	316-310
	setqmax 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmin 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setpgen 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
N1-29	OVERLAPPING LINE AND GENERATOR OUTAGE -- Los Esteros Steam Unit			115	30	316
	setpgen 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmin 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmax 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	obranch 35105 35107 1	line from EASTSHRE 115.00 BRKR to BRKR DUMBARTN 115.	1	115	30	316
N1-29	OVERLAPPING LINE AND GENERATOR OUTAGE -- Los Esteros Steam Unit			230	30	318
	setpgen 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmin 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmax 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	obranch 30735 30731 1	line from LS_ESTRS 230.00 BRKR to BRKR METCALF 230.00	1	230	30	318
N1-29	OVERLAPPING LINE AND GENERATOR OUTAGE -- Los Esteros Steam Unit			230	30	316-318

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No.	Contingency		Ckt	Base kV	Area	Zone
	setqmax 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	obranch 30635 30731 1	line from NEWARK D 230.00 BRKR to BRKR LS_ESTRS 230.0	1	230	30	316-318
	setpgen 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmin 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
N1-3	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	304-308
	obranch 30529 30525 1	line from HIWD TAP 230.00 (3) to BRKR C.COSTA 230.00	1	230	30	308
	obranch 30472 30460 1	line from PBDY TPA 230.00 (3) to BRKR VACA-DIX 230.00	1	230	30	304
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
	obranch 30529 30472 1	line from HIWD TAP 230.00 (3) to BRKR PEABDY A 230.00	1	230	30	304-308
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	316-310
	obranch 30639 30703 1	line from FGP_TAP 230.00 BRKR to BRKR RAVENSWD 230.0	1	230	30	316-310
	obranch 30630 30639 1	line from RAVENSWD 230.00 BRKR to BRKR FGP_TAP 230.00	1	230	30	316
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	316-310
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30560 30700 1	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	1	230	30	316-310
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	316-310
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30560 30700 2	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	2	230	30	316-310
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	316
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30554 30631 1	line from CASTROVL 230.00 BRKR to BRKR NEWARK E 230.0	1	230	30	316
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	311-316
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30624 30630 1	line from TESLA E 230.00 BRKR to BRKR NEWARK D 230.00	1	230	30	311-316
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	310
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30703 30700 1	line from RAVENSWD 230.00 BRKR to BRKR SANMATEO 230.	1	230	30	310
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	310
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30703 30700 2	line from RAVENSWD 230.00 BRKR to BRKR SANMATEO 230.	2	230	30	310
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	316-318
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30635 30731 1	line from NEWARK E 230.00 BRKR to BRKR LS_ESTRS 230.0	1	230	30	316-318
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230-9.11	30	
	obranch 30655 30630 1	TRAN from ADCC 230.00 (2) to (1) NEWARK D 230.00	1	230	30	311-316
	obranch 30640 30655 1	line from TESLA 2E 230.00 BRKR to (2) ADCC 230.00	1	230	30	311
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 30655 35310 1	TRAN from ADCC 230.00 (2) to (1) LFC FIN+ 9.11	1	9.11-230	30	399-311
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			115	30	316
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 35105 35107 1	line from EASTSHRE 115.00 BRKR to BRKR DUMBARTN 115.	1	115	30	316
N1-31	OVERLAPPING LINE AND GENERATOR OUTAGE – Tesla Steam Unit					
	setpgen 30629: 0.0	TESLA ST1 20.00 PGEN=340.00 QGEN=227.00				
	setqmin 30629: 0.0	TESLA ST1 20.00 PGEN=340.00 QGEN=227.00				
	setqmax 30629: 0.0	TESLA ST1 20.00 PGEN=340.00 QGEN=227.00				
	obus 30632	TESLA GEN BUS				
N1-4	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
	obranch 30523 30525 1	line from CC SUB 230.00 BRKR to BRKR C.COSTA 230.00	1	230	30	308
N1-5	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
	obranch 30525 30543 1	line from C.COSTA 230.00 BRKR to BRKR ROSSTAP1 230.00	1	230	30	308
N1-6	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
	obranch 30525 30544 1	line from C.COSTA 230.00 BRKR to BRKR ROSSTAP1 230.00	1	230	30	308
N1-7	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	obranch 30525 30565 1	line from C.COSTA 230.00 BRKR to BRKR BRENTWOD 230.0	1	230	30	308
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
N1-8	OVERLAPPING LINE AND GENERATOR OUTAGE			230-9.11	30	
	obranch 30525 30575 1	line from C.COSTA 230.00 BRKR to (3) WND MSTR 230.00	1	230	30	308
	obranch 30575 38610 1	line from WND MSTR 230.00 (3) to BRKR DELTAPMP 230.00	1	230	30	308-327
	obranch 30575 33170 1	TRAN from WND MSTR 230.00 (3) to (1) WINDMSTR 9.11	1	9.11-230	30	399-308
	setpgen 33170: 0.0	GEN-DROP WINDMSTR 9.11 GEN==12.00(0.00)				
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
N1-9	OVERLAPPING LINE AND GENERATOR OUTAGE					
	obranch 30525 30585 1	line from C.COSTA 230.00 BRKR to BRKR LS PSTAS 230.00	1	230	30	308-316
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				

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Russell City Energy Center

Appendix 6-D
Base Case Power Flow Result

May 2001

Russell City Energy Center AFC

May 2001

Case Summary rcec2

Project Name	RCEC System Impact Study
Title1	Study Plan Case, No East Shore Loop, No RCEC
Title2	(Base Case)
Case Date	5/7/01

Power Flow File C:\T2000\Work\pge_rcec_r1_no_RCEC_base.cft

Power Flow Controls

Area Control	☐	***SmoothStep***	☑
Remote Control	☑	***XfrmVcon***	☑
GenVar Control	☑	***XfrmFcon***	☑
Solve Method	DSOLVE		

Case Settings

Overload	☑	***VlimMin***	0.92	***RateFactor***	1
VLimit	☑	***VlimMax***	1.08	***AmpFactor***	1
VChange	☑	***VlimChange***	0.08	***RatingNumber***	2
Monitored Set	monitor		292 Buses		

Contingency

Contingencies loaded from file M:\PROJ\CALPINE\172028RCEC-AFC\DFS\PowerFlow\RCEC.con

303 contingencies

RCEC System Impact Study

Study Plan Case, No East Shore Loop, No RCEC

(Base Case)

5/7/01

Overloaded Facility										Count of Overloads	
From	Name	To	Name	Circuit	Base kV	Area	Zone	MVA	Norm (%)	Emer (%)	A / B Max (%)
32782	STATIN D	32788	STATIN L	1	115	30	307	80.7	51	51	1 / 0 122.0
32786	OAK C115	32790	STATIN X	1	115	30	337-307	111.8	71	71	1 / 0 122.1
33020	MORAGA	32780	CLARMNT	2	115	30	308-307	50.7	62	54	0 / 1 103.6
33220	GGPP D	33306	SFIA	5	115	30	310-340	147.6	74	74	0 / 1 103.3
33310	SANMATEO	33311	BAY MDWS	1	115	30	310	58.0	60	53	1 / 0 106.5
33310	SANMATEO	33311	BAY MDWS	2	115	30	310	58.0	60	53	1 / 0 106.5
33310	SANMATEO	33312	BELMONT	1	115	30	310	111.2	112	88	1 / 0 145.0
33310	SANMATEO	33315	RAVENSWD	1	115	30	310	65.1	72	63	1 / 0 143.9
35105	EASTSHRE	30560	E. SHORE	1	115-230	30	316	91.1	76	63	0 / 1 104.8
35105	EASTSHRE	30560	E. SHORE	2	115-230	30	316	90.5	75	63	0 / 1 104.1
35120	NEWARK D	36852	SCOTT	1	115	30	316-321	128.4	77	68	2 / 1 107.6
35121	NEWARK E	35110	FREMNT	1	115	30	316	43.4	62	52	1 / 0 106.3
35121	NEWARK E	35110	FREMNT	2	115	30	316	43.4	62	52	1 / 0 106.3
35122	NEWARK F	36852	SCOTT	2	115	30	316-321	113.3	68	60	1 / 1 107.3
35612	TRIMBLE	35616	SJ B E	1	115	30	318	189.0	135	103	20 / 35 184.2
35616	SJ B E	35617	FMC JCT	1	115	30	318	129.5	92	81	2 / 0 186.6
35658	LS ESTRS	35610	MONTAGUE	1	115	30	318	199.0	65	65	1 / 0 106.9
35658	LS ESTRS	35612	TRIMBLE	1	115	30	318	275.7	90	90	3 / 1 129.2
35659	NORTECH	35658	LS ESTRS	1	115	30	318	393.4	140	123	27 / 1 145.8
35659	NORTECH	36850	KIFER	1	115	30	318-321	360.6	117	117	21 / 5 140.8
36850	KIFER	35617	FMC JCT	1	115	30	321-318	74.3	53	46	2 / 0 152.0
36850	KIFER	36852	SCOTT	1	115	30	321	162.8	97	85	2 / 0 130.0
											89 / 48 186.6

Notes:

1. Overloads are based on 100% of Rating 2
2. NS = Normal System Conditions (No Outages)
3. Minimum Reporting Level is 100%
4. Statistical Information (A/B Stats and Maximum Overload)
   A = Serious Overload > 105%
   B = Overloaded Facility between 100% and 105% of Rated Capability

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RCEC System Impact Study

Study Plan Case, No East Shore Loop, No RCEC

(Base Case)

5/7/01

Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone			Norm	Emer
									MVA	(%)	(%)
32782	STATIN D	32788	STATIN L	1	115	30	307	NS	80.7	51	51
		81	B2 LINE Oak C - Station X	1	115	30	337-307		191.5	122	122
									1 / 0		122.0
32786	OAK C115	32790	STATIN X	1	115	30	337-307	NS	111.8	71	71
		79	B2 LINE Station D - Station L	1	115	30	307		191.8	122	122
									1 / 0		122.1
33020	MORAGA	32780	CLARMNT	2	115	30	308-307	NS	50.7	62	54
		81	B2 LINE Oak C - Station X	1	115	30	337-307		97.4	119	104
									0 / 1		103.6
33220	GGPP D	33306	SFIA	5	115	30	310-340	NS	147.6	74	74
		145	B2 LINE San Mateo - ShawRoad - Martin C		115	30	340-310		205.6	103	103
									0 / 1		103.3
33310	SANMATEO	33311	BAY MDWS	1	115	30	310	NS	58.0	60	53
		158	B2 LINE San Mateo - Bay Meadows Ckt 2	2	115	30	310		117.2	121	107
									1 / 0		106.5
33310	SANMATEO	33311	BAY MDWS	2	115	30	310	NS	58.0	60	53
		157	B2 LINE San Mateo - Bay Meadows Ckt 1	1	115	30	310		117.2	121	107
									1 / 0		106.5
33310	SANMATEO	33312	BELMONT	1	115	30	310	NS	111.2	112	88
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310		182.7	185	145
									1 / 0		145.0
33310	SANMATEO	33315	RAVENSWD	1	115	30	310	NS	65.1	72	63
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310		149.6	164	144
									1 / 0		143.9
35105	EASTSHRE	30560	E. SHORE	1	115-230	30	316	NS	91.1	76	63
		97	B2 LINE Dumbarton - Newark	1	115	30	316		150.9	126	105
									0 / 1		104.8
35105	EASTSHRE	30560	E. SHORE	2	115-230	30	316	NS	90.5	75	63
		97	B2 LINE Dumbarton - Newark	1	115	30	316		149.9	125	104
									0 / 1		104.1
35120	NEWARK D	36852	SCOTT	1	115	30	316-321	NS	128.4	77	68
		192	B2 LINE Kiefer - Scott	1	115	30	321		203.3	122	108
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		200.2	120	106
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		194.3	116	103
									2 / 1		107.6
35121	NEWARK E	35110	FREMNT	1	115	30	316	NS	43.4	62	52
		105	B2 LINE Newark E - Freemont #2	2	115	30	316		88.2	126	106
									1 / 0		106.3

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
35121	NEWARK E	35110	FREMNT	2	115	30	316	NS	43.4	62	52
		104	B2 LINE Newark E - Freemont #1	1	115	30	316		88.2	126	106
									1 / 0		106.3
35122	NEWARK F	36852	SCOTT	2	115	30	316-321	NS	113.3	68	60
		192	B2 LINE Kiefer - Scott	1	115	30	321		202.9	121	107
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		189.4	113	100
									1 / 1		107.3

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
35612	TRIMBLE	35616	SJ B E	1	115	30	318	NS	189.0	135	103
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		338.9	242	184
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		327.6	234	178
		204	B2 LINE San Jose A - El Patio	1	115	30	318		228.7	163	124
		229	B2 LINE Tesla - Metcalf	1	500	30	300		224.1	160	122
		206	B2 LINE El Patio - Metcalf		115	30	318		217.6	155	118
		205	B2 LINE Eal Patio - Metcalf		115	30	318		217.5	155	118
		209	52 LINE Evergreen - Metcalf	1	115	30	318		212.7	152	116
		203	B2 LINE San Jose A - San Jose B	1	115	30	318		211.9	151	115
		243	TRANSFORMER Metcalf 500-230 kV #2	12	230-500	30	318-300		205.0	146	111
		242	TRANSFORMER Metcalf 500-230 kV #1	11	230-500	30	318-300		203.9	146	111
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321		201.5	144	110
		207	B2 LINE San Jose B - Evergreen		9.11-115	30			201.4	144	110
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321		200.7	143	109
		117	B2 LINE Newark F - Dixon	1	115	30	316-318		200.5	143	109
		119	B2 LINE Newark F - Kiefer		115	30			200.5	143	109
		218	B2 LINE LLA Gas - Glory COG		115	30	318-348		198.1	141	108
		200	B2 LINE Los Esteros - Agnew		115-9.11	30	318-396		196.3	140	107
		231	B2 LINE Metcalf - Moss Landing	1	500	30	300		194.7	139	106
		208	B2 LINE Evergreen - Metcalf		115	30	318		193.6	138	105
		226	B2 LINE Vaca Dixon - Tesla	1	500	30	300		193.6	138	105
		176	B2 LINE Metcalf - Moss Landing	1	230	30	318-319		193.0	138	105
		190	B2 LINE MEC - Metcalf Ckt 4	4	230	30	318		192.7	138	105
		223	B2 LINE Metcalf - Calpine MEC	4	230	30	318		192.7	138	105
		118	B2 LINE Newark F - Milpitas	1	115	30	316-318		191.7	137	104
		202	B2 Milpitas - Newark F	1	115	30	316-318		191.7	137	104
		121	B2 LINE Newark F - Milpitas	1	115	30	316-318		191.7	137	104
		228	B2 LINE Tracy - Los Banos	1	500	30	300		191.4	137	104
		202A	B2 Milpitas - Newark F	2	115	30	316-318		191.2	137	104
		230	B2 LINE Tesla - Los Bonos	1	500	30	300		191.2	137	104
		118A	B2 LINE Newark F - Milpitas	2	115	30	316-318		191.2	137	104
		115	B2 LINE Newark F - Lockheed		115	30			191.0	136	104
		225	B2 LINE Table MT - Tesla	1	500	30	300		191.0	136	104
		171	32 LINE Metcalf - Monta Vista Ckt 3	3	230	30	318-317		187.1	134	102
		190A	B2 LINE Monta Vista - MEC	4	230	30	318-317		187.0	134	102
		212	B2 LINE Dixon Landing - McKee		115	30	318		186.9	134	102
		222	B2 LINE Monta Vista - Calpine MEC	4	230	30	318-317		187.0	134	102
		191	B2 LINE Vasona - Metcalf	1	230	30	317-318		186.9	133	102
		31	B2 LINE Moraga - Castro Valley	1	230	30	308-316		186.8	133	102
		232	B2 LINE Moss Landing - Los Bonos	1	500	30	300		186.6	133	101
		239	TRANSFORMER Tesla 500-230 kV	4	500-230	30	300-311		186.2	133	101
		214	B2 LINE Swift - Milpitas		115	30	318-348		185.8	133	101
		13	B2 LINE Sobrante - Ignacio		230-18	30			185.6	133	101
		127A	B1 GENERATOR OUTAGE – DEC Steam Unit						185.7	133	101
		175	32 LINE Hicks - Metcalf		230	30	318		185.1	132	101

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
		6	B2 LINE Pittsburg - Tassajara	1	230	30	308		185.0	132	101
		128E	B1 GENERATOR OUTAGE – Golden Gate Pow						184.5	132	100
		N1-31	OVERLAPPING LINE AND GENERATOR OUTAG						184.6	132	100
		126A	B1 GENERATOR OUTAGE – SECAL Unit 1						184.6	132	100
		210	B2 LINE Edenvale - Edenvale J3/J1 - Metcalf		115	30	318-348		184.5	132	100
		183	B2 LINE VSA - Lawrence		115	30	317-347		184.5	132	100
		128	B1 GENERATOR OUTAGE – Potrero Unit 3						184.6	132	100
		J1-28A	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	316-310		184.3	132	100
		N1-4	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	308		184.1	131	100
		J1-28(	OVERLAPPING LINE AND GENERATOR OUTAG		115	30	316		184.2	132	100
		N1-7	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	308		184.0	131	100
									20 / 35		184.2
35616	SJ B E	35617	FMC JCT	1	115	30	318	NS	129.5	92	81
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		298.5	213	187
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		285.6	204	179
									2 / 0		186.6
35658	LS ESTRS	35610	MONTAGUE	1	115	30	318	NS	199.0	65	65
		197	B2 LINE Los Esteros - Trimble	1	115	30	318		328.1	107	107
									1 / 0		106.9
35658	LS ESTRS	35612	TRIMBLE	1	115	30	318	NS	275.7	90	90
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		396.7	129	129
		196	B2 LINE Los Esteros - Montague	1	115	30	318		395.4	129	129
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		387.5	126	126
		201	B2 LINE Montague - Trimble	1	115	30	318		318.7	104	104
									3 / 1		129.2

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
35659	NORTECH	35658	LS ESTRS	1	115	30	318	NS	393.4	140	123
		195	B2 LINE Trimble - San Jose B	1	115	30	318		466.7	167	146
		197	B2 LINE Los Esteros - Trimble	1	115	30	318		457.1	163	143
		193	B2 LINE Kiefer - FMC		115	30	321-318		433.7	155	136
		194	B2 LINE FMC - San Jose B		115	30	318		433.4	155	135
		196	B2 LINE Los Esteros - Montague	1	115	30	318		428.0	153	134
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321		427.8	153	134
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321		422.5	151	132
		119	B2 LINE Newark F - Kiefer		115	30			422.0	151	132
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310		406.0	145	127
		201	B2 LINE Montague - Trimble	1	115	30	318		405.9	145	127
		200	B2 LINE Los Esteros - Agnew		115-9.11	30	318-396		402.6	144	126
		215	B2 LINE Swift - Metcalf	1	115	30	318		400.1	143	125
		186	B2 LINE Monta Vista - Britton	1	115	30	317		398.3	142	125
		204	B2 LINE San Jose A - El Patio	1	115	30	318		398.2	142	124
		213	B2 LINE McKee - Metcalf		115	30	318		397.7	142	124
		183	B2 LINE VSA - Lawrence		115	30	317-347		397.4	142	124
		N1-30	OVERLAPPING LINE AND GENERATOR OUTAG		230-9.11	30			389.1	139	122
		N1-30	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	311-316		388.3	139	121
		97	B2 LINE Dumbarton - Newark	1	115	30	316		386.1	138	121
		95	B2 LINE Metcalf - Los Esteros	1	230	30	318		373.6	133	117
		N1-30	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	316-318		355.7	127	111
		N1-29	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	316-310		350.8	125	110
		128	B1 GENERATOR OUTAGE – Los Esteros Stea						350.8	125	110
		N1-29	OVERLAPPING LINE AND GENERATOR OUTAG		115	30	316		350.3	125	110
		94	B2 LINE Newark E - Los Esteros	1	230	30	316-318		348.0	124	109
		110	B2 LINE Newark D - Los Esteros #1	1	230	30	316-318		348.0	124	109
		192	B2 LINE Kiefer - Scott	1	115	30	321		336.0	120	105
		N1-29	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	318		327.1	117	102
									27 / 1		145.8

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
35659	NORTECH	36850	KIFER	1	115	30	318-321	NS	360.6	117	117
		195	B2 LINE Trimble - San Jose B	1	115	30	318		432.2	141	141
		197	B2 LINE Los Esteros - Trimble	1	115	30	318		423.1	138	138
		193	B2 LINE Kiefer - FMC		115	30	321-318		400.0	130	130
		194	B2 LINE FMC - San Jose B		115	30	318		399.8	130	130
		196	B2 LINE Los Esteros - Montague	1	115	30	318		394.6	129	129
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321		393.8	128	128
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321		388.8	127	127
		119	B2 LINE Newark F - Kiefer		115	30			388.4	126	127
		201	B2 LINE Montague - Trimble	1	115	30	318		372.9	121	122
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310		373.0	121	122
		200	B2 LINE Los Esteros - Agnew		115-9.11	30	318-396		369.6	120	120
		215	B2 LINE Swift - Metcalf	1	115	30	318		367.1	120	120
		204	B2 LINE San Jose A - El Patio	1	115	30	318		365.3	119	119
		186	B2 LINE Monta Vista - Britton	1	115	30	317		365.3	119	119
		213	B2 LINE McKee - Metcalf		115	30	318		364.9	119	119
		183	B2 LINE VSA - Lawrence		115	30	317-347		364.5	119	119
		N1-30	OVERLAPPING LINE AND GENERATOR OUTAG		230-9.11	30			356.4	116	116
		N1-30	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	311-316		355.5	116	116
		97	B2 LINE Dumbarton - Newark	1	115	30	316		353.6	115	115
		95	B2 LINE Metcalf - Los Esteros	1	230	30	318		341.2	111	111
		N1-30	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	316-318		324.0	106	106
		128	B1 GENERATOR OUTAGE – Los Esteros Stea						318.5	104	104
		N1-29	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	316-310		318.4	104	104
		N1-29	OVERLAPPING LINE AND GENERATOR OUTAG		115	30	316		318.1	104	104
		110	B2 LINE Newark D - Los Esteros #1	1	230	30	316-318		316.4	103	103
		94	B2 LINE Newark E - Los Esteros	1	230	30	316-318		316.4	103	103
									21 / 5		140.8
36850	KIFER	35617	FMC JCT	1	115	30	321-318	NS	74.3	53	46
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		243.1	174	152
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		230.3	164	144
									2 / 0		152.0
36850	KIFER	36852	SCOTT	1	115	30	321	NS	162.8	97	85
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321		248.4	149	130
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321		244.1	146	128
									2 / 0		130.0
									89 / 48		186.6

Notes:

1. Overloads are based on 100% of Rating 2
2. NS = Normal System Conditions (No Outages)
3. Minimum Reporting Level is 100%
4. Statistical Information (A/B Stats and Maximum Overload)
   A = Serious Overload > 105%
   B = Overloaded Facility between 100% and 105% of Rated Capability

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Russell City Energy Center

Appendix 6-E
Power Flow Results

May 2001

Russell City Energy Center AFC

May 2001

Case Summary **rcec1**

Project Name	RCEC System Impact Study
Title1	Study Plan Case
Title2	-----
Case Date	5/7/01
Power Flow File	C:\T2000\Work\pge_rcec_r1.cft

Power Flow Controls

Area Control	☐	***SmoothStep***	☑
Remote Control	☑	***XfrmVcon***	☑
GenVar Control	☑	***XfrmFcon***	☑
Solve Method	DSOLVE		

Case Settings

Overload	☑	***VlimMin***	0.92	***RateFactor***	1
VLimit	☑	***VlimMax***	1.08	***AmpFactor***	1
VChange	☑	***VlimChange***	0.08	***RatingNumber***	2
Monitored Set	monitor	293 Buses			

Contingency

Contingencies loaded from file M:\PROJ\CALPINE\172028RCEC-AFC\DFS\PowerFlow\RCEC.con

303 contingencies

RCEC System Impact Study
Study Plan Case

5/7/01

Overloaded Facility										Count of Overloads	
From	Name	To	Name	Circuit	Base kV	Area	Zone	MVA	Norm (%)	Emer (%)	A / B Max (%)
30560	E. SHORE	30700	SANMATEO	1	230	30	316-310	250.9	63	56	1 / 1 106.3
30560	E. SHORE	30700	SANMATEO	2	230	30	316-310	250.9	63	56	1 / 1 106.3
32782	STATIN D	32788	STATIN L	1	115	30	307	83.3	53	53	1 / 0 122.0
32786	OAK C115	32790	STATIN X	1	115	30	337-307	109.2	70	70	1 / 0 122.1
33220	GGPP D	33306	SFIA	5	115	30	310-340	147.6	74	74	0 / 1 103.3
33310	SANMATEO	33311	BAY MDWS	1	115	30	310	58.0	60	53	1 / 0 106.5
33310	SANMATEO	33311	BAY MDWS	2	115	30	310	58.0	60	53	1 / 0 106.5
33310	SANMATEO	33312	BELMONT	1	115	30	310	130.0	131	103	21 / 28 159.1
33310	SANMATEO	33315	RAVENSWD	1	115	30	310	89.8	99	86	2 / 0 165.5
35105	EASTSHRE	30560	E. SHORE	1	115-230	30	316	131.2	109	91	1 / 3 131.8
35105	EASTSHRE	30560	E. SHORE	2	115-230	30	316	130.3	109	91	1 / 1 131.3
35120	NEWARK D	36852	SCOTT	1	115	30	316-321	138.0	83	73	3 / 0 111.2
35121	NEWARK E	35110	FREMNT	1	115	30	316	43.4	62	52	1 / 0 106.3
35121	NEWARK E	35110	FREMNT	2	115	30	316	43.4	62	52	1 / 0 106.3
35122	NEWARK F	35602	ZNKER J2	1	115	30	316-318	113.0	68	60	0 / 1 100.8
35122	NEWARK F	36852	SCOTT	2	115	30	316-321	116.5	70	62	1 / 1 105.0
35612	TRIMBLE	35616	SJ B E	1	115	30	318	202.0	144	110	80 / 12 190.3
35616	SJ B E	35617	FMC JCT	1	115	30	318	113.9	81	71	2 / 0 175.9
35658	LS ESTRS	35610	MONTAGUE	1	115	30	318	201.4	66	66	1 / 0 108.3
35658	LS ESTRS	35612	TRIMBLE	1	115	30	318	279.7	91	91	4 / 0 130.6
35659	NORTECH	35658	LS ESTRS	1	115	30	318	389.1	139	122	27 / 3 146.0
35659	NORTECH	36850	KIFER	1	115	30	318-321	356.4	116	116	25 / 5 140.9
36850	KIFER	35617	FMC JCT	1	115	30	321-318	59.9	43	37	2 / 0 141.4
36850	KIFER	36852	SCOTT	1	115	30	321	145.9	87	76	2 / 0 126.7
											180 / 57 190.3

Notes:

1. Overloads are based on 100% of Rating 2
2. NS = Normal System Conditions (No Outages)
3. Minimum Reporting Level is 100%
4. Statistical Information (A/B Stats and Maximum Overload)
   A = Serious Overload > 105%
   B = Overloaded Facility between 100% and 105% of Rated Capability

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RCEC System Impact Study
Study Plan Case

5/7/01

Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
30560	E. SHORE	30700	SANMATEO	1	230	30	316-310	NS	251	63	56
		31-27E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		477	121	106
		31-28E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		463	117	103
									1 / 1		106.3
30560	E. SHORE	30700	SANMATEO	2	230	30	316-310	NS	251	63	56
		31-27A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		477	121	106
		31-28A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		463	117	103
									1 / 1		106.3
32782	STATIN D	32788	STATIN L	1	115	30	307	NS	83	53	53
		81	B2 LINE Oak C - Station X	1	115	30	337-307		192	122	122
									1 / 0		122.0
32786	OAK C115	32790	STATIN X	1	115	30	337-307	NS	109	70	70
		79	B2 LINE Station D - Station L	1	115	30	307		192	122	122
									1 / 0		122.1
33220	GGPP D	33306	SFIA	5	115	30	310-340	NS	148	74	74
		145	B2 LINE San Mateo - ShawRoad - Martin C		115	30	340-310		205	103	103
									0 / 1		103.3
33310	SANMATEO	33311	BAY MDWS	1	115	30	310	NS	58	60	53
		158	B2 LINE San Mateo - Bay Meadows Ckt 2	2	115	30	310		117	121	107
									1 / 0		106.5
33310	SANMATEO	33311	BAY MDWS	2	115	30	310	NS	58	60	53
		157	B2 LINE San Mateo - Bay Meadows Ckt 1	1	115	30	310		117	121	107
									1 / 0		106.5

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Overloaded Facility		Contingency								Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone			MVA	Norm (%)	Emer (%)
33310	SANMATEO	33312	BELMONT	1	115	30	310	NS		130	131	103
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310			200	202	159
		160	B2 LINE San Mateo D - Ravenswood	1	115	30	310			148	150	118
		229	B2 LINE Tesla - Metcalf	1	500	30	300			136	137	108
		N1-29(	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316			135	137	107
		N1-29E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-318			134	136	107
		162	B2 LINE Bair - Ravenwood		115	30	310-340			134	136	107
		N1-30H	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316			134	135	106
		N1-30F	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	310			134	135	106
		93B	B2 LINE Newark - Ravenswood		230	30	316-310			133	135	106
		98	B2 LINE East Shore - Dumbarton	1	115	30	316			133	135	106
		N1-30A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310			133	135	106
		136	B3 TRANSFORMER East Shore 230-115 kV	1	115-230	30	316			133	135	106
		136A	B3 TRANSFORMER East Shore 230-115 kV	2	115-230	30	316			133	135	106
		6	B2 LINE Pittsburg - Tassajara	1	230	30	308			133	134	106
		148	B2 LINE San Mateo - Ravenswood	1	230	30	310			133	134	106
		93	B2 LINE Ravenswood - San Mateo #1	1	230	30	310			133	134	106
		198	B2 LINE Nortech - Los Esteros	1	115	30	318			133	134	105
		N1-30C	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	310			133	134	105
		199	B2 LINE Nortech - Kifer	1	115	30	318-321			133	134	105
		243	TRANSFORMER Metcalf 500-230 kV #2	12	230-500	30	318-300			133	134	105
		242	TRANSFORMER Metcalf 500-230 kV #1	11	230-500	30	318-300			132	134	105
		26	B2 LINE Pittsburg - San Ramon	1	230	30	308-316			132	133	105
		93A	B2 LINE Ravenswood - San Mateo #2	2	230	30	310			132	133	105
		215	B2 LINE Swift - Metcalf	1	115	30	318			132	133	105
		N1-30H	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-318			132	133	105
		144	B2 LINE East Grand - Mil SFIA - San Mateo 115 kV		115	30	310			132	133	105
		110	B2 LINE Newark D - Los Esteros #1	1	230	30	316-318			132	133	105
		94	B2 LINE Newark E - Los Esteros	1	230	30	316-318			132	133	105
		N1-30E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	311-316			132	133	105
		N1-30.	OVERLAPPING LINE AND GENERATOR OUTAGE -		230-9.11	30				132	133	105
		N1-29I	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	318			132	133	104
		128I	B1 GENERATOR OUTAGE – Los Esteros Steam							132	133	104
		226	B2 LINE Vaca Dixon - Tesla	1	500	30	300			131	133	104
		13	B2 LINE Sobrante - Ignacio		230-18	30				129	130	102
		152	B2 LINE Martin C - EBT	2	115	30	309-310			129	130	102
		92	B2 LINE Tesla E - Ravenswood	1	230	30	311-310			128	130	102
		7A	B2 LINE Pittsburg - East Shore	1	230	30	308-316			128	130	102
		7B	B2 LINE Pittsburg - East Shore	2	230	30	308-316			128	130	102
		127A	B1 GENERATOR OUTAGE – DEC Steam Unit							128	129	102
		97	B2 LINE Dumbarton - Newark	1	115	30	316			128	129	102
		N1-25	B1 OVERLAPPING LINE AND GENERATOR OUTA		18-230	30	308			128	129	102
		237	TRANSFORMER Vaca-Dixon 500/230 kV			30	304-300			128	129	102
		182	32 LINE Ravenswood - Ames BS2	1	115	30	310-317			127	129	101
		N1-16	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308			128	129	101

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
		165	B2 LINE Ravenswood - Ames	1	115	30	310-317		127	129	101
		N1-29A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		127	128	101
		N1-29E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		127	128	101
		N1-15	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308-316		127	128	101
		153	B2 LINE Martin C - Airport		115	30	310-340		126	127	100
									21 / 28		159.1
33310	SANMATEO	33315	RAVENSWD	1	115	30	310	NS	90	99	86
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310		172	189	166
		159	B2 LINE San Mateo - Belmont	1	115	30	310		122	134	117
									2 / 0		165.5
35105	EASTSHRE	30560	E. SHORE	1	115-230	30	316	NS	131	109	91
		136A	B3 TRANSFORMER East Shore 230-115 kV	2	115-230	30	316		190	158	132
		97	B2 LINE Dumbarton - Newark	1	115	30	316		151	126	105
		N1-29E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		144	120	100
		N1-29A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		144	120	100
									1 / 3		131.8
35105	EASTSHRE	30560	E. SHORE	2	115-230	30	316	NS	130	109	91
		136	B3 TRANSFORMER East Shore 230-115 kV	1	115-230	30	316		189	158	131
		97	B2 LINE Dumbarton - Newark	1	115	30	316		150	125	104
									1 / 1		131.3
35120	NEWARK D	36852	SCOTT	1	115	30	316-321	NS	138	83	73
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		210	126	111
		192	B2 LINE Kiefer - Scott	1	115	30	321		207	124	110
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		204	122	108
									3 / 0		111.2
35121	NEWARK E	35110	FREMNT	1	115	30	316	NS	43	62	52
		105	B2 LINE Newark E - Freemont #2	2	115	30	316		88	126	106
									1 / 0		106.3
35121	NEWARK E	35110	FREMNT	2	115	30	316	NS	43	62	52
		104	B2 LINE Newark E - Freemont #1	1	115	30	316		88	126	106
									1 / 0		106.3
35122	NEWARK F	35602	ZNKER J2	1	115	30	316-318	NS	113	68	60
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		190	114	101
									0 / 1		100.8
35122	NEWARK F	36852	SCOTT	2	115	30	316-321	NS	117	70	62
		192	B2 LINE Kiefer - Scott	1	115	30	321		199	119	105
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		192	115	102
									1 / 1		105.0

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
35612	TRIMBLE	35616	SJ B E	1	115	30	318	NS	202	144	110
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		350	250	190
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		339	242	184
		229	B2 LINE Tesla - Metcalf	1	500	30	300		238	170	129
		204	B2 LINE San Jose A - El Patio	1	115	30	318		236	168	128
		206	B2 LINE El Patio - Metcalf		115	30	318		228	163	124
		205	B2 LINE Eal Patio - Metcalf		115	30	318		228	163	124
		209	52 LINE Evergreen - Metcalf	1	115	30	318		224	160	122
		203	B2 LINE San Jose A - San Jose B	1	115	30	318		219	156	119
		243	TRANSFORMER Metcalf 500-230 kV #2	12	230-500	30	318-300		217	155	118
		242	TRANSFORMER Metcalf 500-230 kV #1	11	230-500	30	318-300		216	154	117
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321		215	154	117
		117	B2 LINE Newark F - Dixon	1	115	30	316-318		215	153	117
		119	B2 LINE Newark F - Kiefer		115	30			214	153	116
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321		214	153	116
		218	B2 LINE LLA Gas - Glory COG		115	30	318-348		211	151	115
		207	B2 LINE San Jose B - Evergreen		9.11-115	30			210	150	114
		200	B2 LINE Los Esteros - Agnew		115-9.11	30	318-396		209	150	114
		226	B2 LINE Vaca Dixon - Tesla	1	500	30	300		207	148	113
		231	B2 LINE Metcalf - Moss Landing	1	500	30	300		206	147	112
		223	B2 LINE Metcalf - Calpine MEC	4	230	30	318		206	147	112
		190	B2 LINE MEC - Metcalf Ckt 4	4	230	30	318		206	147	112
		176	B2 LINE Metcalf - Moss Landing	1	230	30	318-319		206	147	112
		230	B2 LINE Tesla - Los Bonos	1	500	30	300		205	147	112
		228	B2 LINE Tracy - Los Banos	1	500	30	300		205	147	112
		208	B2 LINE Evergreen - Metcalf		115	30	318		205	147	112
		118	B2 LINE Newark F - Milpitas	1	115	30	316-318		205	146	111
		121	B2 LINE Newark F - Milpitas	1	115	30	316-318		205	146	111
		202	B2 Milpitas - Newark F	1	115	30	316-318		205	146	111
		115	B2 LINE Newark F - Lockheed		115	30			205	146	111
		202A	B2 Milpitas - Newark F	2	115	30	316-318		204	146	111
		118A	B2 LINE Newark F - Milpitas	2	115	30	316-318		204	146	111
		191	B2 LINE Vasona - Metcalf	1	230	30	317-318		200	143	109
		31	B2 LINE Moraga - Castro Valley	1	230	30	308-316		200	143	109
		239	TRANSFORMER Tesla 500-230 kV	4	500-230	30	300-311		200	143	109
		127A	B1 GENERATOR OUTAGE – DEC Steam Unit						199	142	108
		13	B2 LINE Sobrante - Ignacio		230-18	30			199	142	108
		175	32 LINE Hicks - Metcalf		230	30	318		198	142	108
		183	B2 LINE VSA - Lawrence		115	30	317-347		198	142	108
		1-28(	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316		198	141	107
		6	B2 LINE Pittsburg - Tassajara	1	230	30	308		198	141	107
		210	B2 LINE Edenvale - Edenvale J3/J1 - Metcalf		115	30	318-348		198	141	107
		128E	B1 GENERATOR OUTAGE – Golden Gate Powe						197	141	107
		128	B1 GENERATOR OUTAGE – Potrero Unit 3						197	141	107
		126A	B1 GENERATOR OUTAGE – SECAL Unit 1						197	141	107

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Overloaded Facility		Contingency						Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone	MVA	Norm (%)	Emer (%)
		N1-31	OVERLAPPING LINE AND GENERATOR OUTAGE -					197	141	107
		186	B2 LINE Monta Vista - Britton	1	115	30	317	197	141	107
		N1-4	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308	197	141	107
		232	B2 LINE Moss Landing - Los Bonos	1	500	30	300	197	141	107
		N1-7	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308	197	141	107
		20	B2 LINE Contra Costa - Los Positas	1	230	30	308-316	197	141	107
		126	B1 GENERATOR OUTAGE – Contra Costa Unit 7					197	141	107
		N1-28A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310	197	140	107
		N1-6	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308	196	140	107
		N1-28E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310	197	140	107
		N1-8	OVERLAPPING LINE AND GENERATOR OUTAGE		230-9.11	30		197	140	107
		N1-5	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308	196	140	107
		N1-27C	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316	196	140	107
		128A	B1 GENERATOR OUTAGE – Potrero Unit 7C					196	140	107
		92	B2 LINE Tesla E - Ravenswood	1	230	30	311-310	196	140	106
		N1-3	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	304-308	196	140	106
		N1-27E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310	195	139	106
		N1-27A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310	195	139	106
		96	B2 LINE Tesla E - Newark D (ADCC)		230-9.11	30		194	138	105
		N1-30H	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316	194	139	105
		N1-21	OVERLAPPING LINE AND GENERATOR OUTAGE		115	30-8	308-338	194	138	105
		128E	B1 GENERATOR OUTAGE – Freemont Generati					194	138	105
		N1-12	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308	194	138	105
		N1-11	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308	194	138	105
		N1-19	OVERLAPPING LINE AND GENERATOR OUTAGE		115	30	308	194	138	105
		N1-23	OVERLAPPING LINE AND GENERATOR OUTAGE		115	30	308	194	138	105
		N1-20	OVERLAPPING LINE AND GENERATOR OUTAGE		115	30	308-338	194	138	105
		N1-14	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308-316	194	138	105
		N1-30C	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	310	194	138	105
		N1-13	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308-316	194	138	105
		N1-24	OVERLAPPING LINE AND GENERATOR OUTAGE		115-13.8	30		193	138	105
		127	B1 GENERATOR OUTAGE – Pittsburg Unit 7					193	138	105
		N1-30F	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	310	193	138	105
		N1-30D	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316	193	138	105
		237	TRANSFORMER Vaca-Dixon 500/230 kV			30	304-300	193	138	105
		N1-15	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308-316	193	138	105
		N1-30G	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310	193	138	105
		N1-30B	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310	193	138	105
		N1-22	OVERLAPPING LINE AND GENERATOR OUTAGE		115-13.8	30		193	138	105
		N1-9	OVERLAPPING LINE AND GENERATOR OUTAGE					193	138	105
		91	B2 LINE Tesla E - Newark D	1	230	30	311-316	192	137	104
		N1-18	OVERLAPPING LINE AND GENERATOR OUTAGE		230-9.11	30		192	137	104
		N1-17	OVERLAPPING LINE AND GENERATOR OUTAGE		9.11-230	30		192	137	104
		N1-16	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308	190	136	103
		120	B2 LINE Newark F - Trimble		115	30	318-316	190	136	103

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
		N1-25	B1 OVERLAPPING LINE AND GENERATOR OUTA		18-230	30	308		188	134	102
		213	B2 LINE McKee - Metcalf		115	30	318		188	134	102
		N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE -		230-9.11	30			185	132	100
									80 / 12		190.3
35616	SJ B E	35617	FMC JCT	1	115	30	318	NS	114	81	71
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		281	201	176
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		268	192	168
									2 / 0		175.9
35658	LS ESTRS	35610	MONTAGUE	1	115	30	318	NS	201	66	66
		197	B2 LINE Los Esteros - Trimble	1	115	30	318		332	108	108
									1 / 0		108.3
35658	LS ESTRS	35612	TRIMBLE	1	115	30	318	NS	280	91	91
		196	B2 LINE Los Esteros - Montague	1	115	30	318		401	131	131
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		399	130	130
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		390	127	127
		201	B2 LINE Montague - Trimble	1	115	30	318		324	106	106
									4 / 0		130.6

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Overloaded Facility		Contingency								Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone			MVA	Norm (%)	Emer (%)
35659	NORTECH	35658	LS ESTRS	1	115	30	318	NS		389	139	122
		195	B2 LINE Trimble - San Jose B	1	115	30	318			467	167	146
		197	B2 LINE Los Esteros - Trimble	1	115	30	318			454	162	142
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321			427	152	133
		196	B2 LINE Los Esteros - Montague	1	115	30	318			424	151	133
		193	B2 LINE Kiefer - FMC		115	30	321-318			422	151	132
		194	B2 LINE FMC - San Jose B		115	30	318			422	151	132
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321			419	150	131
		119	B2 LINE Newark F - Kiefer		115	30				419	150	131
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310			402	144	126
		201	B2 LINE Montague - Trimble	1	115	30	318			402	144	126
		200	B2 LINE Los Esteros - Agnew		115-9.11	30	318-396			398	142	125
		215	B2 LINE Swift - Metcalf	1	115	30	318			395	141	124
		186	B2 LINE Monta Vista - Britton	1	115	30	317			393	141	123
		204	B2 LINE San Jose A - El Patio	1	115	30	318			393	140	123
		213	B2 LINE McKee - Metcalf		115	30	318			393	140	123
		120	B2 LINE Newark F - Trimble		115	30	318-316			385	138	120
		N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE -		230-9.11	30				385	138	120
		N1-30E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	311-316			384	137	120
		93B	B2 LINE Newark - Ravenswood		230	30	316-310			382	136	119
		N1-30A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310			382	136	119
		95	B2 LINE Metcalf - Los Esteros	1	230	30	318			374	134	117
		N1-29(	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316			350	125	109
		128E	B1 GENERATOR OUTAGE – Los Esteros Steam							347	124	108
		N1-29E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310			346	124	108
		N1-29A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310			346	124	108
		N1-30H	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-318			339	121	106
		192	B2 LINE Kiefer - Scott	1	115	30	321			337	120	105
		94	B2 LINE Newark E - Los Esteros	1	230	30	316-318			332	118	104
		110	B2 LINE Newark D - Los Esteros #1	1	230	30	316-318			332	118	104
		N1-29E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	318			327	117	102
										27 / 3		146.0

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
35659	NORTECH	36850	KIFER	1	115	30	318-321	NS	356	116	116
		195	B2 LINE Trimble - San Jose B	1	115	30	318		433	141	141
		197	B2 LINE Los Esteros - Trimble	1	115	30	318		420	137	137
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321		393	128	128
		196	B2 LINE Los Esteros - Montague	1	115	30	318		391	127	127
		193	B2 LINE Kiefer - FMC		115	30	321-318		389	127	127
		194	B2 LINE FMC - San Jose B		115	30	318		389	127	127
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321		386	126	126
		119	B2 LINE Newark F - Kiefer		115	30			385	125	126
		201	B2 LINE Montague - Trimble	1	115	30	318		369	120	120
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310		369	120	120
		200	B2 LINE Los Esteros - Agnew		115-9.11	30	318-396		365	119	119
		215	B2 LINE Swift - Metcalf	1	115	30	318		362	118	118
		186	B2 LINE Monta Vista - Britton	1	115	30	317		361	117	118
		204	B2 LINE San Jose A - El Patio	1	115	30	318		360	117	117
		N1-27(	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316		360	117	117
		136	B3 TRANSFORMER East Shore 230-115 kV	1	115-230	30	316		360	117	117
		N1-28(	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316		360	117	117
		213	B2 LINE McKee - Metcalf		115	30	318		360	117	117
		136A	B3 TRANSFORMER East Shore 230-115 kV	2	115-230	30	316		360	117	117
		N1-30\	OVERLAPPING LINE AND GENERATOR OUTAGE -		230-9.11	30			352	115	115
		120	B2 LINE Newark F - Trimble		115	30	318-316		352	115	115
		N1-30E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	311-316		352	115	115
		93B	B2 LINE Newark - Ravenswood		230	30	316-310		349	114	114
		N1-30A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		349	114	114
		95	B2 LINE Metcalf - Los Esteros	1	230	30	318		342	111	111
		N1-29(	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316		318	103	103
		128D	B1 GENERATOR OUTAGE -- Los Esteros Steam						314	102	102
		N1-29E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		314	102	102
		N1-29A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		314	102	102
		N1-30H	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-318		308	100	100
									25 / 5		140.9
36850	KIFER	35617	FMC JCT	1	115	30	321-318	NS	60	43	37
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		226	162	141
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		213	152	133
									2 / 0		141.4
36850	KIFER	36852	SCOTT	1	115	30	321	NS	146	87	76
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321		242	145	127
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321		232	139	121
									2 / 0		126.7

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Overloaded Facility		Contingency					Overloads		
From	Name	To	Name	Circuit Base kV	Area	Zone	MVA	Norm (%)	Emer (%)
							180 / 57		190.3

Notes:

1. Overloads are based on 100% of Rating 2
2. NS = Normal System Conditions (No Outages)
3. Minimum Reporting Level is 100%
4. Statistical Information (A/B Stats and Maximum Overload)
   A = Serious Overload > 105%
   B = Overloaded Facility between 100% and 105% of Rated Capability

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Appendix 6-F
Project Dynamic Data

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Model Name: genrou

Description: Solid rotor generator represented by Equal mutual inductance rotor modeling

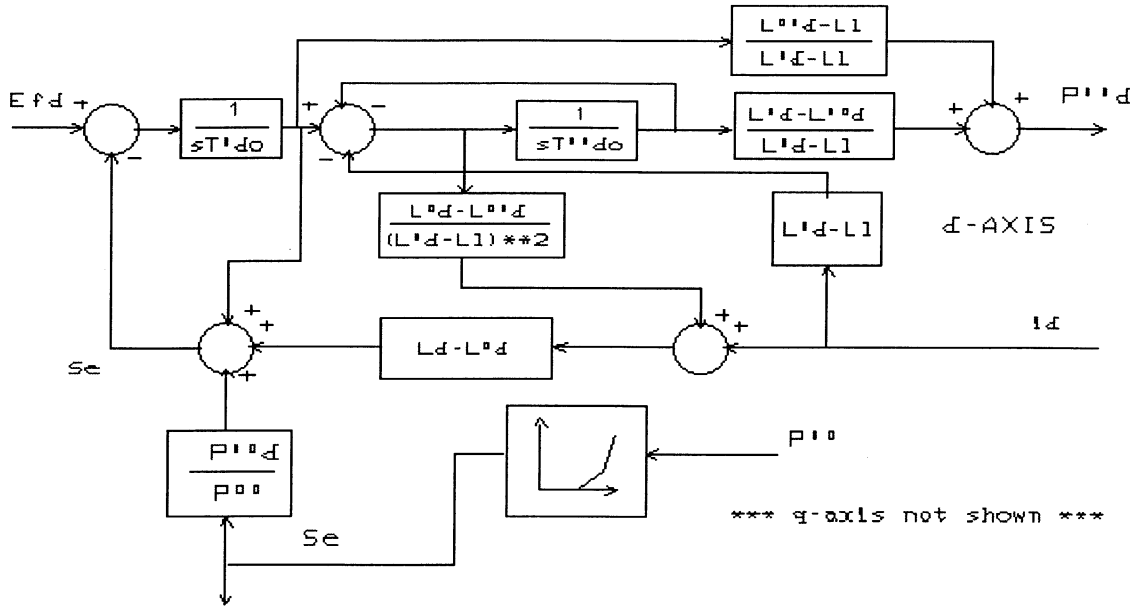
Invocation: genrou [<n>] {<name> <kv>} <id> :

Parameters:

Parameters:

Variable	*Description*	***RCEC PROJECT DATA***
tpdo	D-axis transient rotor time constant	9.7000
tppdo	D-axis subtransient rotor time constant	0.0430
tpqo	Q-axis transient rotor time constant	1.0800
tppqo	Q-axis subtransient rotor time constant	0.0740
h	Inertia constant, sec	6.4200
d	Damping factor, pu	0.0000
ld	D-axis synchronous reactance	2.0774
lq	Q-axis synchronous reactance	2.0236
lpd	D-axis transient reactance	0.2367
lpq	Q-axis transient reactance	0.4002
lppd	D-axis subtransient reactance	0.1917
ll	Stator leakage reactance, pu	0.1640
s1	Saturation factor at 1 pu flux	0.0783
s12	Saturation factor at 1.2 pu flux	0.3496
ra	Stator resistance, pu	0.0000
rcomp	Compounding resistance voltage control, pu	0.0000
xcomp	Compounding reactance voltage control, pu	0.0000

Notes:



Model Name: exst1

Descriptions: IEEE type ST1 excitation system

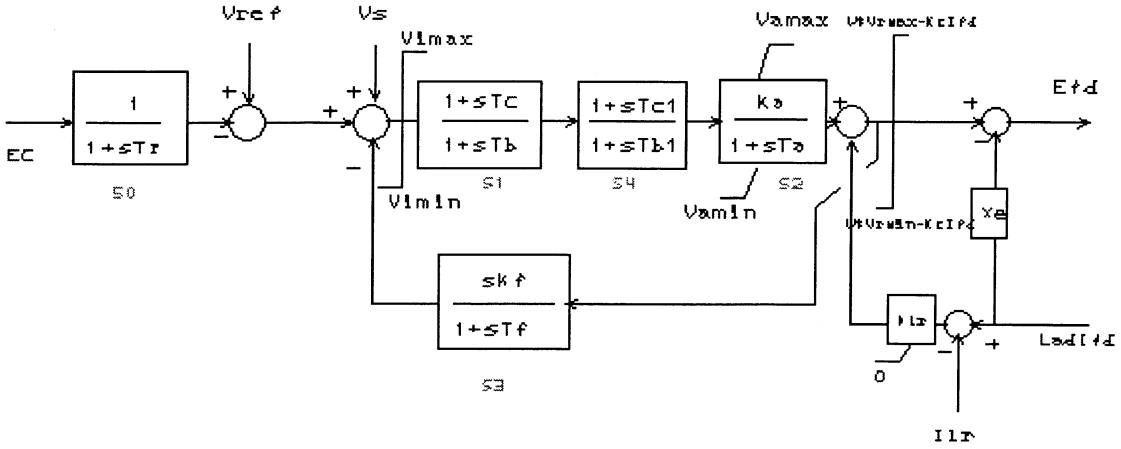
Invocation: exst1 [<n>] {<name> <kv>} <id> :

Parameters:

Variable	*Description*	***RCEC PROJECT DATA***
tr	Filter time constant, sec	0.0000
vimax	Maximum error, pu	0.1700
vimin	Minimum error, pu	-0.1700
tc	Lead time constant, sec	1.0000
tb	Lag time constant, sec	8.0000
ka	Gain	250.0000
ta	Time constant, sec	0.0200
vrmax	Maximum controller output	7.1570
vrmin	Minimum controller output	-6.4420
kc	Excitation sys. regulation factor, pu	0.1090
kf	Rate feedback gain	0.0000
tf	Rate feedback time constant, sec	0.0000
tc1	Lead time constant, sec	0.0000
tb1	Lag time constant, sec	0.0000
vamax	Maximum control element output, p.u.	7.1570
vamin	Minimum control element output, p.u	-6,4420
xe	Excitation XFMR effective X, p.u.	0.0000
ilr	Maximum field current, p.u.	3.2000
klr	Gain on field current limit	0.0000

Notes:

a) This model can be used to represent a controlled-rectifier excitation system whose a.c. power source is a simple power transformer fed from the generator terminals. The voltage regulation of the excitation transformer and rectifier are approximated by the parameter Kc.


Vref
Vs
Vimax
Vamax
Efd
EC
1
1+sTr
1+sTc
1+sTb
1+sTc1
1+sTb1
Ka
1+sTa
Vamin
Vimin
sKf
1+sTf
Xe
Kir
0
LadIfd
Iir
S0
S1
S4
S2
S3

Model Name: pss2a

Descriptions: Dual input Power system stabilizer (IEEE type PSS2A)

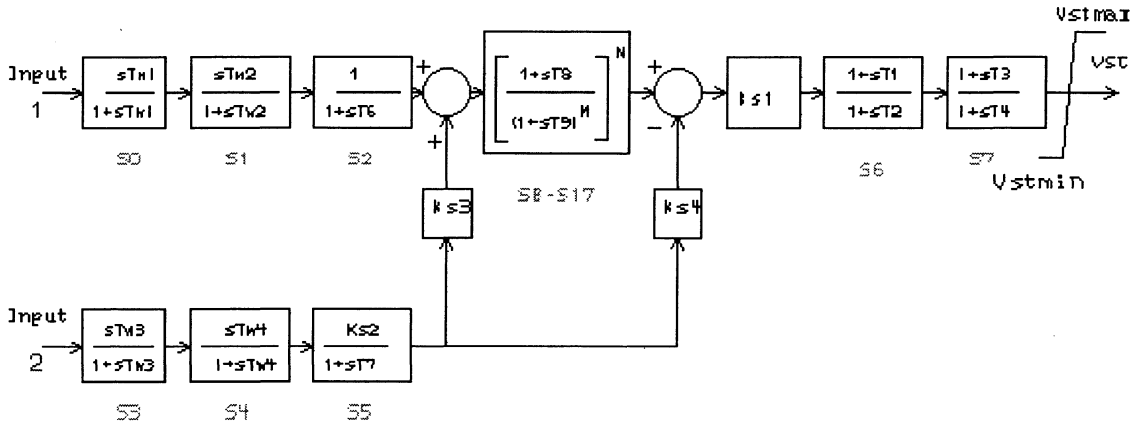
Invocation: pss2a [<n>] {<name> <kv>} <id> :

Parameters:

Variable	*Description*	***RCEC PROJECT DATA***
j1	Input signal #1 code	1.0000
k1	Input signal #1 remote bus number	0.0000
j2	Input signal #2 code	3.0000
k2	Input signal #2 remote bus number	0.0000
tw1	First washout on signal #1, sec	2.0000
tw2	Second washout on signal #1, sec	2.0000
tw3	First washout on signal #2, sec	2.0000
tw4	Second washout on signal #2, sec	0.0000
t6	Time constant on signal #1, sec	0.0000
t7	Time constant on signal #2, sec	2.0000
ks2	Gain on signal #2	0.1558 (set to tw2/2H)
ks3	Gain on signal #2	1.0000
ks4	Gain on signal #2	1.0000
t8	Lead of ramp tracking filter	0.5000
t9	Lag of ramp tracking filter	0.1000
n	Order of ramp tracking filter	1.0000
m	Order of ramp tracking filter	5.0000
ks1	Stabilizer gain	10.0000
t1-t4	Lead/lag time constants, sec, 0.25, 0.04,	0.20, 0.03
vstmax	Stabilizer output max limit, p.u.	0.1000
vstmin	Stabilizer output min limit, p.u.	-0.1000

The input signal code, j, is

1	for shaft speed
2	for frequency of bus voltage
3	for generator electrical power
4	for generator accelerating power
5	for amplitude of bus voltage
7	for amplitude of branch current


Input
1
sTw1
1+sTw1
sTw2
1+sTw2
1
1+sT6
1+sT8
(1+sT9)
N
M
Ks1
1+sT1
1+sT2
1+sT3
1+sT4
Vstmax
Vst
Vstmin
Ks3
Ks4
S0
S1
S2
S8-S17
S6
S7
Input
2
sTw3
1+sTw3
sTw4
1+sTw4
Ks2
1+sT7
S3
S4
S5

Model Name: gast

Description: Single shaft gas turbine

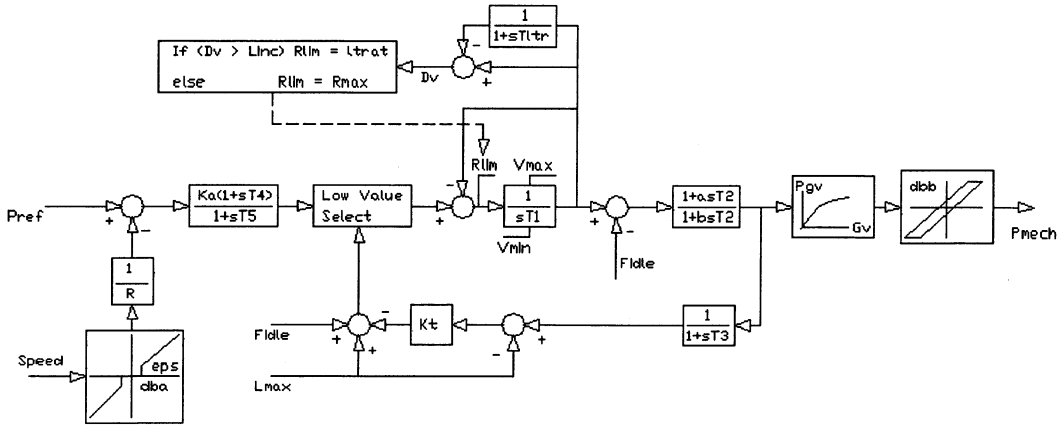
Invocation: gast [<n>] {<name> <kv>} <id> : [mwcap=<value>]

Parameters:

Variable	*Description*	***RCEC PROJECT DATA****(see note 1)*
r	Permanent droop, pu	0.0400
t1	Governor mechanism time constant, sec	0.4000
t2	Turbine power time constant, sec	0.5000
t3	Turbine exhaust temp. time constant, sec	3.0000
lmax	Ambient temperature load limit	1.0000
kt	Temperature limiter gain	3.0000
vmax	Maximum turbine power, pu of mwcap	1.5000
vmin	Minimum turbine power, pu of mwcap	0.0000
dturb	Turbine damping coefficient, pu [NOT USED}	
fidle	Fuel flow at zero power output, pu	0.2000
rmax	Maximum fuel valve opening rate, pu/sec	0.0100
linc	Valve position change allowed at fast rate,pu	0.0500
tltr	Valve pos. averaging time constant, sec	5.0000
ltrate	Max. long term fuel valve rate,pu/sec	0.0005
a	Turb.pwr t-const. numerator scale factor	0.0000
b	Turb.pwr t-const. denominator scale factor	0.0000
db1	Intentional deadband width, Hz.	0.0000
eps	Intentional db hysteresis, Hz.	0.0000
db2	Unintentional deadband, MW	0.0000
gv1	Nonlinear gain point 1, p.u. gv	0.0000
pgv1	Nonlinear gain point 1, p.u. power	0.0000
gv2	Nonlinear gain point 2, p.u. gv	0.0000
pgv2	Nonlinear gain point 2, p.u. power	0.0000
gv3	Nonlinear gain point 3, p.u. gv	0.0000
pgv3	Nonlinear gain point 3, p.u. power	0.0000
gv4	Nonlinear gain point 4, p.u. gv	0.0000
pgv4	Nonlinear gain point 4, p.u. power	0.0000
gv5	Nonlinear gain point 5, p.u. gv	0.0000
pgv5	Nonlinear gain point 5, p.u. power	0.0000
gv6	Nonlinear gain point 6, p.u. gv	0.0000
pgv6	Nonlinear gain point 6, p.u. power	0.0000
ka	Governor gain	0.0000
t4	Governor lead time constant, sec	0.0000
t5	Governor lag time constant, sec	0.0000

Notes:

1) Used GE program defaults. No impact for analysis in time domain of interest for electrical dynamics analysis. BUT WOULD NOT BE ACCURATE FOR USE IN AN OPERATIONA STUDY(EXTENDED TIME DOMAIN ANALYSIS) SUCH AS TURBINE RESPONSE DUE TO DISPATCH ORDER TO RAMP UP/DOWN PLANT OUTPUT.


If (Dv > Linc) Rlim = ltrat
else Rlim = Rmax
1
1+sTltr
Dv
Rlim
Vmax
Vmin
Pref
Ka(1+sT4)
1+sT5
Low Value
Select
1
sT1
1+asT2
1+bsT2
Fidle
Pgv
Gv
dbb
Pmech
1
R
Speed
eps
dba
Kt
1
1+sT3
Lmax

Model Name: genrou

Description: Solid rotor generator represented by Equal mutual inductance rotor modeling

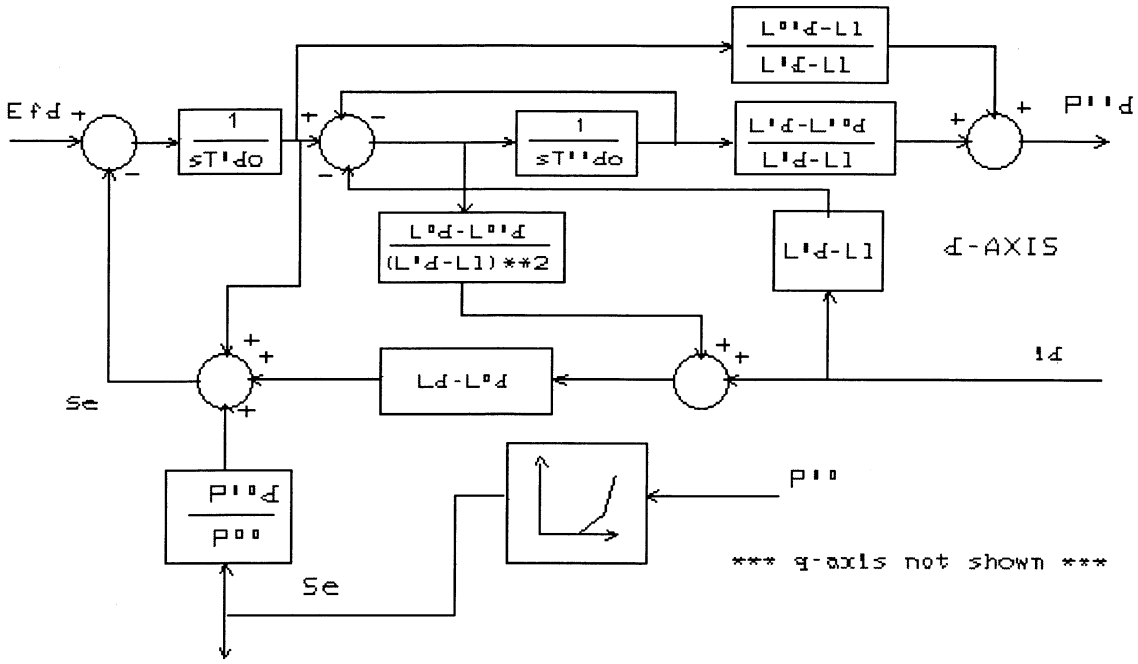
Invocation: genrou [<n>] {<name> <kv>} <id> :

Parameters:

Parameters:

Variable	*Description*	***RCEC PROJECT DATA***
tpdo	D-axis transient rotor time constant	5.8850
tppdo	D-axis subtransient rotor time constant	0.0420
tpqo	Q-axis transient rotor time constant	0.6500
tppqo	Q-axis subtransient rotor time constant	0.0640
h	Inertia constant, sec	4.1340
d	Damping factor, pu	0.0000
ld	D-axis synchronous reactance	2.3164
lq	Q-axis synchronous reactance	2.2631
lpd	D-axis transient reactance	0.3440
lpq	Q-axis transient reactance	0.5132
lppd	D-axis subtransient reactance	0.2848
ll	Stator leakage reactance, pu	0.2425
s1	Saturation factor at 1 pu flux	0.1992
s12	Saturation factor at 1.2 pu flux	0.8690
ra	Stator resistance, pu	0.0000
rcomp	Compounding resistance voltage control, pu	0.0000
xcomp	Compounding reactance voltage control, pu	0.0000

Notes:


Efd
1
sT'do
1
sT''do
L''d-Ll
L'd-Ll
L'd-L''d
L'd-Ll
P''d
L''d-L''d
(L'd-Ll)**2
L'd-Ll
d-AXIS
Ld-L''d
Id
Se
P''d
P''o
P''o
Se
*** q-axis not shown ***

Model Name: exst1

Descriptions: IEEE type ST1 excitation system

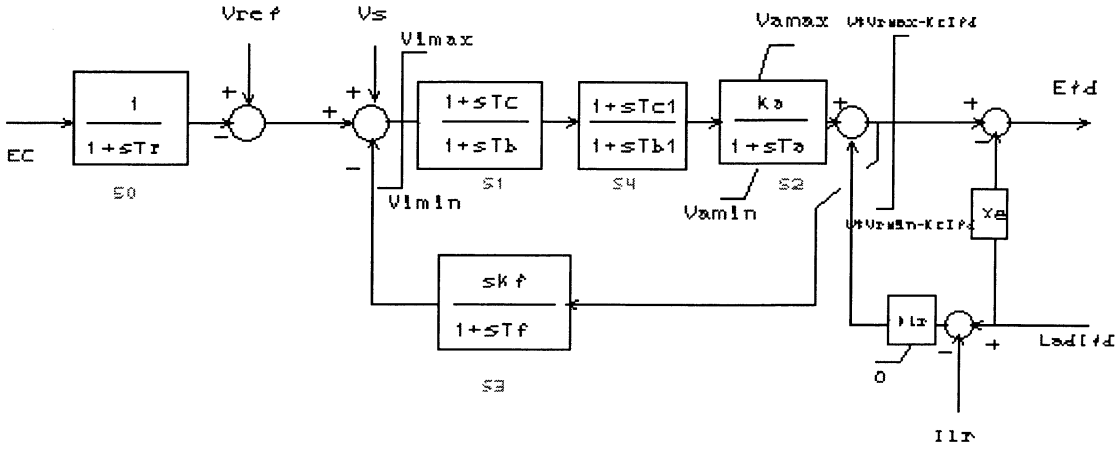
Invocation: exst1 [<n>] {<name> <kv>} <id> :

Parameters:

Variable	*Description*	***RCEC PROJECT DATA***
tr	Filter time constant, sec	0.0000
vimax	Maximum error, pu	0.1700
vimin	Minimum error, pu	-0.1700
tc	Lead time constant, sec	1.0000
tb	Lag time constant, sec	8.0000
ka	Gain	250.0000
ta	Time constant, sec	0.0200
vrmax	Maximum controller output	7.1570
vrmin	Minimum controller output	-6.4420
kc	Excitation sys. regulation factor, pu	0.1090
kf	Rate feedback gain	0.0000
tf	Rate feedback time constant, sec	0.0000
tc1	Lead time constant, sec	0.0000
tb1	Lag time constant, sec	0.0000
vamax	Maximum control element output, p.u.	7.1570
vamin	Minimum control element output, p.u	-6,4420
xe	Excitation XFMR effective X, p.u.	0.0000
ilr	Maximum field current, p.u.	3.2000
klr	Gain on field current limit	0.0000

Notes:

a) This model can be used to represent a controlled-rectifier excitation system whose a.c. power source is a simple power transformer fed from the generator terminals. The voltage regulation of the excitation transformer and rectifier are approximated by the parameter Kc.



Vref
Vs
Vimax
Vamax
Efd
EC
1
1+sTr
S0
1+sTc
1+sTb
S1
1+sTc1
1+sTb1
S4
Ka
1+sTa
S2
Vimin
Vamin
Xe
skf
1+sTf
S3
Ilr
0
Ilr

Model Name: pss2a

Descriptions: Dual input Power system stabilizer (IEEE type PSS2A)

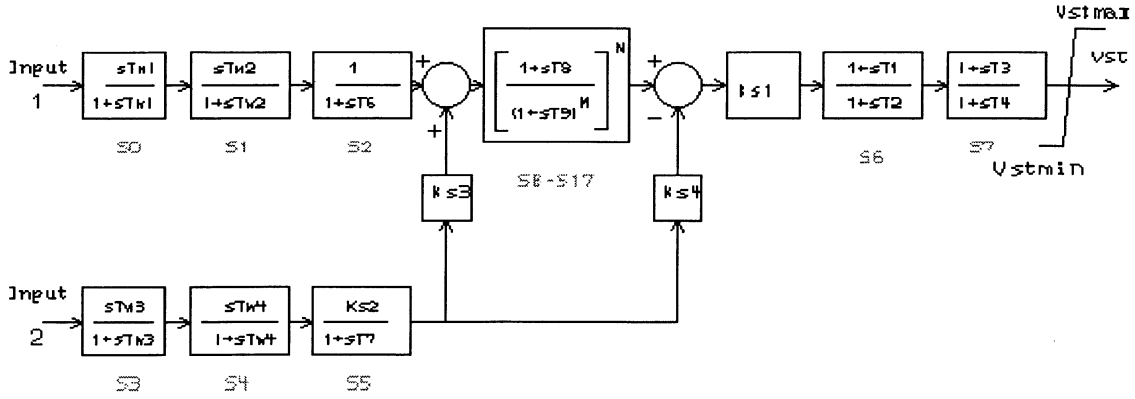
Invocation: pss2a [<n>] {<name> <kv>} <id> :

Parameters:

Variable	*Description*	***RCEC PROJECT DATA***	
j1	Input signal #1 code	1.0000	
k1	Input signal #1 remote bus number	0.0000	
j2	Input signal #2 code	3.0000	
k2	Input signal #2 remote bus number	0.0000	
tw1	First washout on signal #1, sec	2.0000	
tw2	Second washout on signal #1, sec	2.0000	
tw3	First washout on signal #2, sec	2.0000	
tw4	Second washout on signal #2, sec	0.0000	
t6	Time constant on signal #1, sec	0.0000	
t7	Time constant on signal #2, sec	2.0000	
ks2	Gain on signal #2	0.2419	(set to tw2/2H)
ks3	Gain on signal #2	1.0000	
ks4	Gain on signal #2	1.0000	
t8	Lead of ramp tracking filter	0.5000	
t9	Lag of ramp tracking filter	0.1000	
n	Order of ramp tracking filter	1.0000	
m	Order of ramp tracking filter	5.0000	
ks1	Stabilizer gain	10.0000	
t1-t4	Lead/lag time constants, sec, 0.25, 0.04,	0.20, 0.03	
vstmax	Stabilizer output max limit, p.u.	0.1000	
vstmin	Stabilizer output min limit, p.u.	-0.1000	

The input signal code, j, is

1	for shaft speed
2	for frequency of bus voltage
3	for generator electrical power
4	for generator accelerating power
5	for amplitude of bus voltage
7	for amplitude of branch current


Input
1
sTM1
1+sTM1
sTM2
1+sTM2
1
1+sT6
1+sT8
(1+sT9)^M
N
Ks1
1+sT1
1+sT2
1+sT3
1+sT4
Vstmax
Vst
Vstmin
Ks3
Ks4
S0
S1
S2
S8-S17
S6
S7
Input
2
sTM3
1+sTM3
sTM4
1+sTM4
Ks2
1+sT7
S3
S4
S5

Model Name: tgov1

Description: Basic steam turbine and governor

Invocation: tgov1 [<n>] {<name> <kv>} <id> : [mwcap=<value>]

Parameters

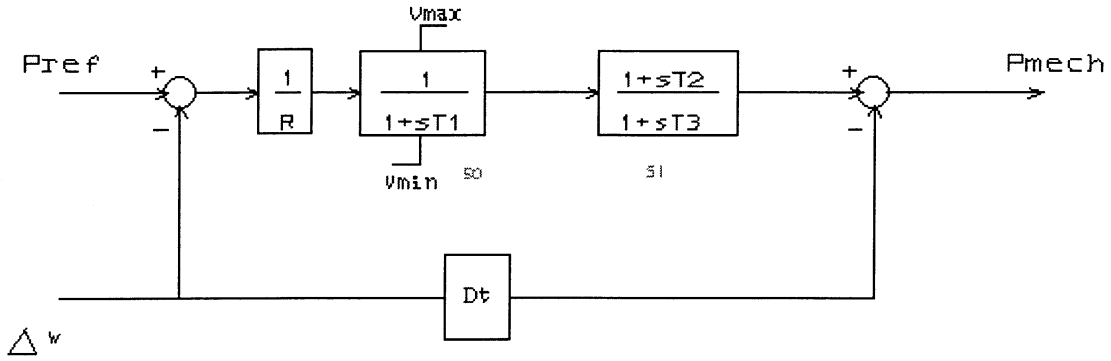
Parameters:

Variable	*Description*	***RCEC PROJECT DATA***	
r	Permanent droop, p.u.	0.0500	
t1	Steam bowl time constant, sec	1.0000	(see note 1)
vmax	Maximum valve position, p.u. of mwcap	1.0000	
vmin	Minimum valve position, p.u. of mwcap	0.0000	
t2	time constant of T2, T3 block, sec	2.1000	(see note 2)
t3	Reheater time constant, sec	7.0000	(see note 2)
dt	Turbine damping coefficient, p.u.		

Notes:

1) Project's specific turbine governor model included forward gain = 20. Set T1 per general governor time constant equation: Tgov = Gain*Droop = 20 * 0.05 = 1

2) Used GE program defaults. No impact for analysis in time domain of interest for electrical dynamics analysis. BUT WOULD NOT BE ACCURATE FOR USE IN AN OPERATIONA STUDY(EXTENDED TIME DOMAIN ANALYSIS) SUCH AS TURBINE RESPONSE DUE TO DISPATCH ORDER TO RAMP UP/DOWN PLANT OUTPUT.



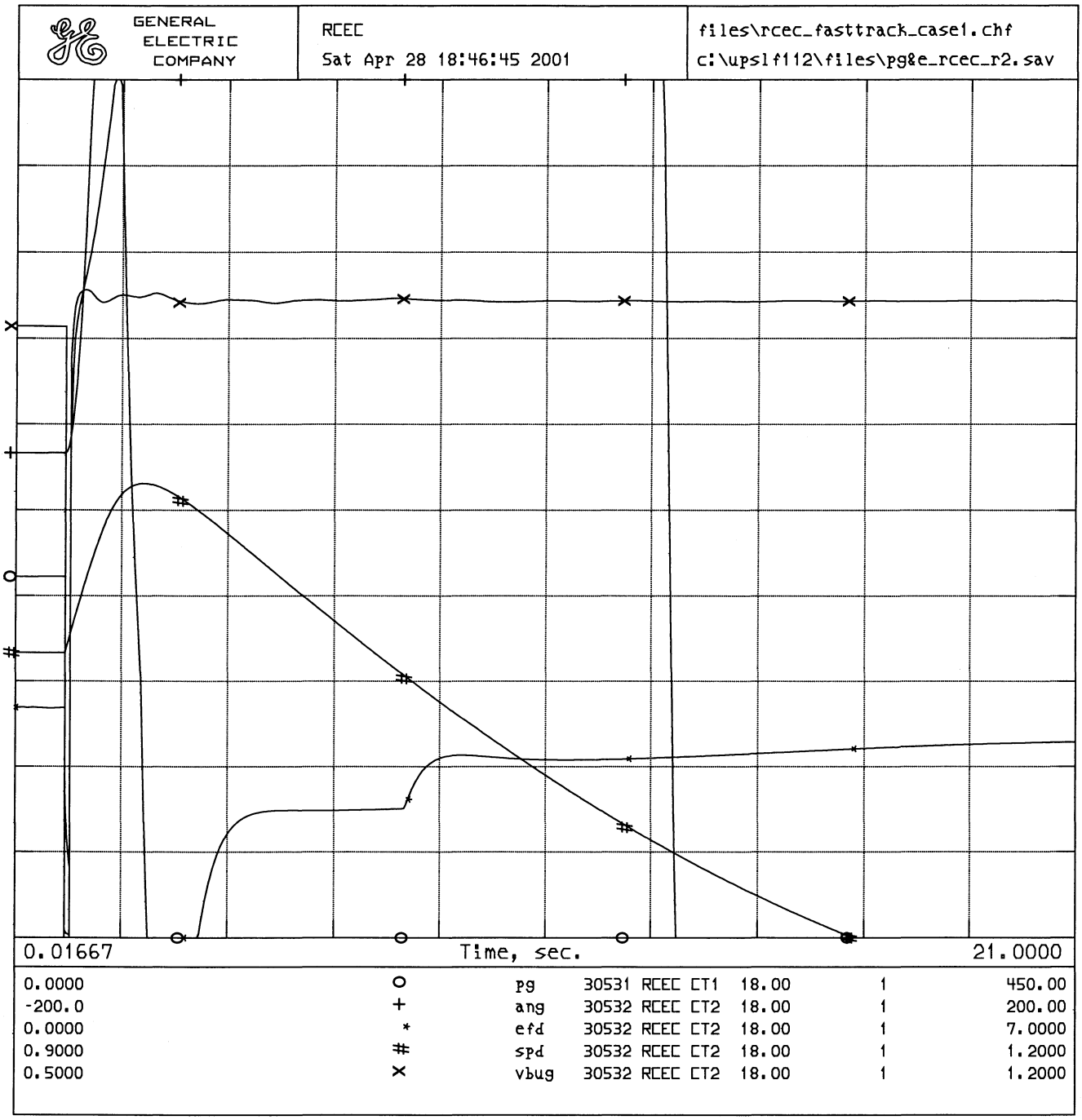
Russell City Energy Center

Appendix 6-G
Plotted Dynamic Run Results

May 2001

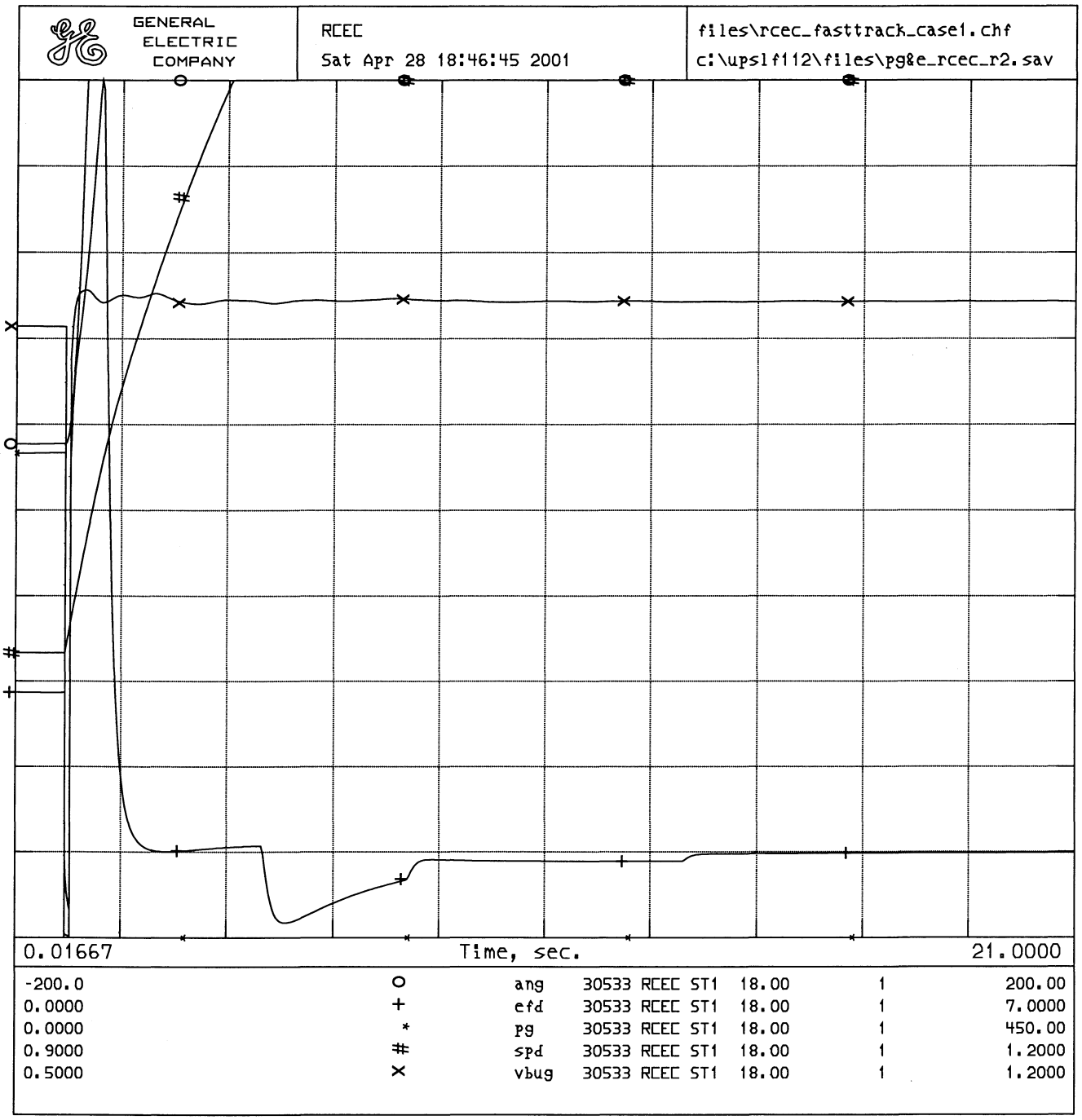
Russell City Energy Center AFC

May 2001



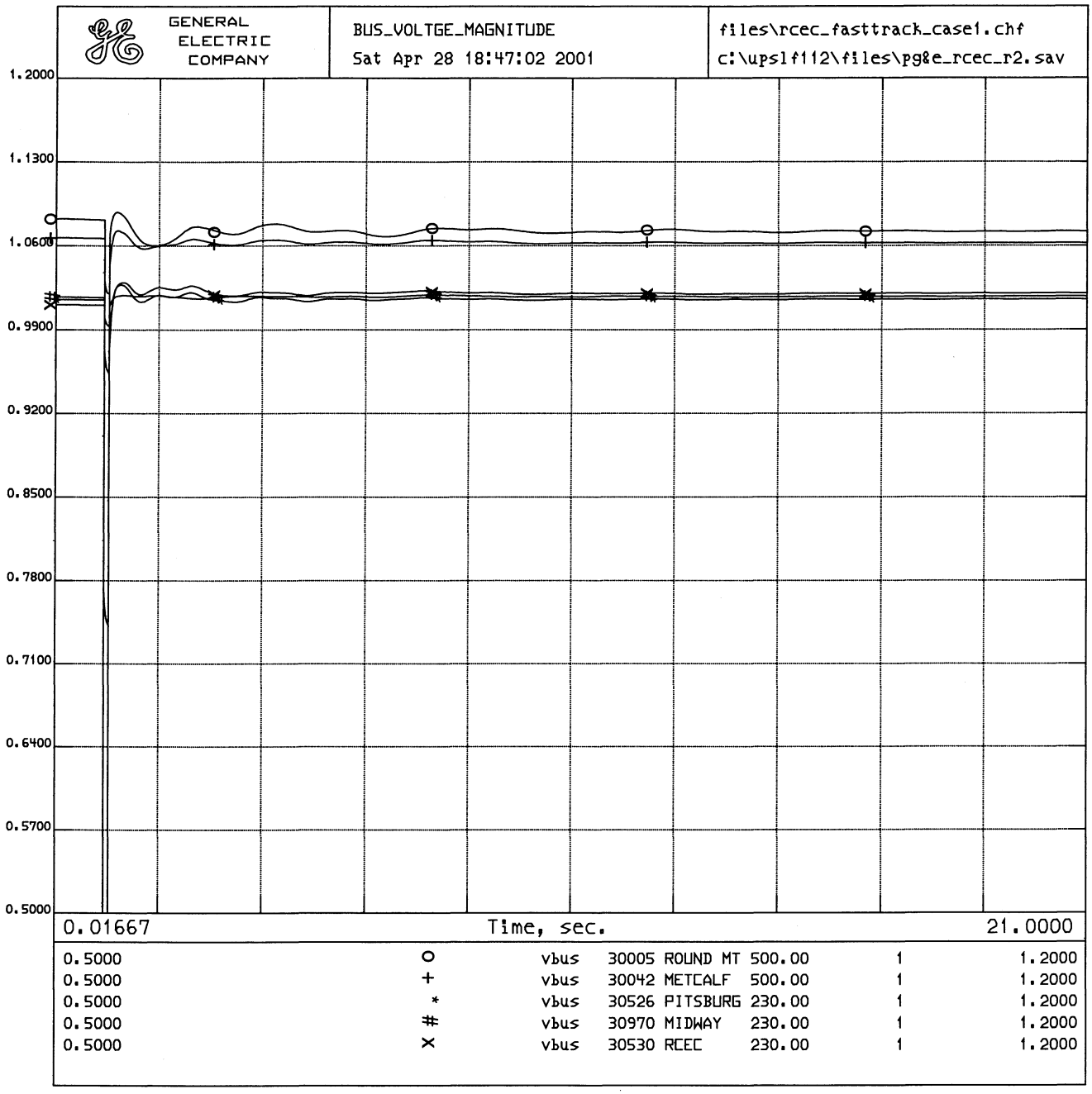
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



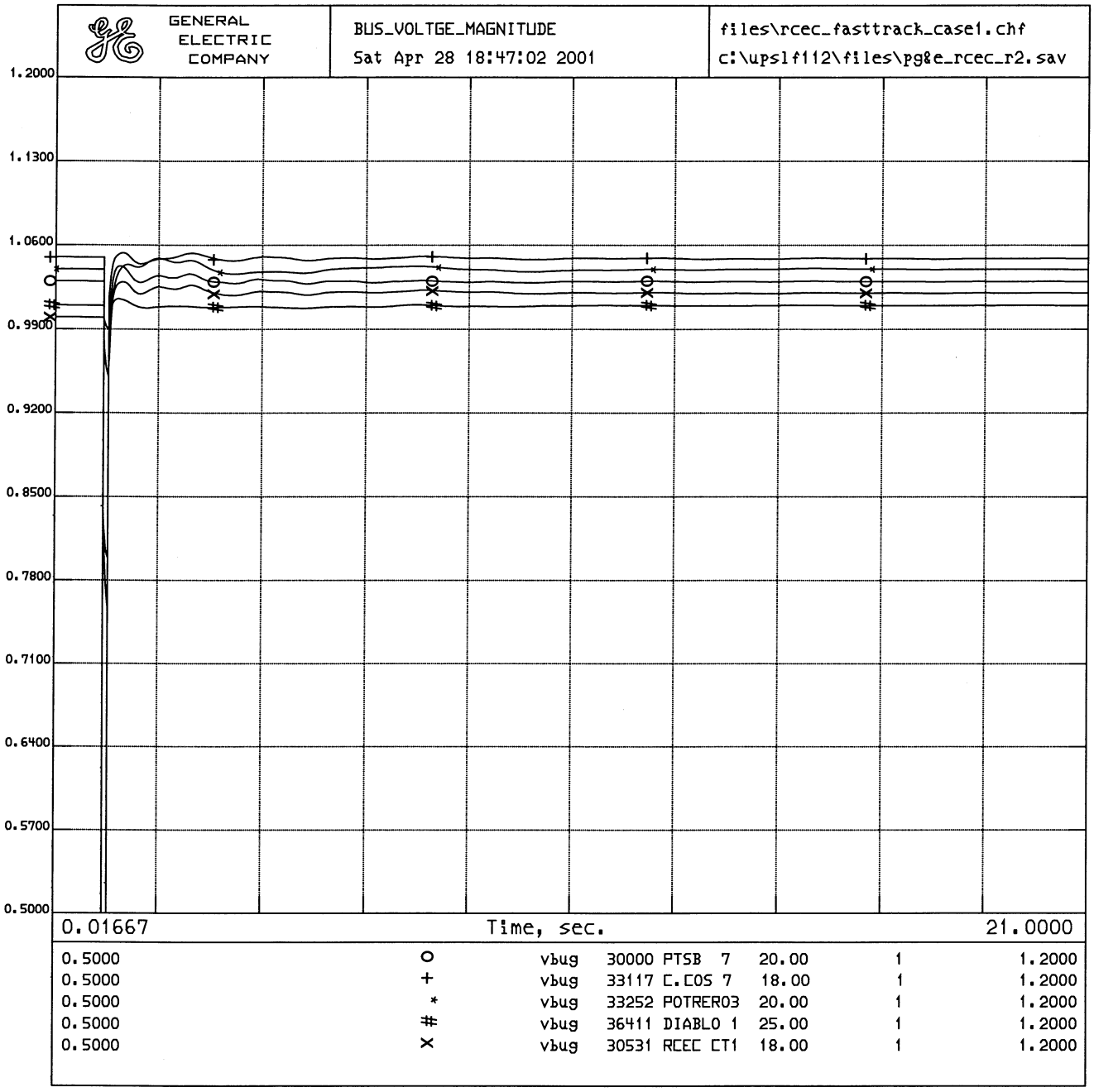
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



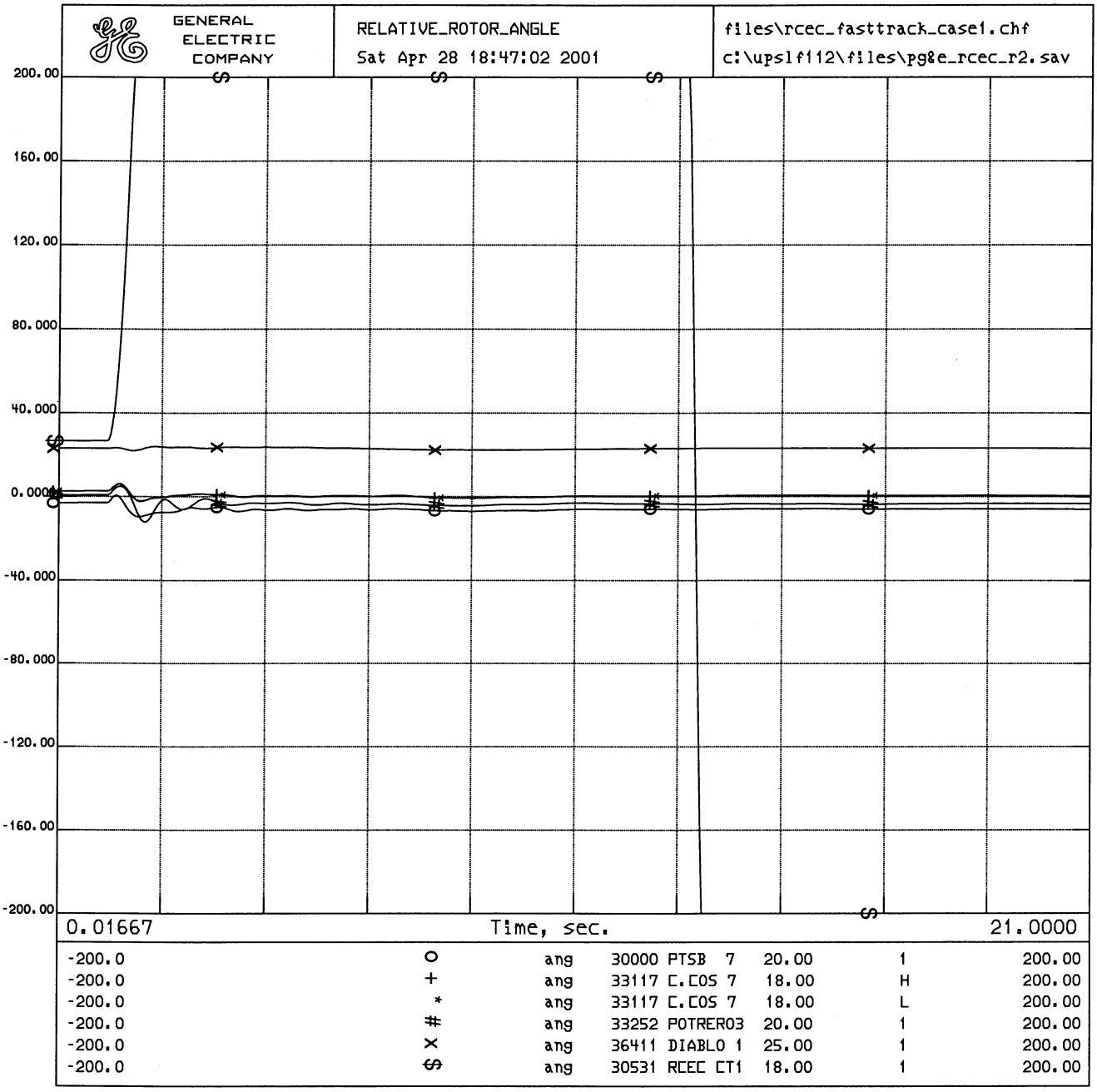
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



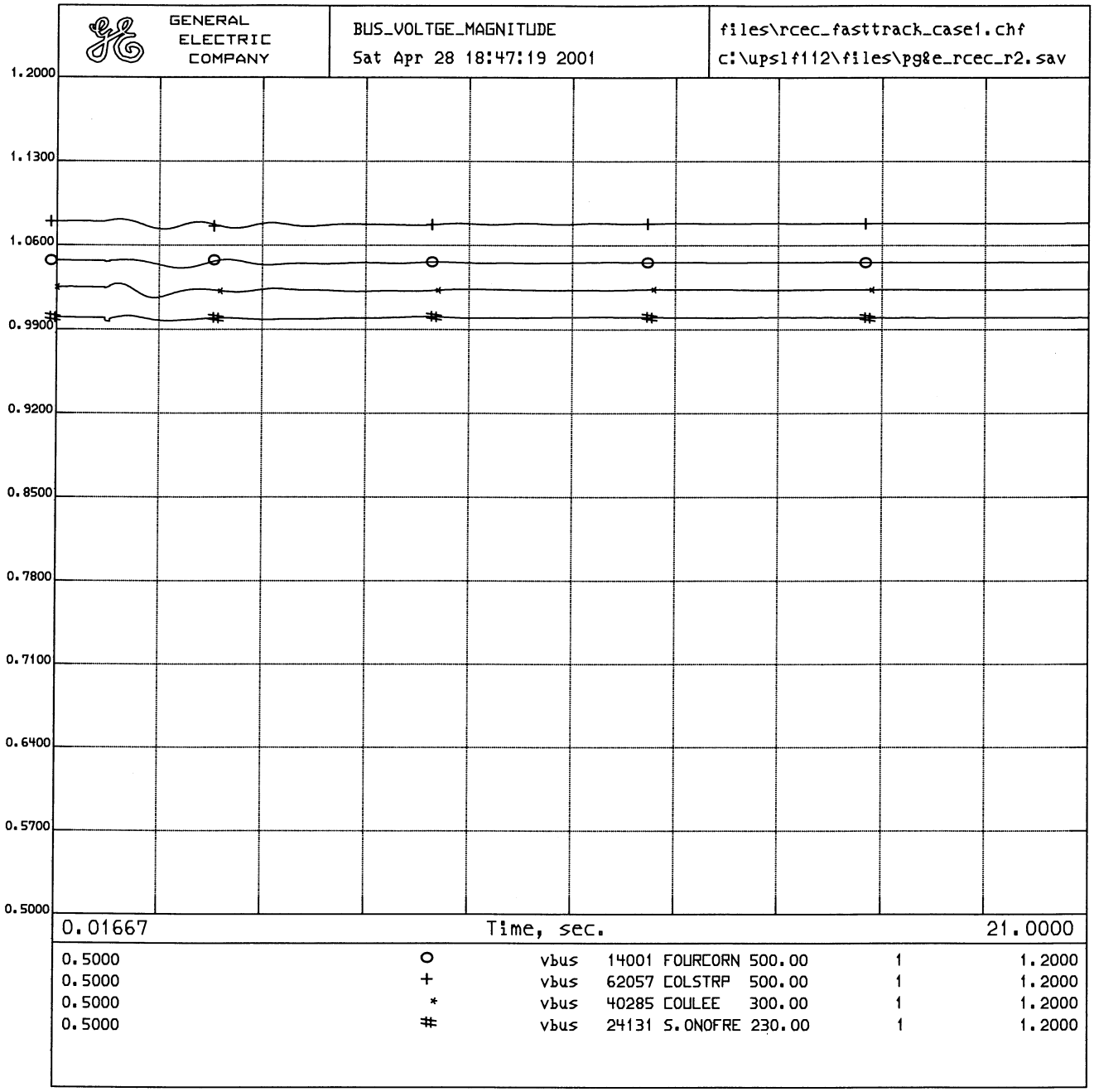
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



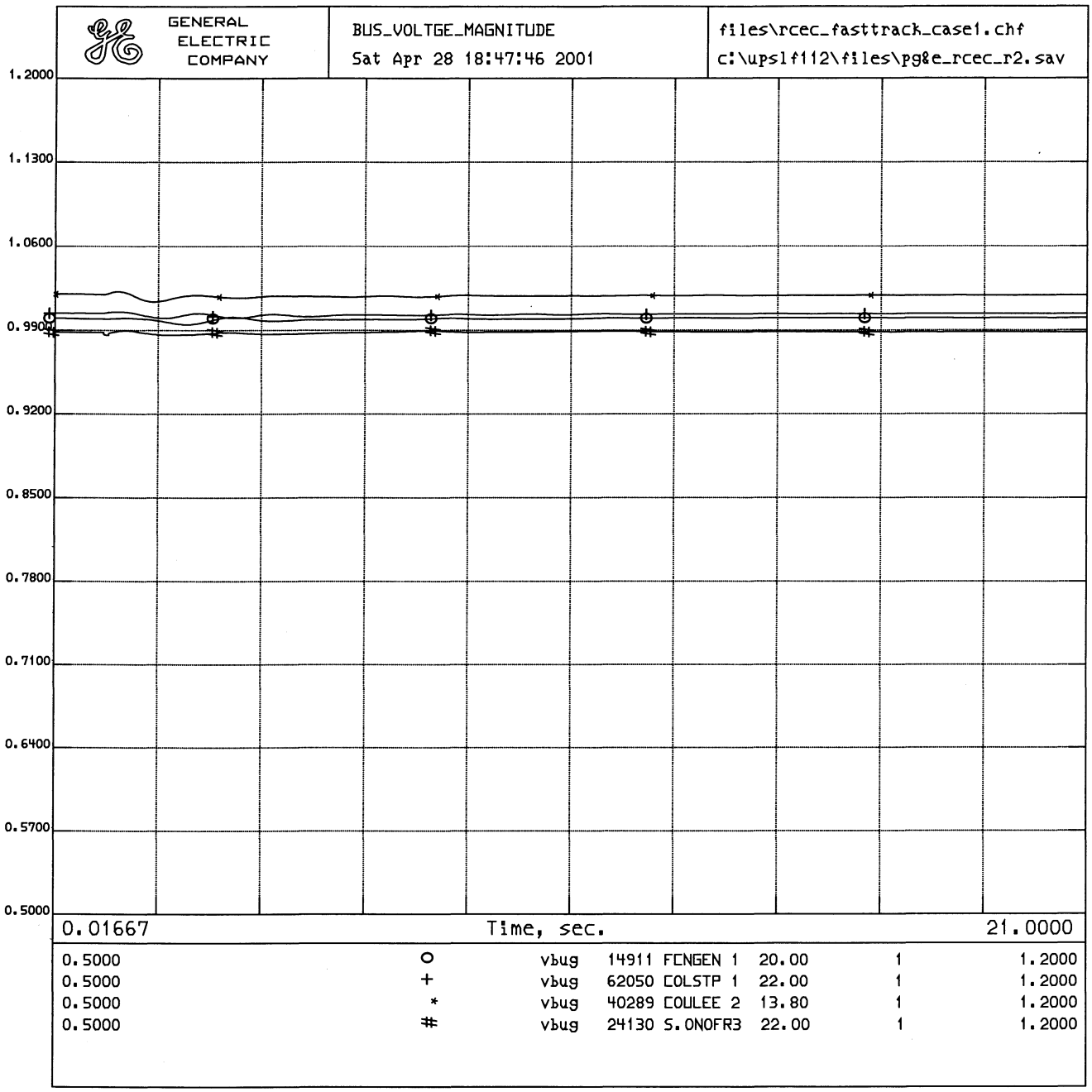
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



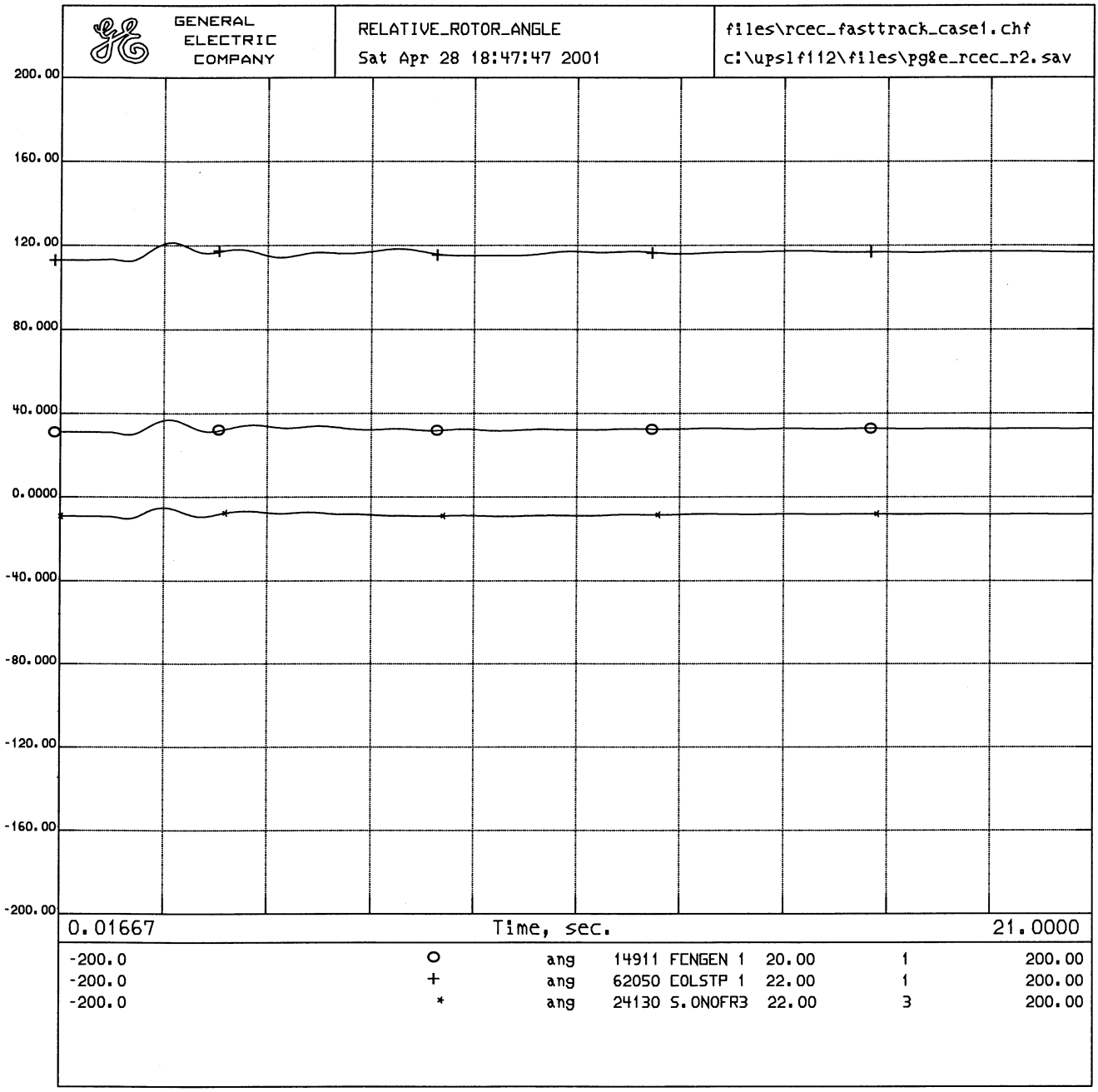
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



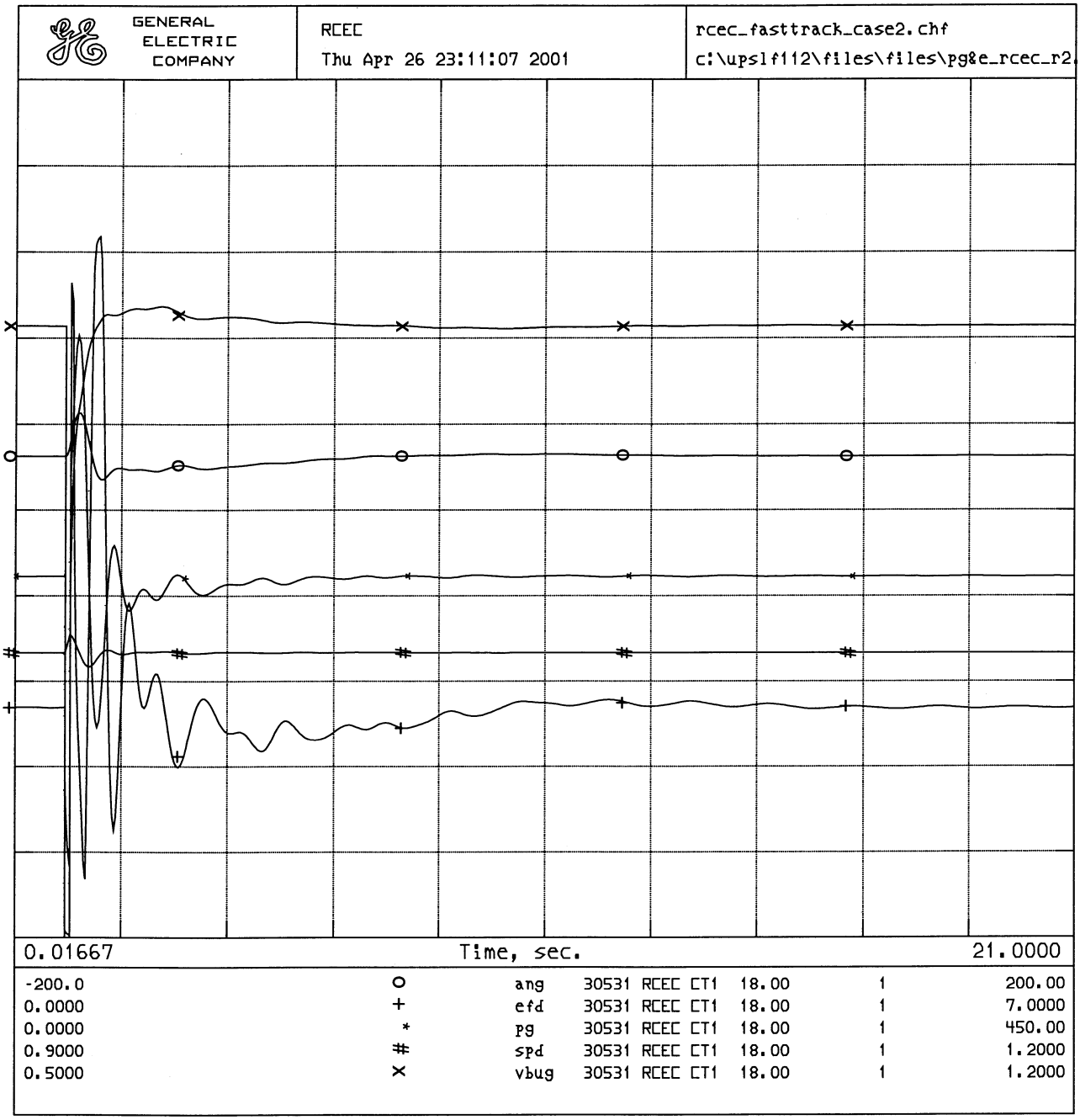
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

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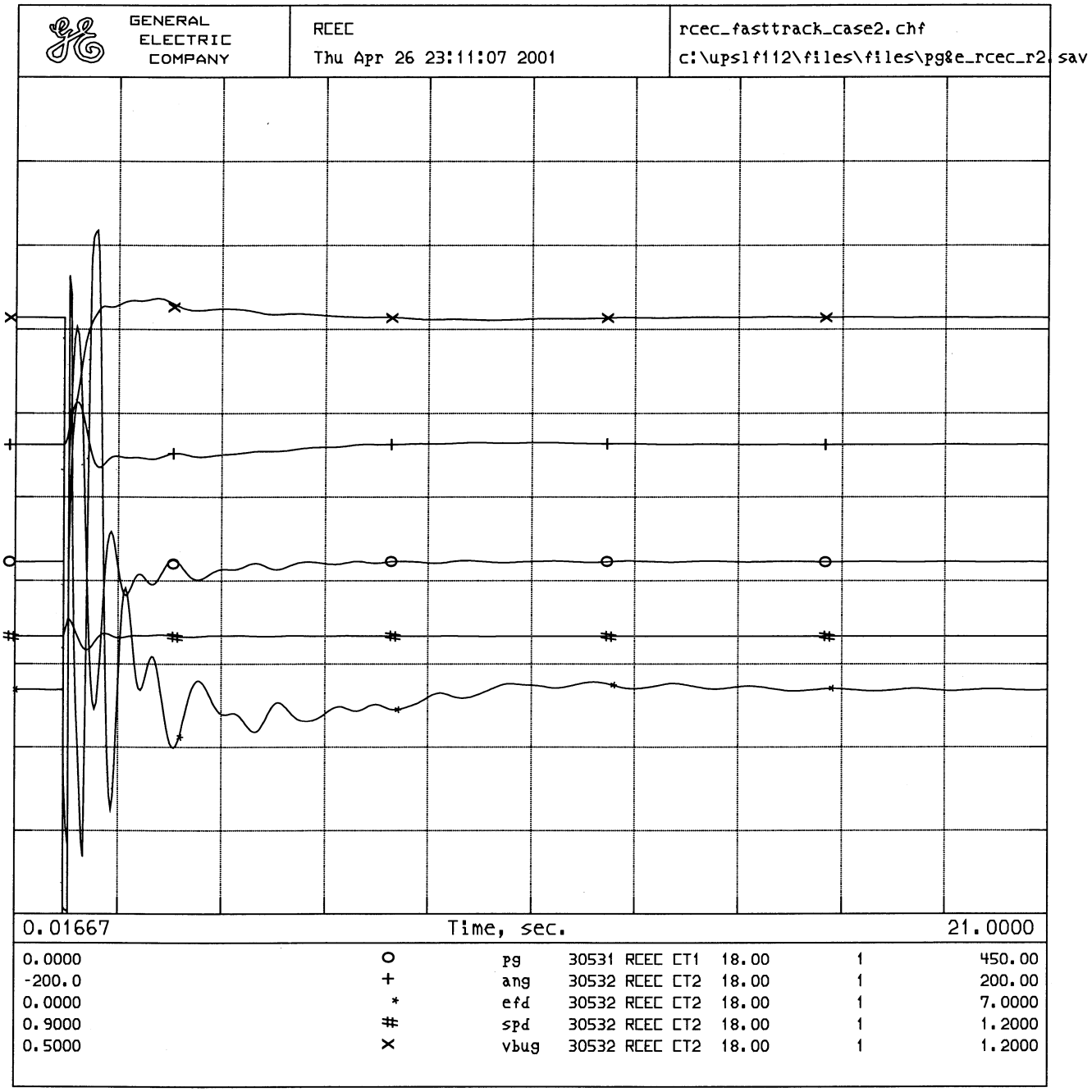

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

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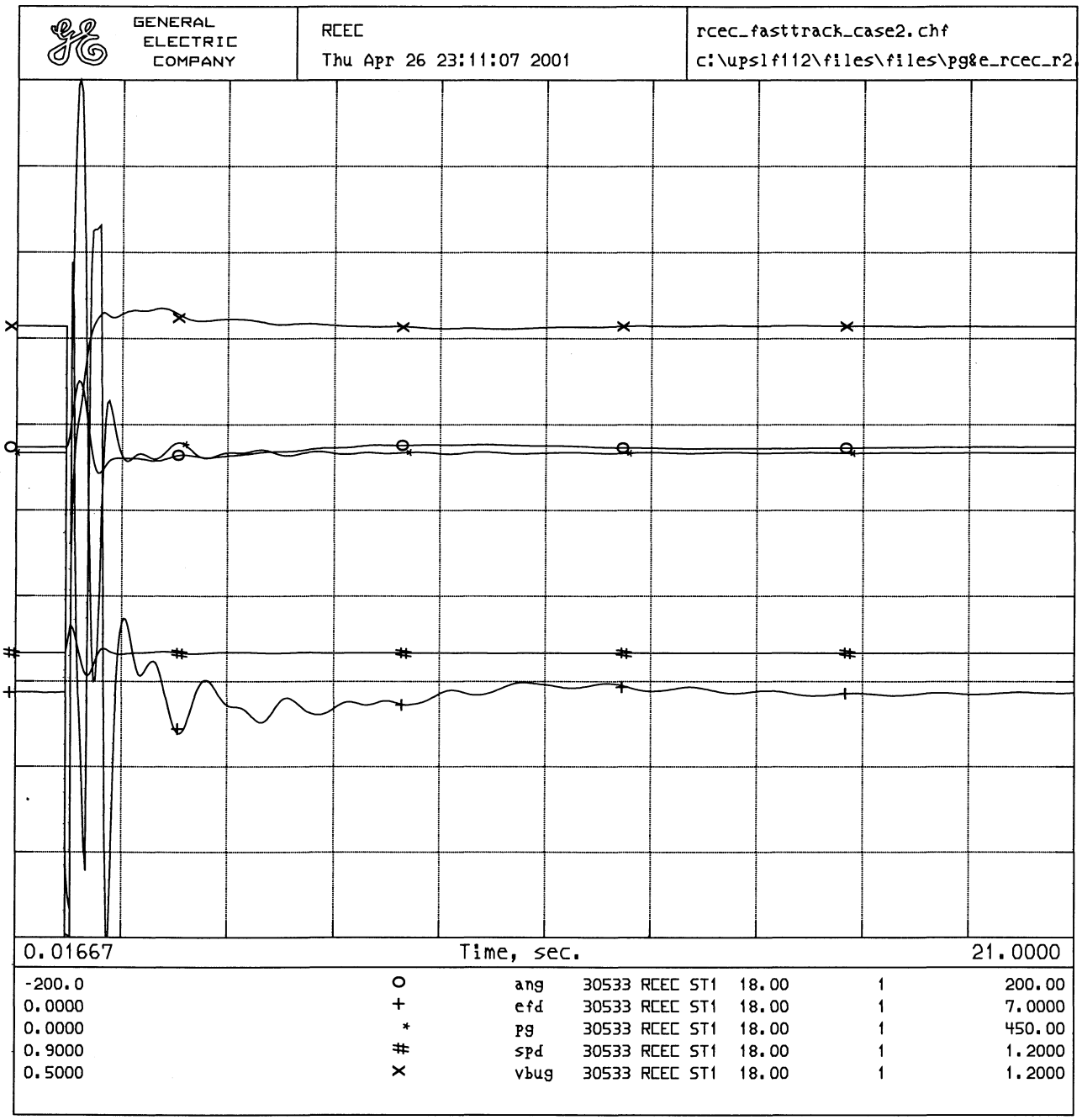

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
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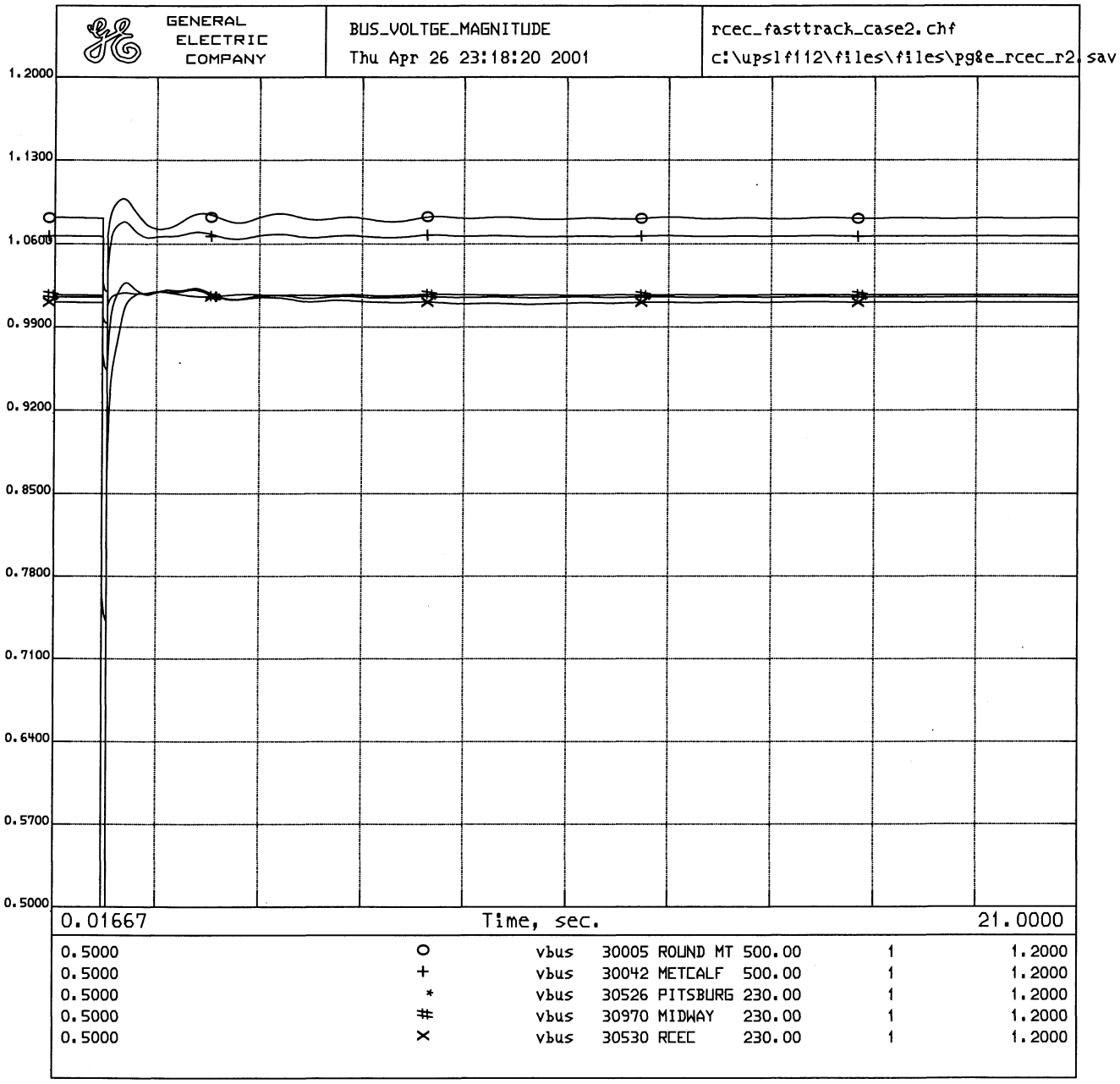

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

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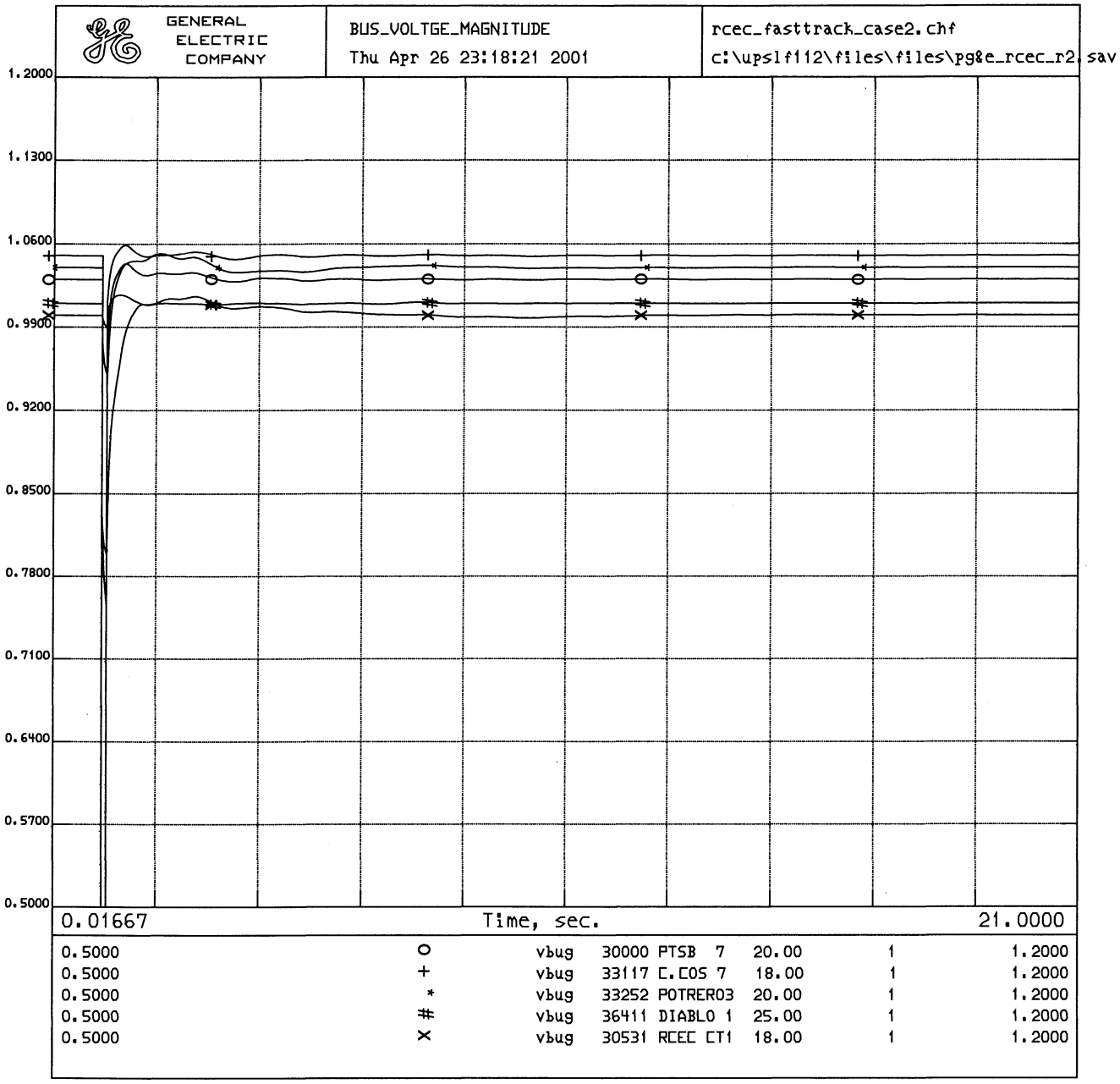

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

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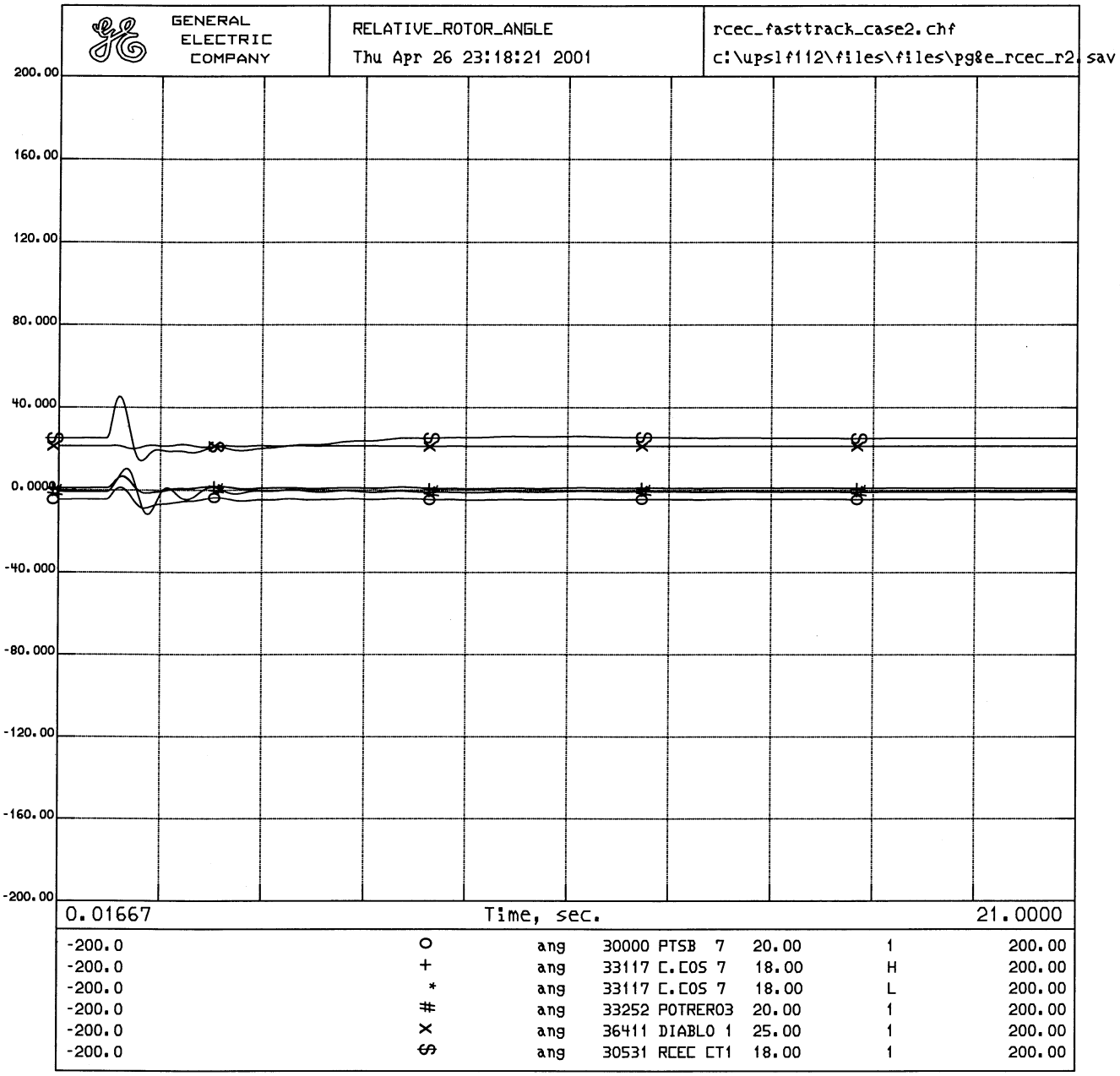

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

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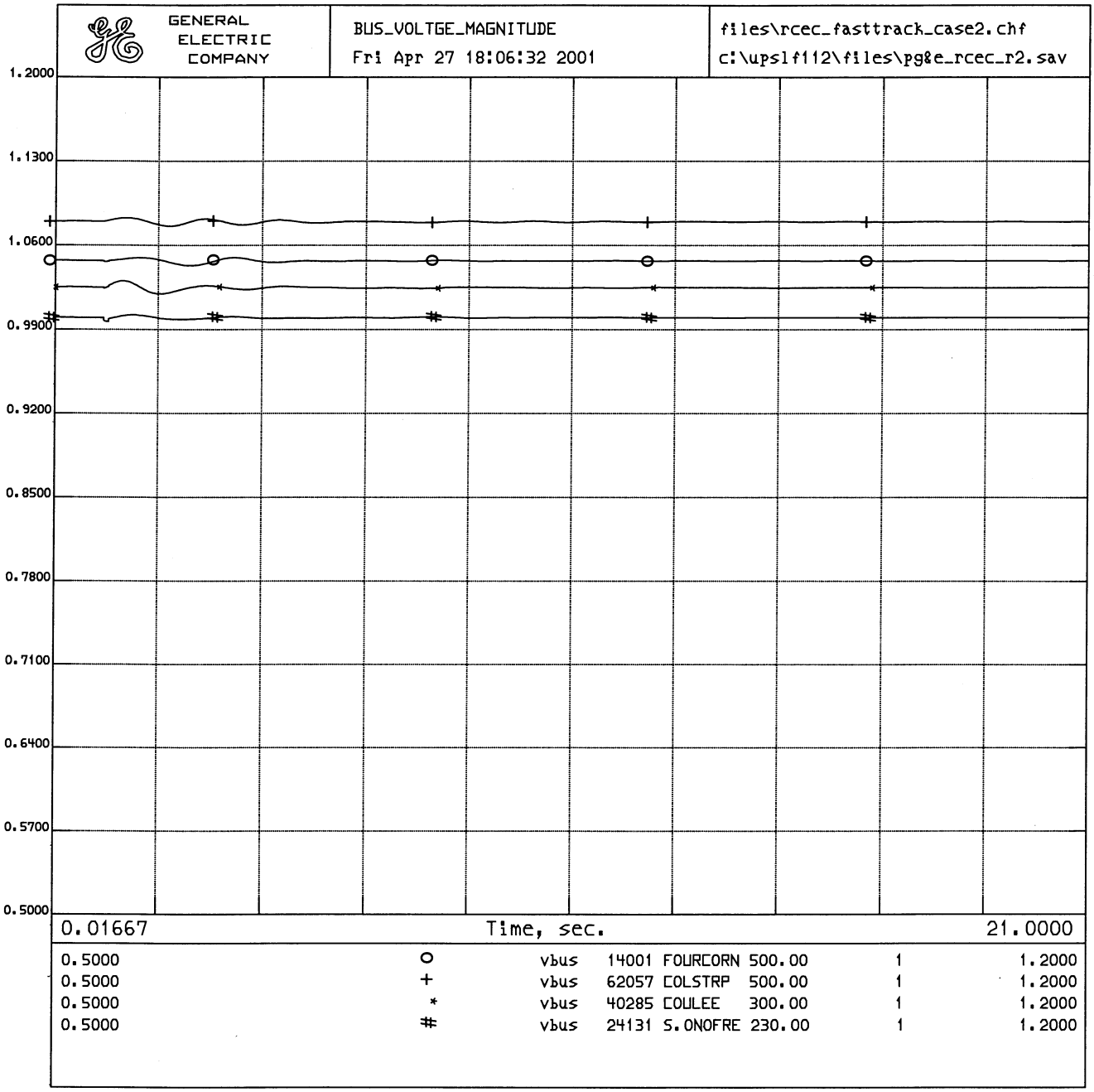
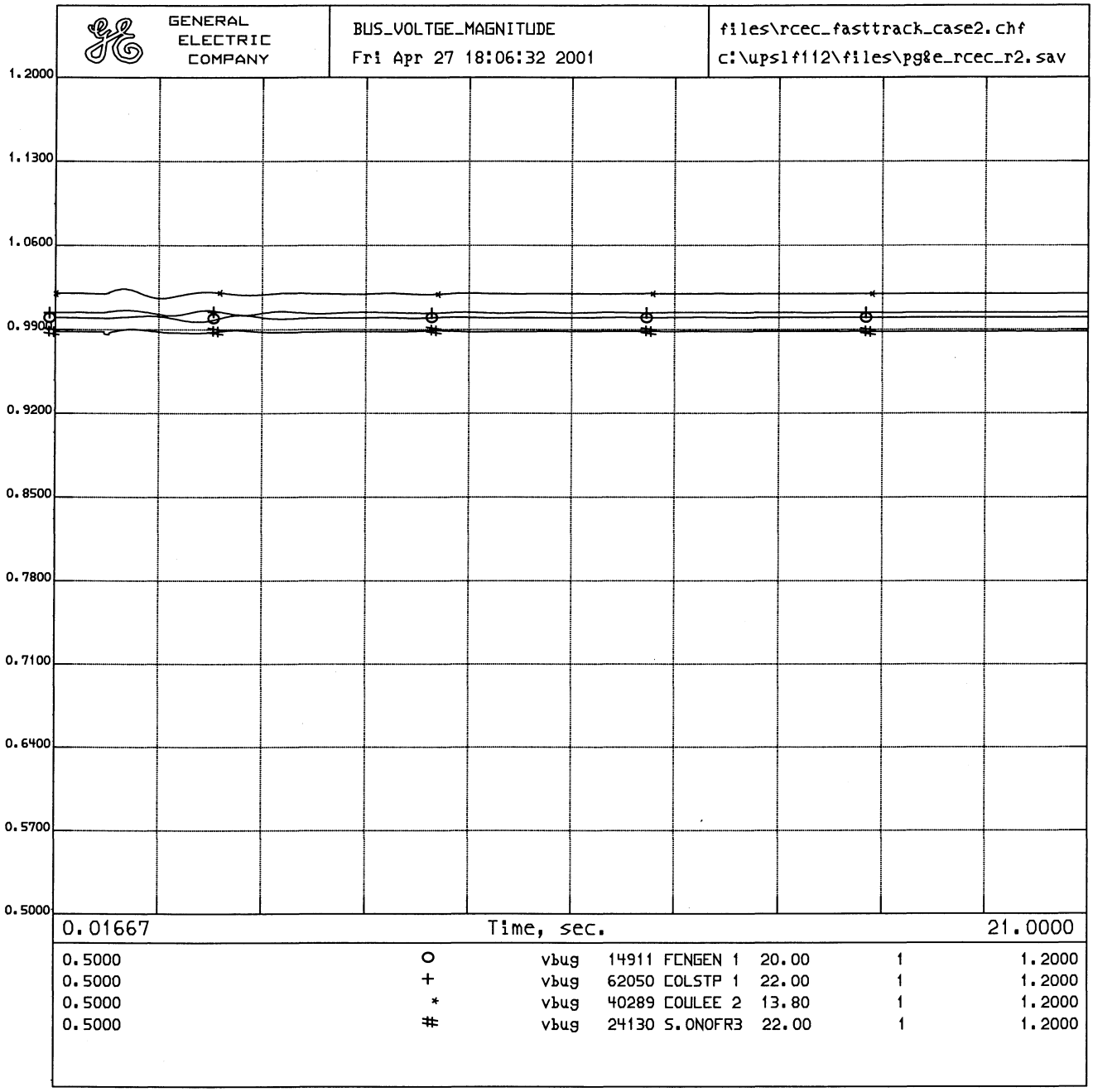


2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

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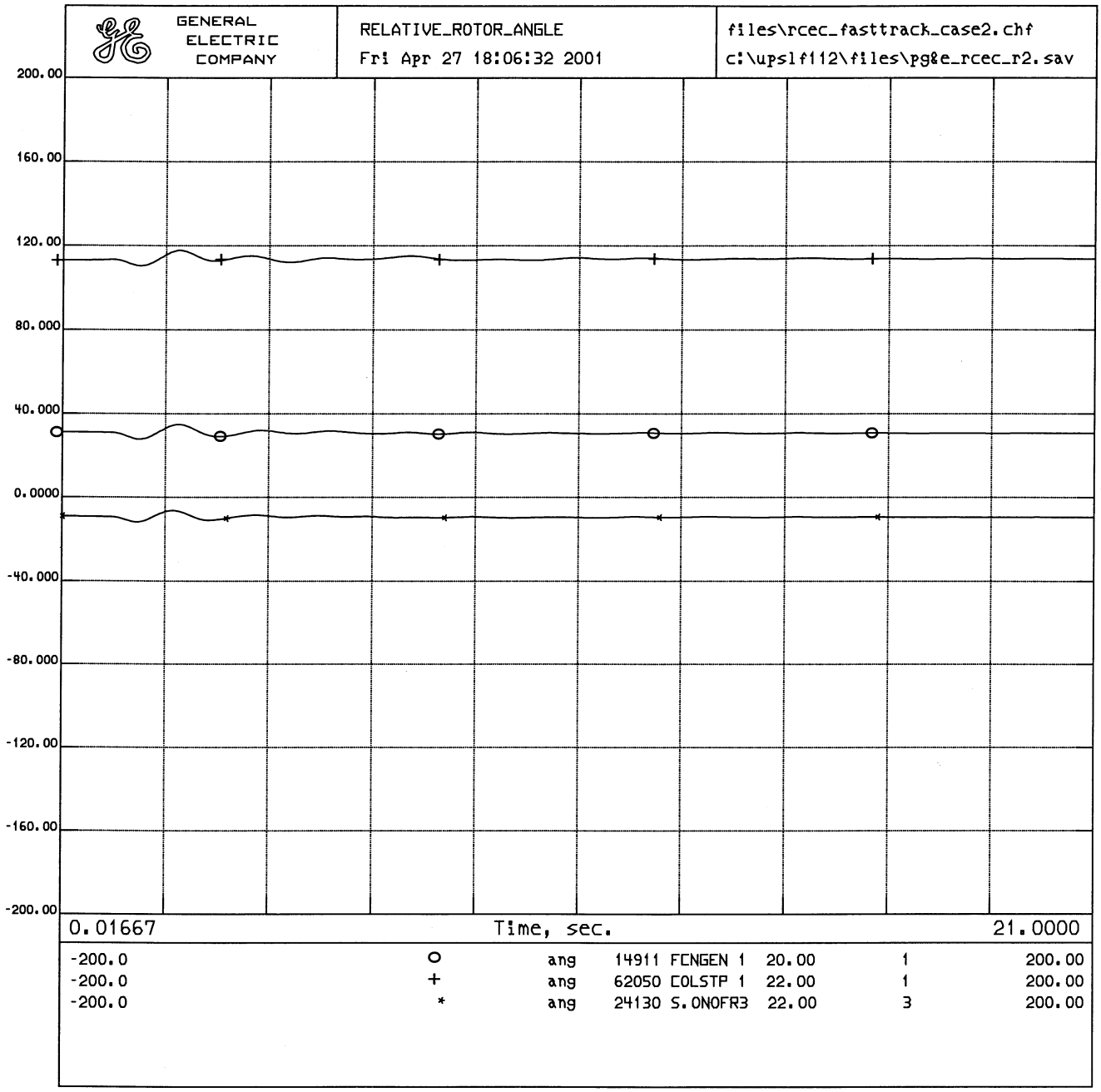

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

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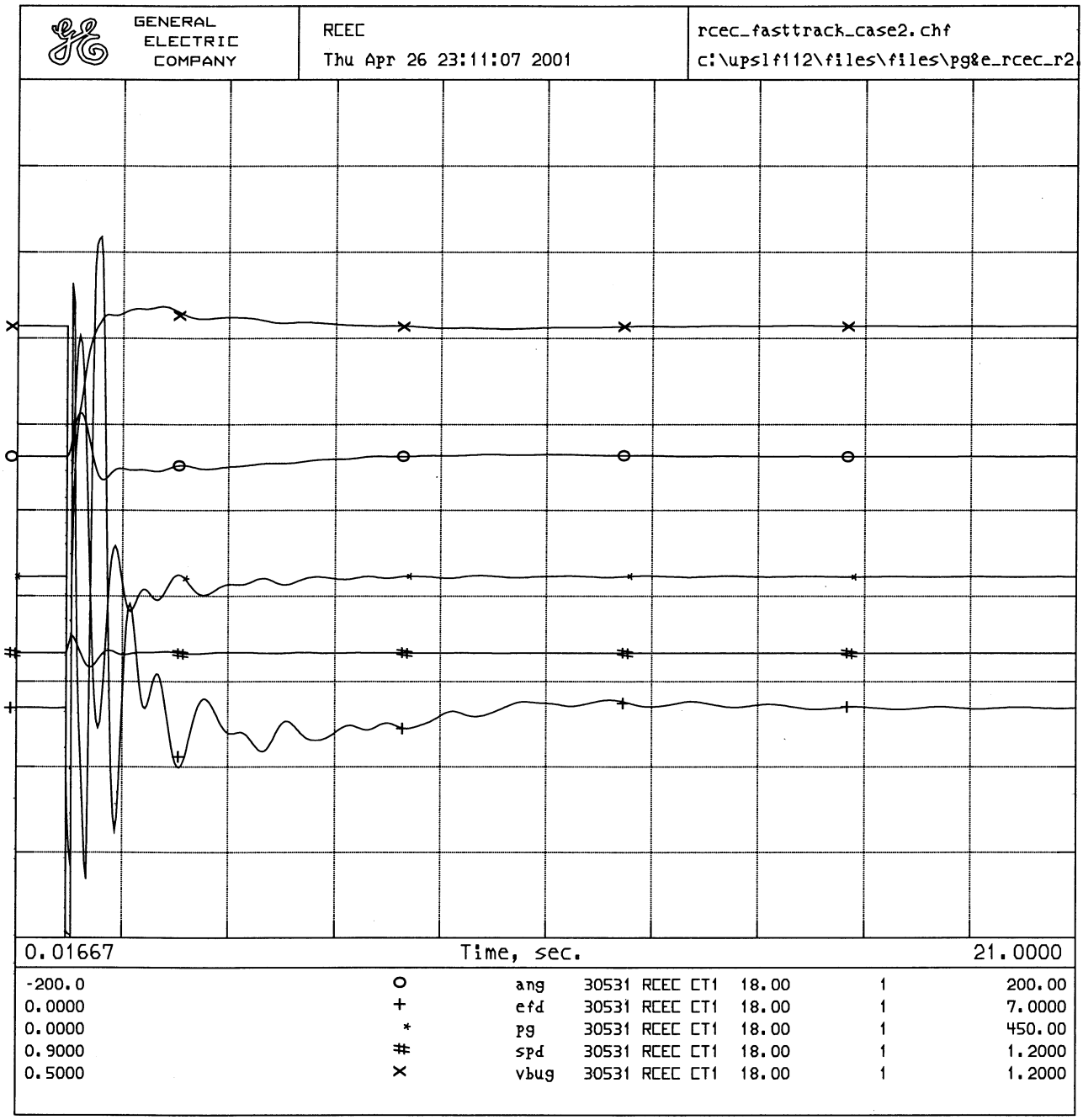

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

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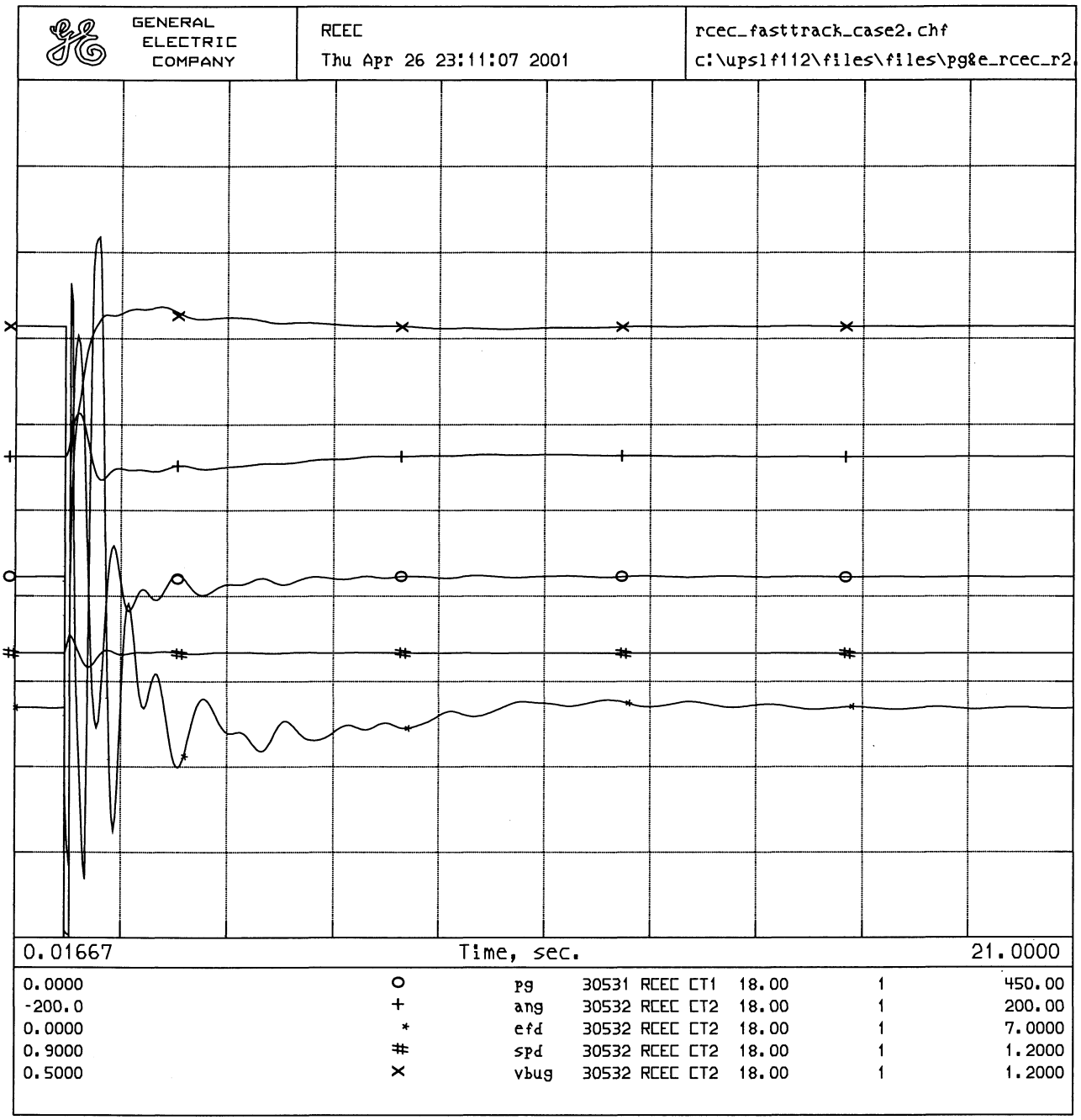

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
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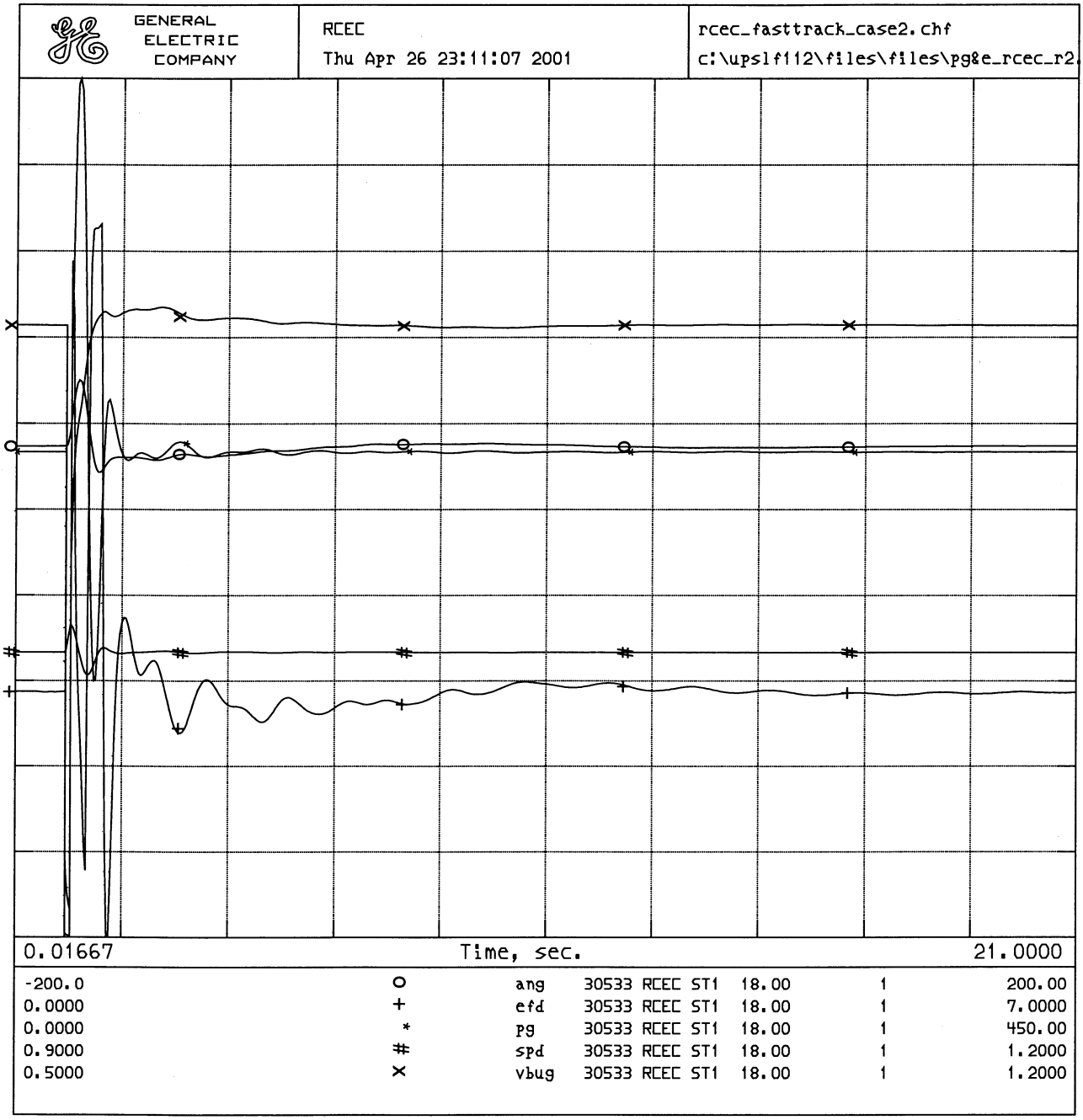

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
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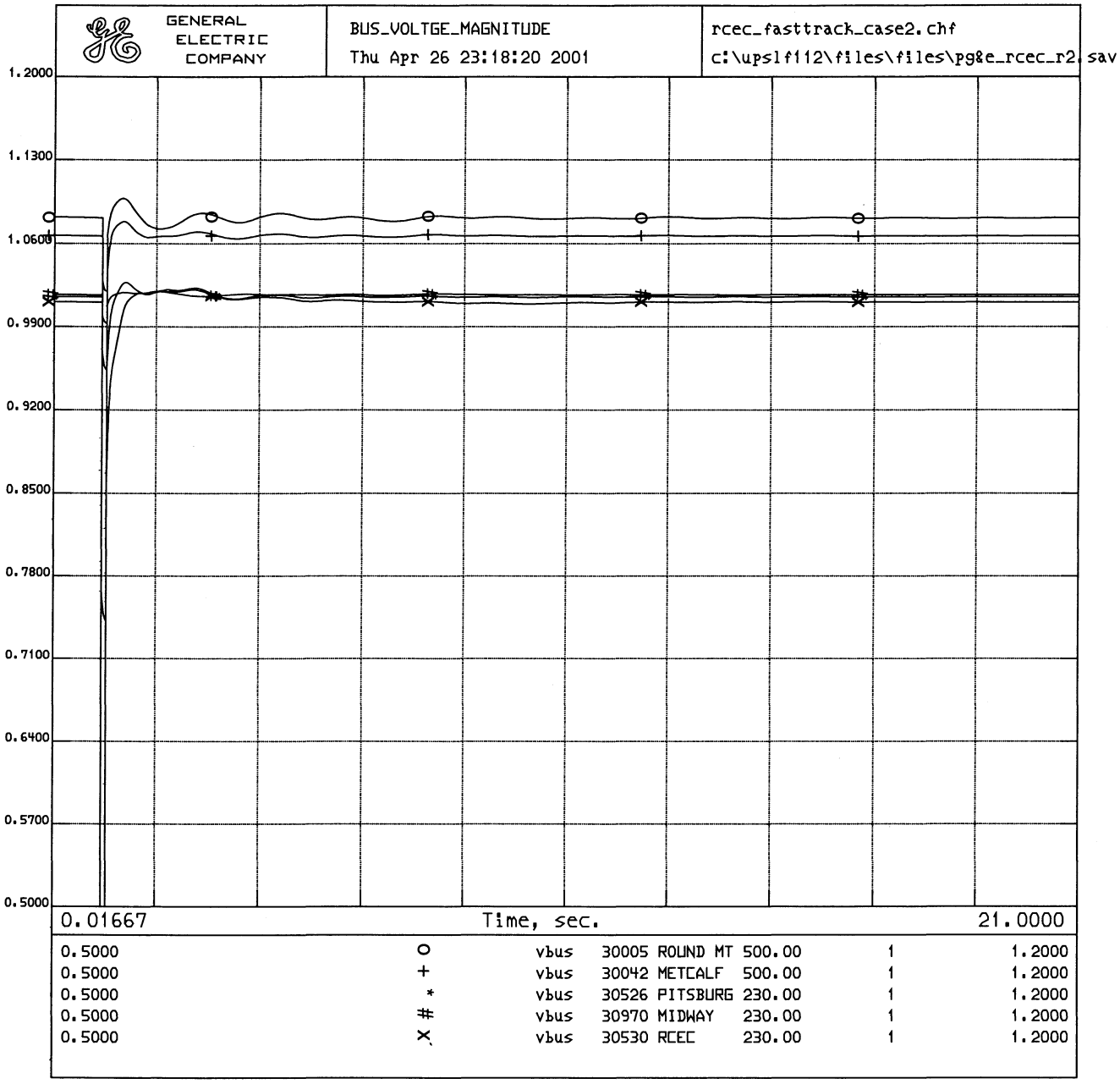

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
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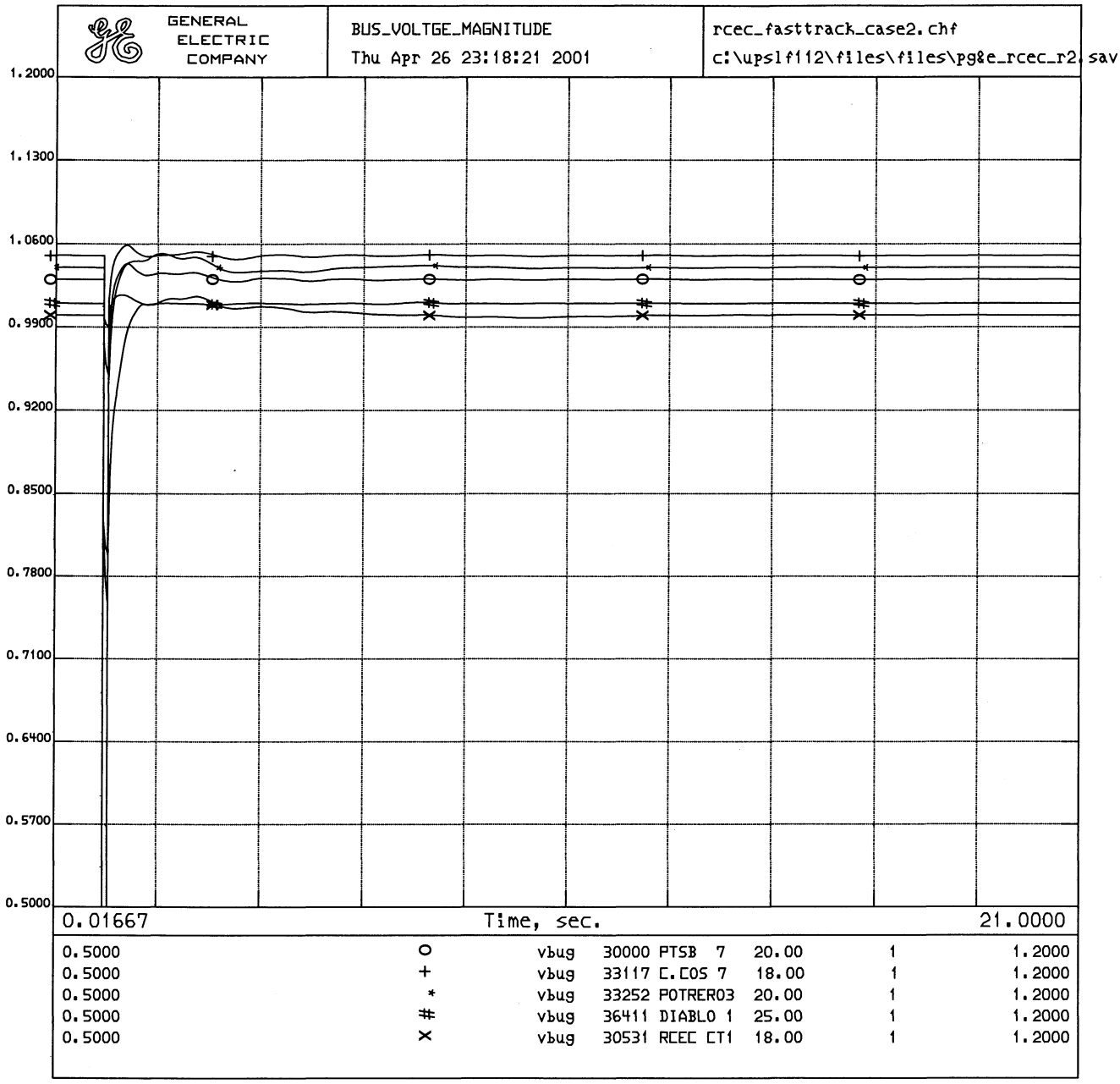

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
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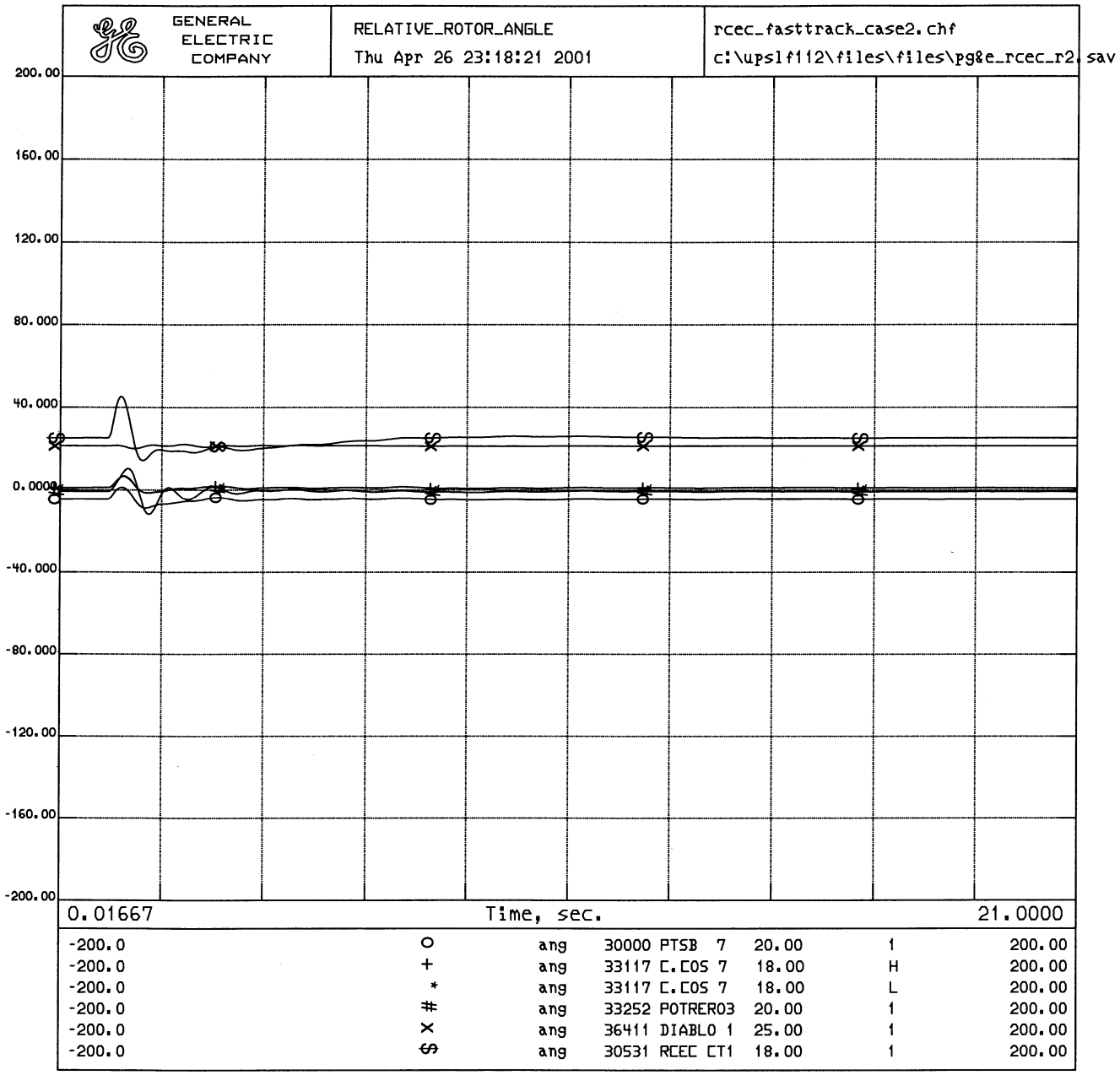

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
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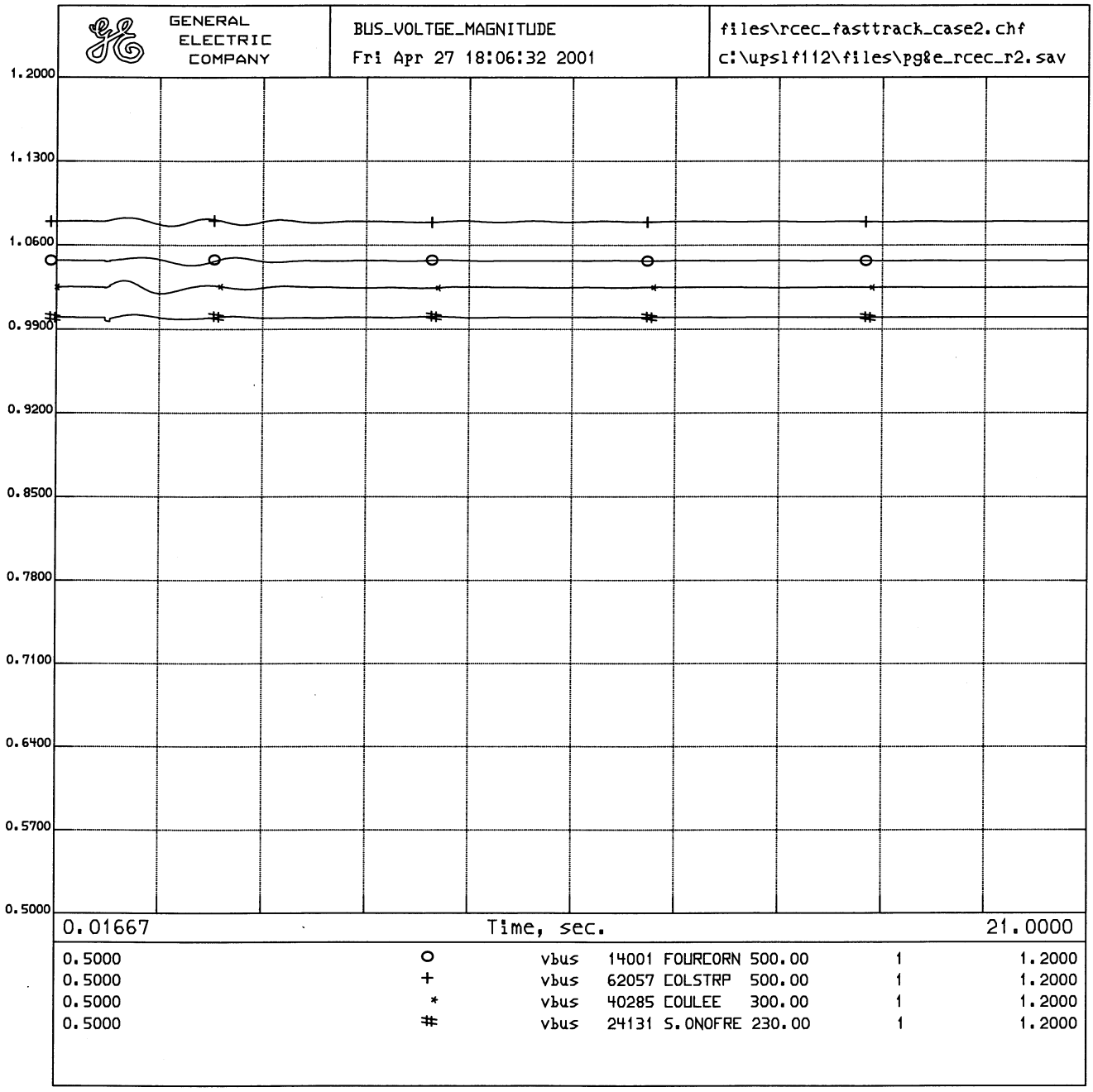

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
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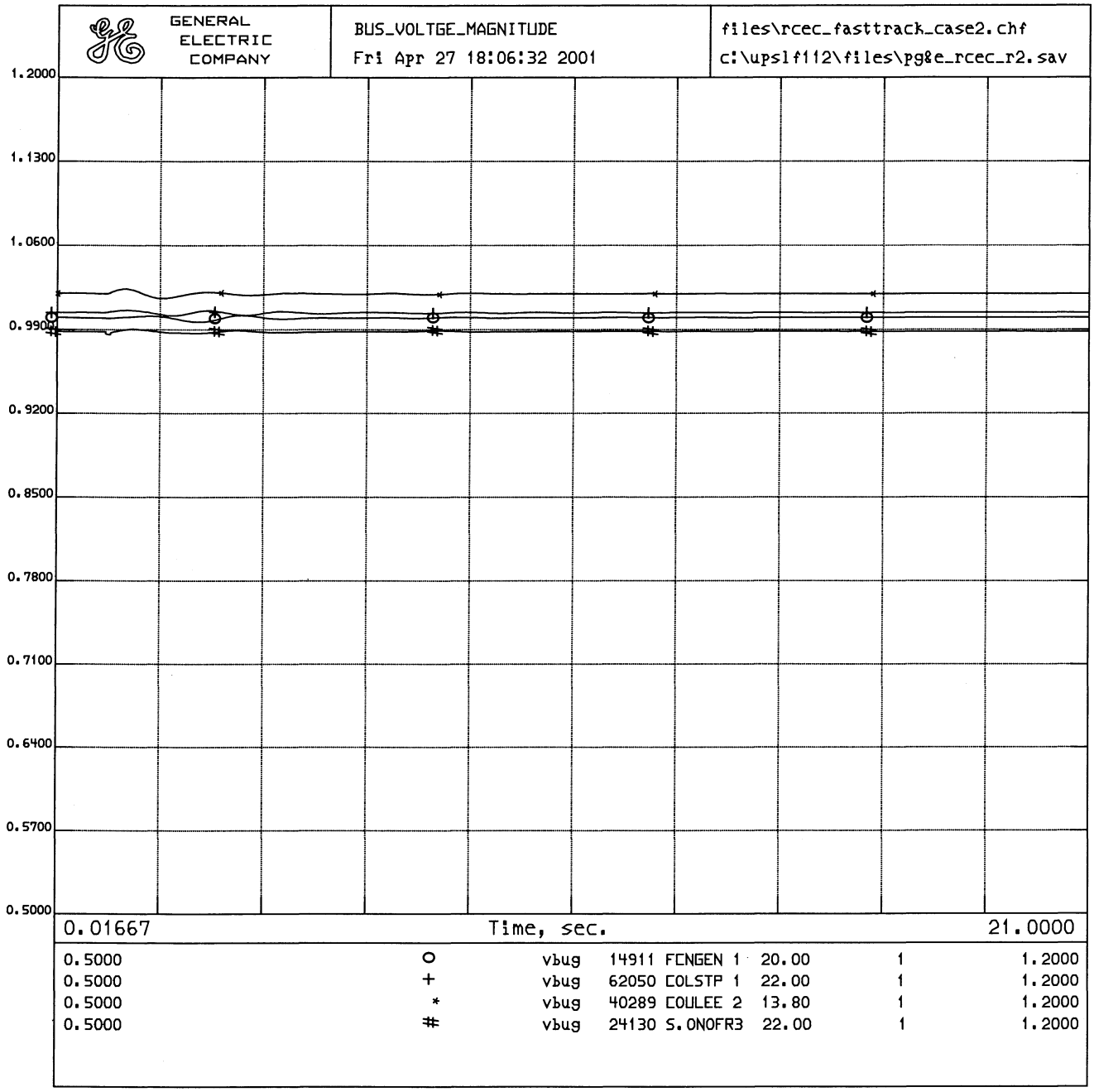

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
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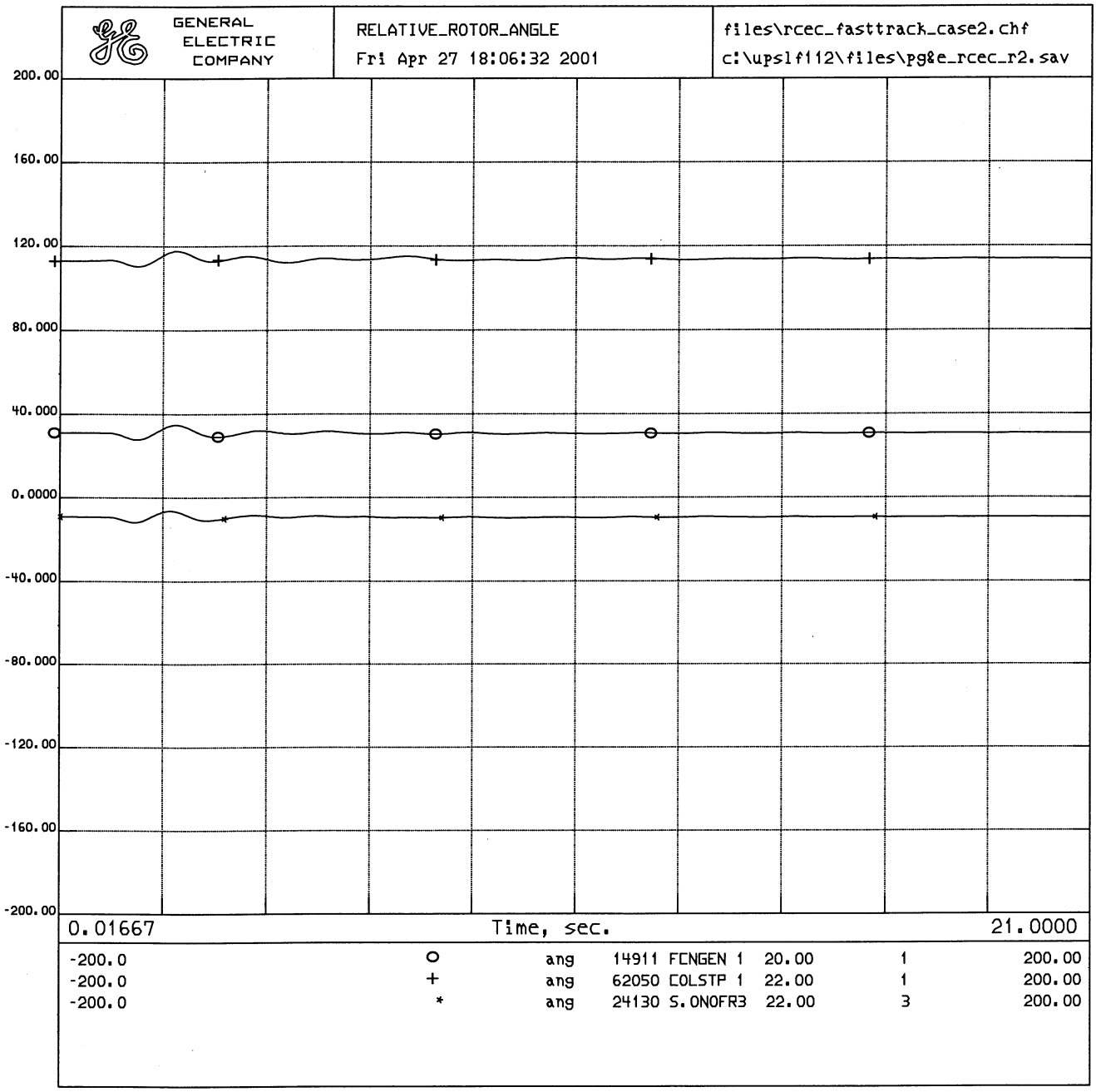

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

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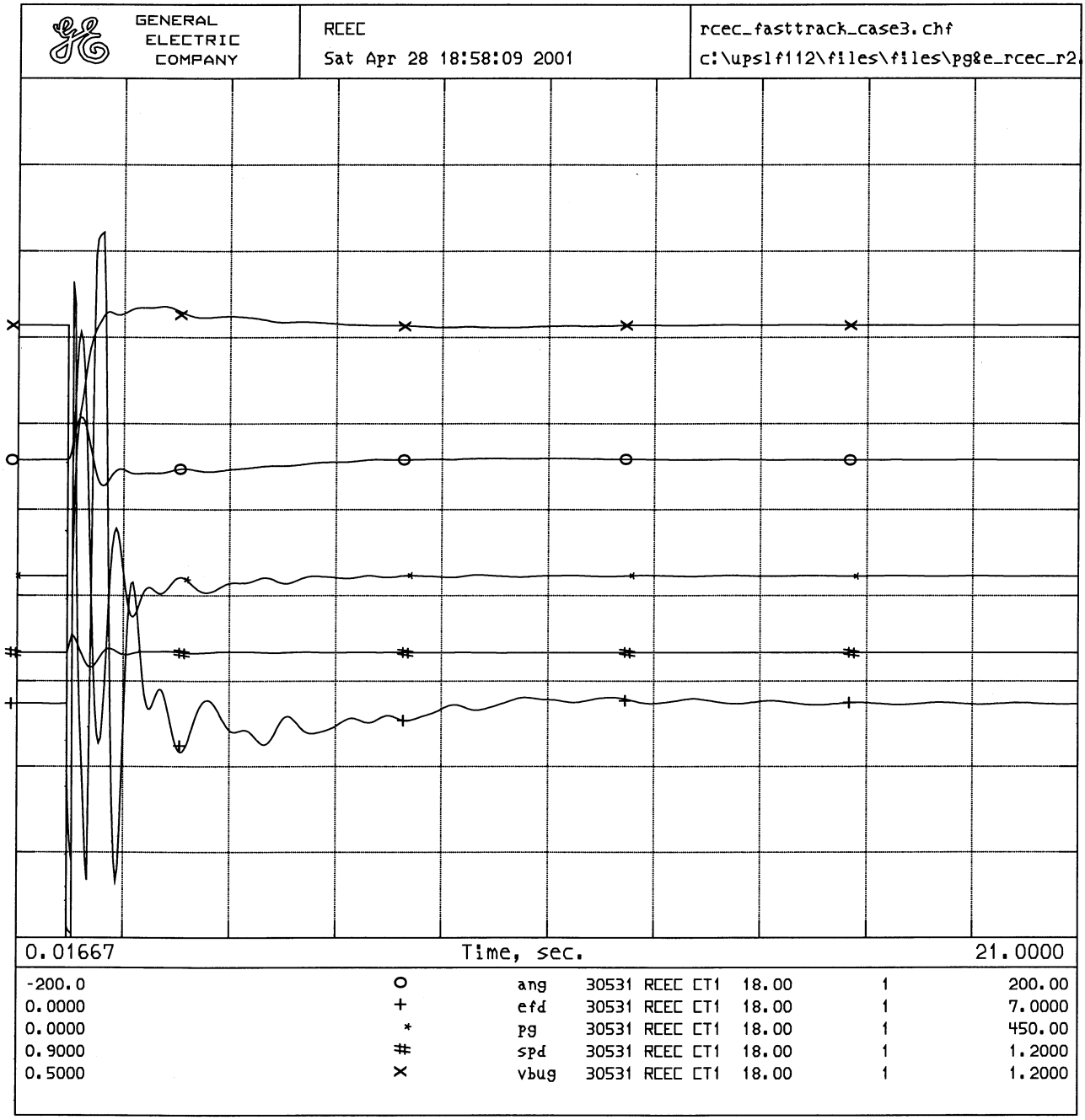

2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

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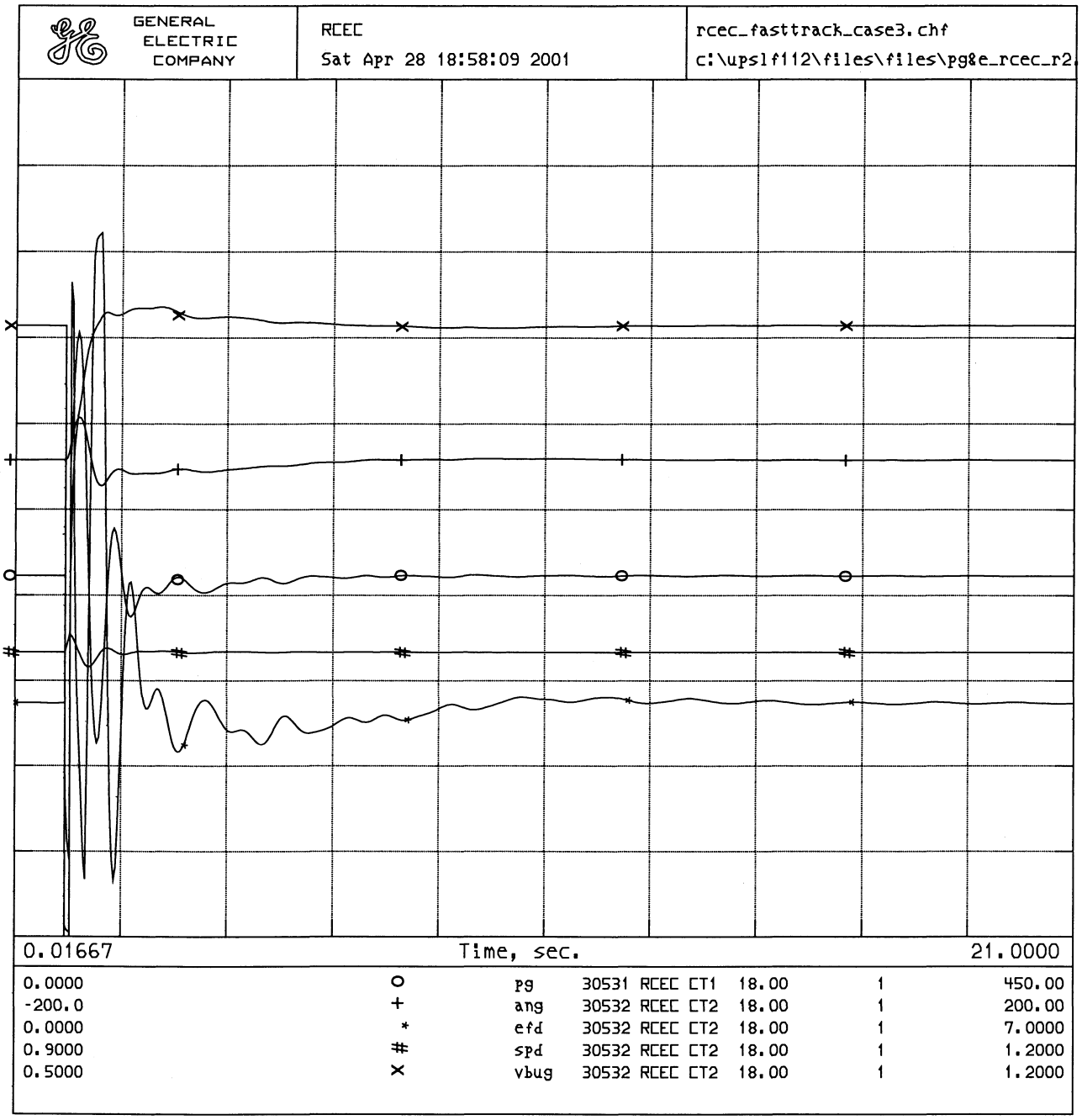

2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
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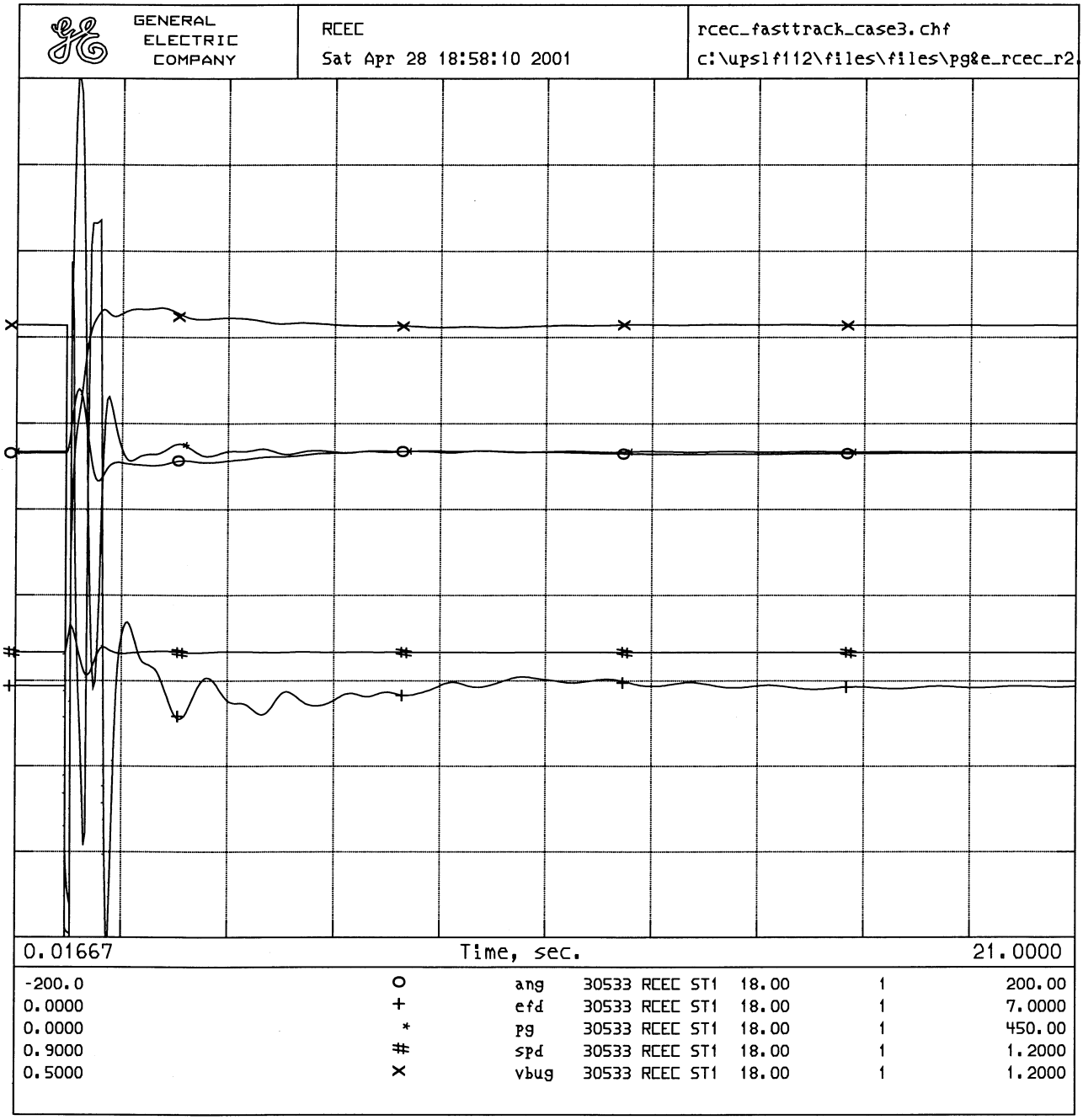

2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

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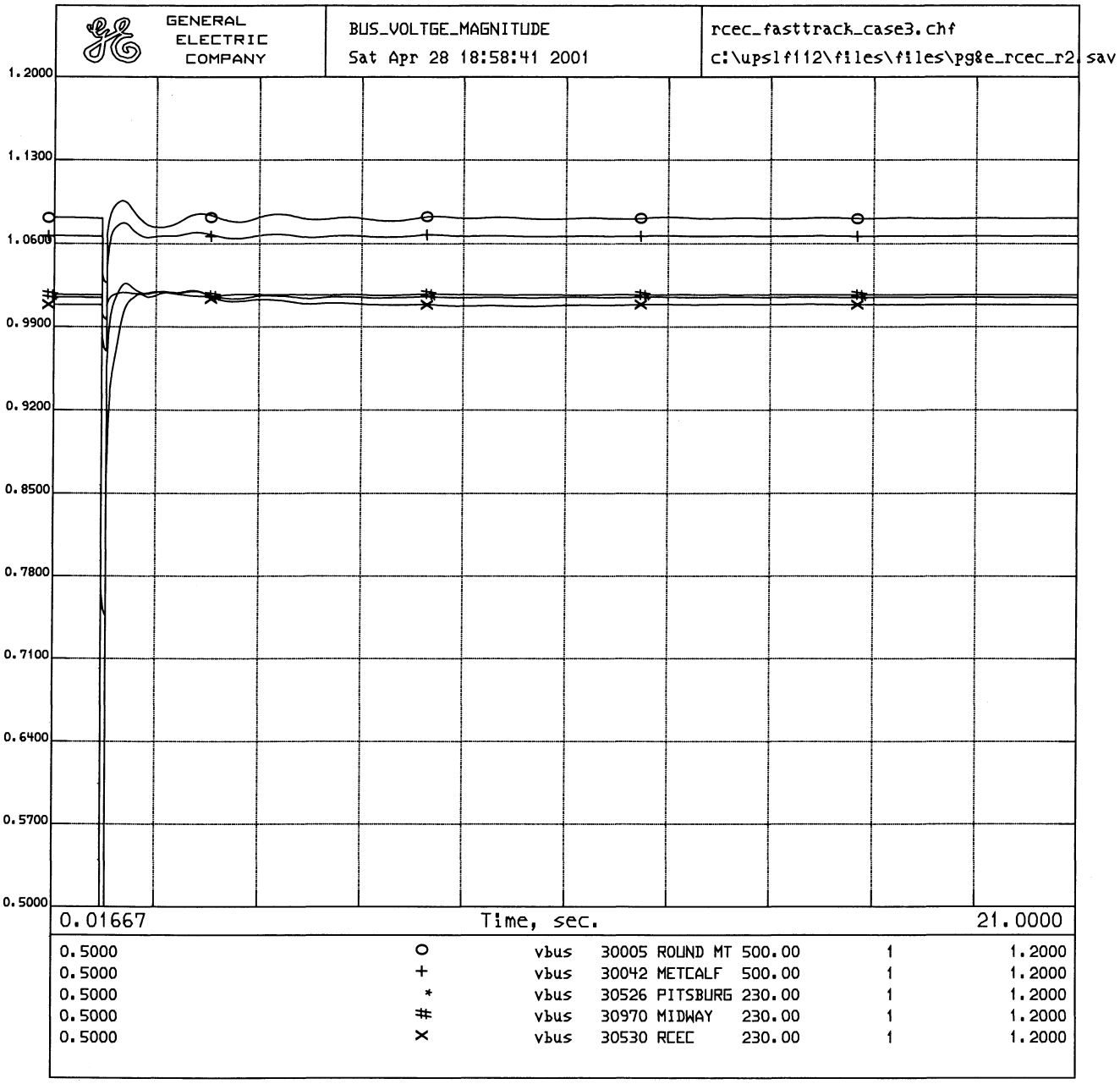
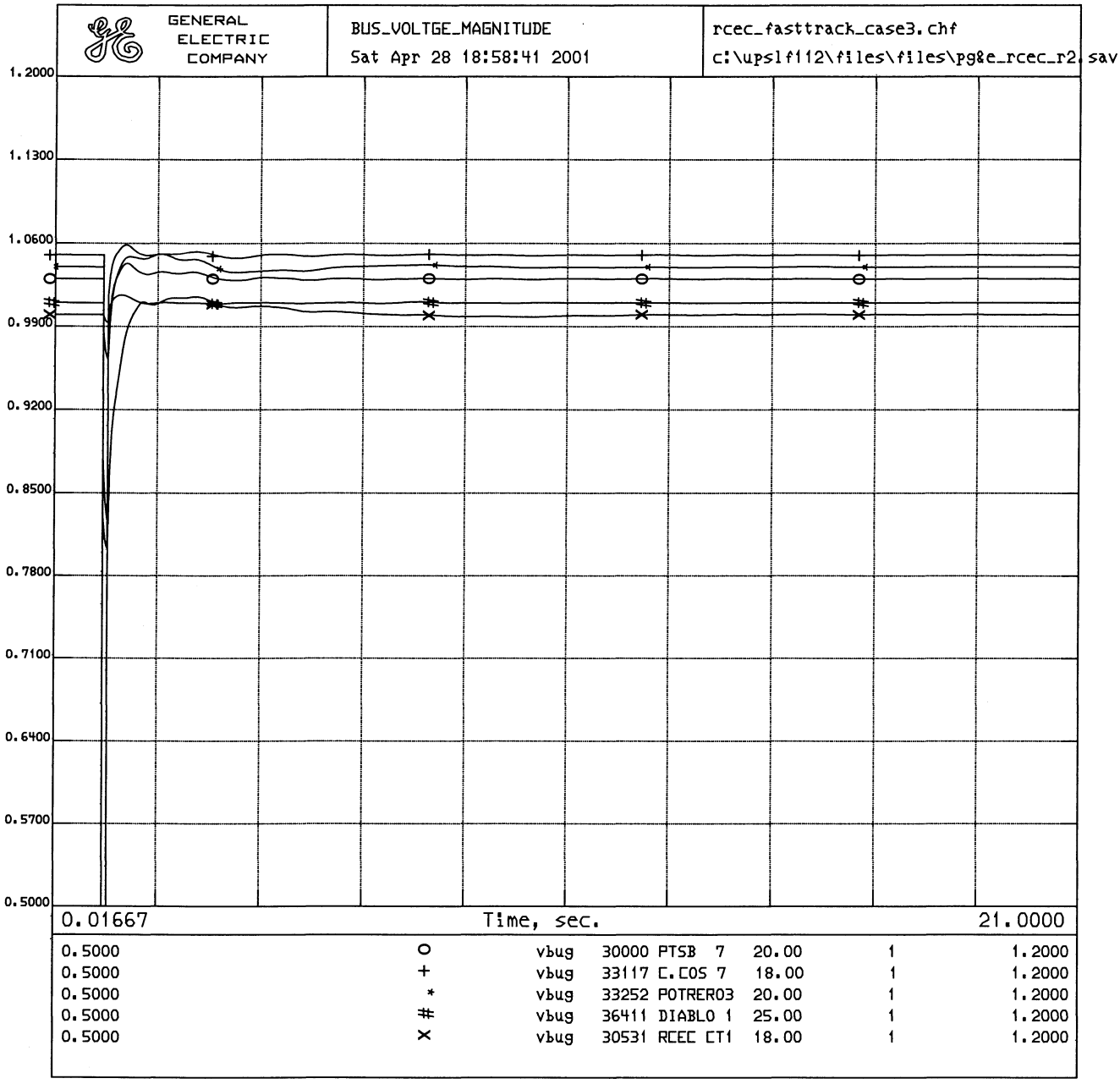


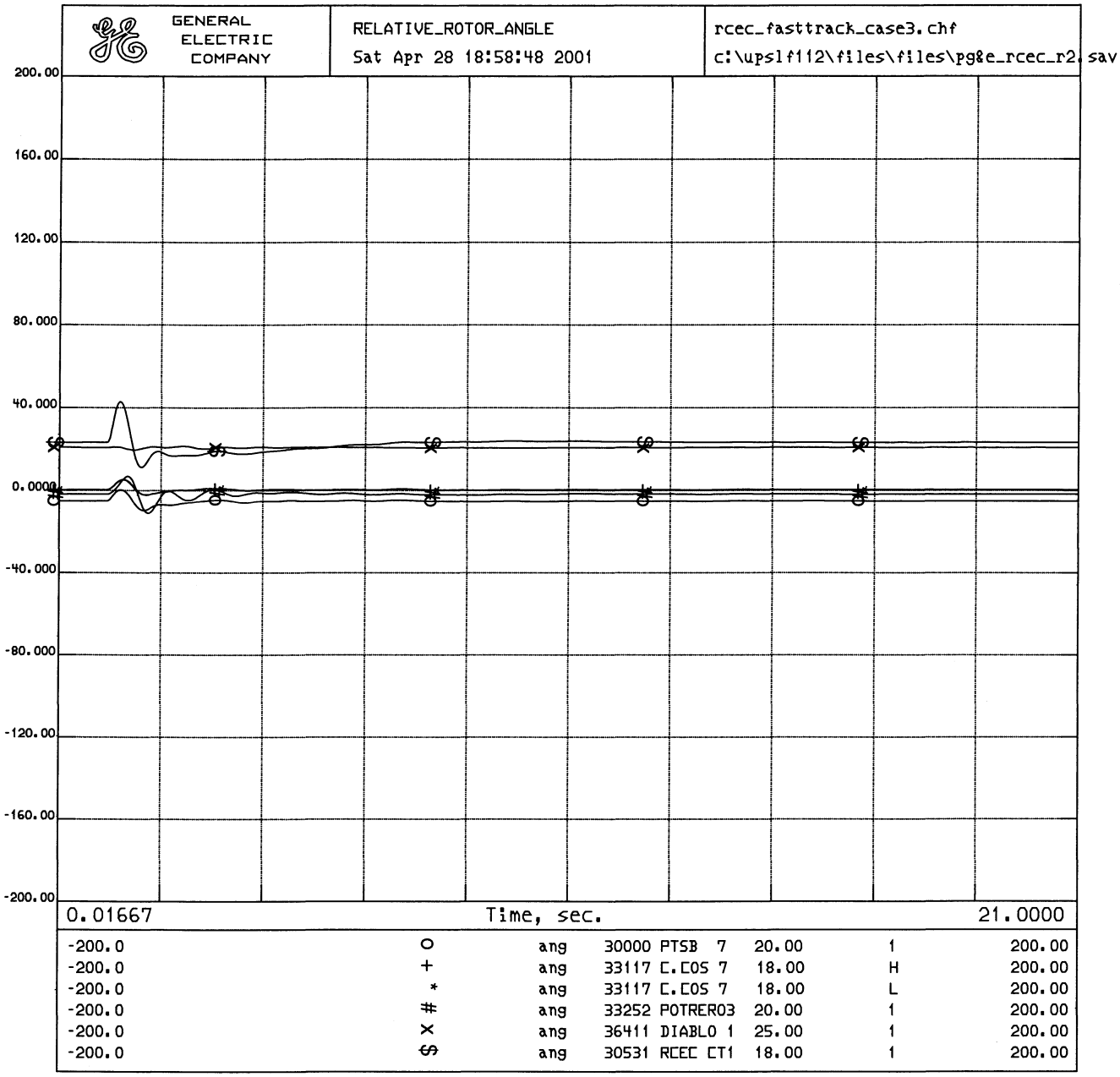
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

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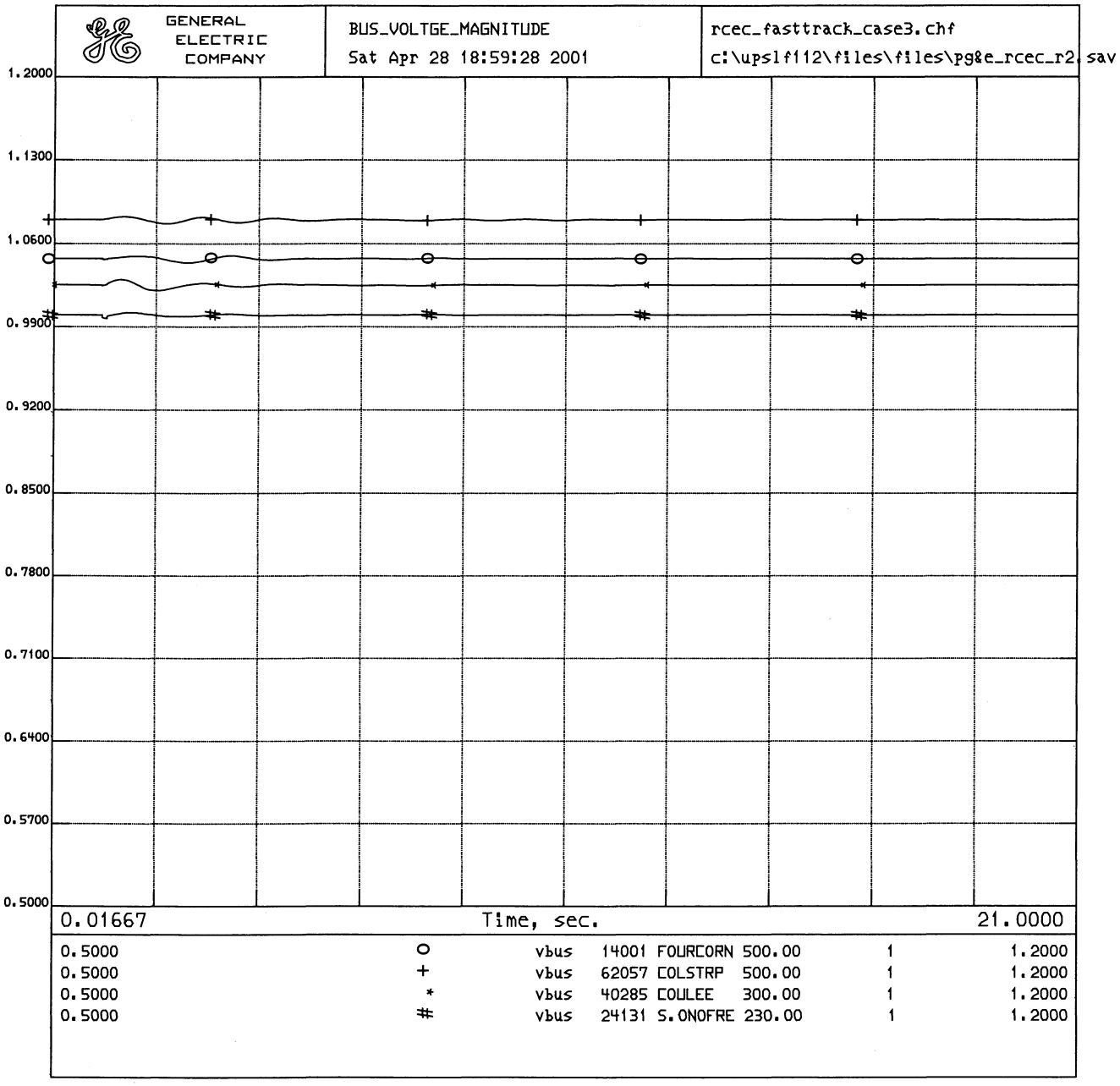

2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

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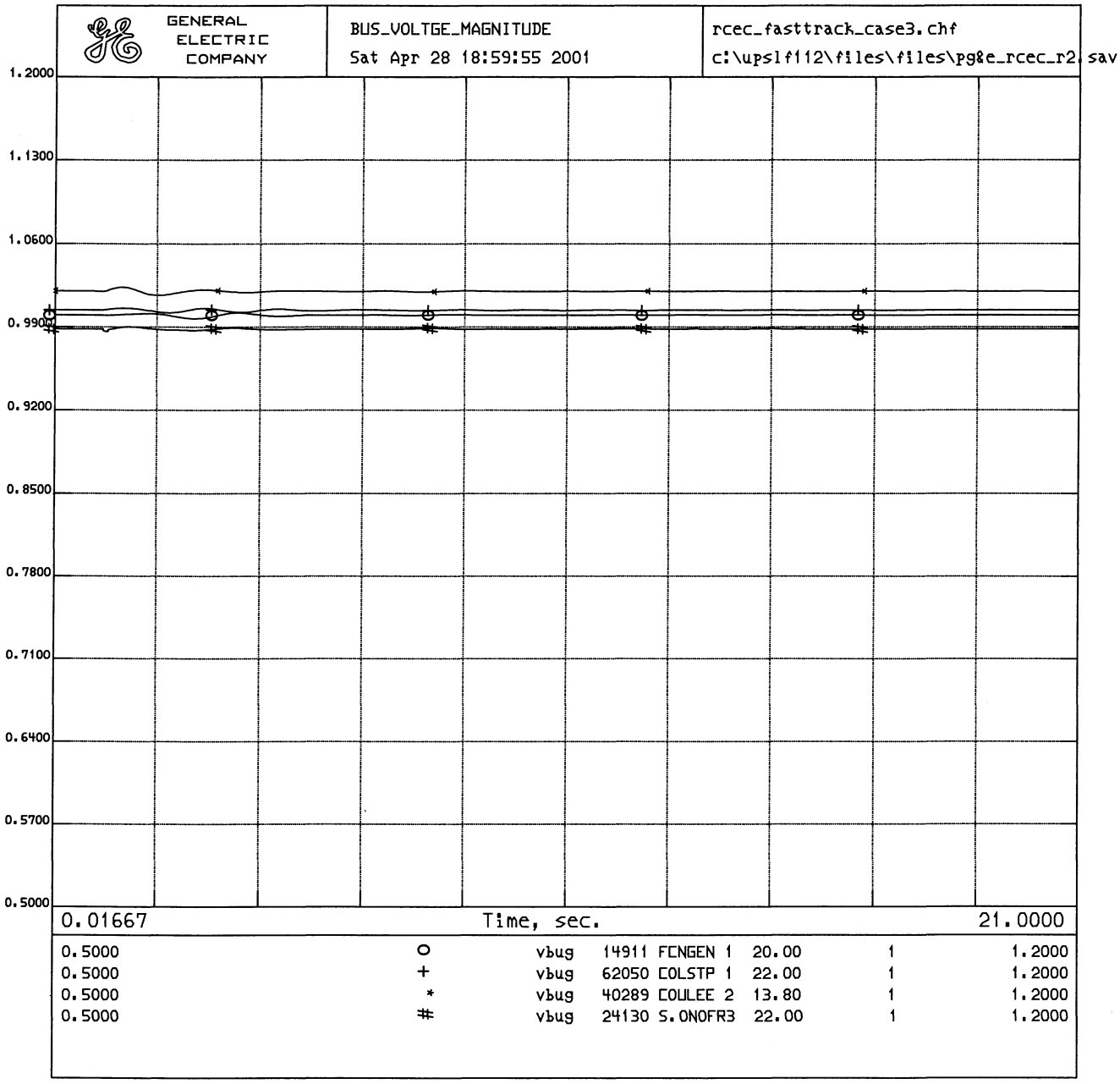

2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

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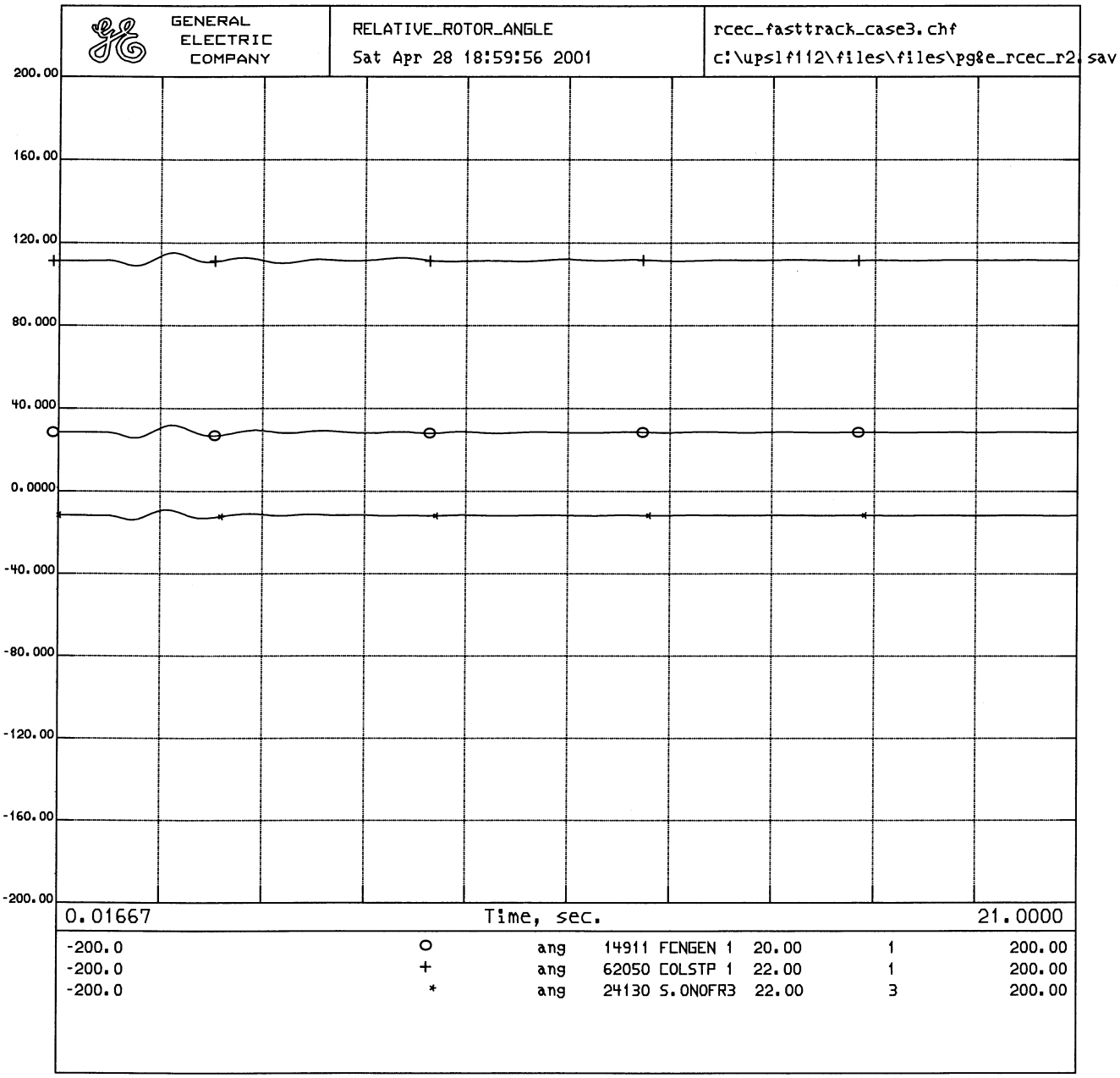
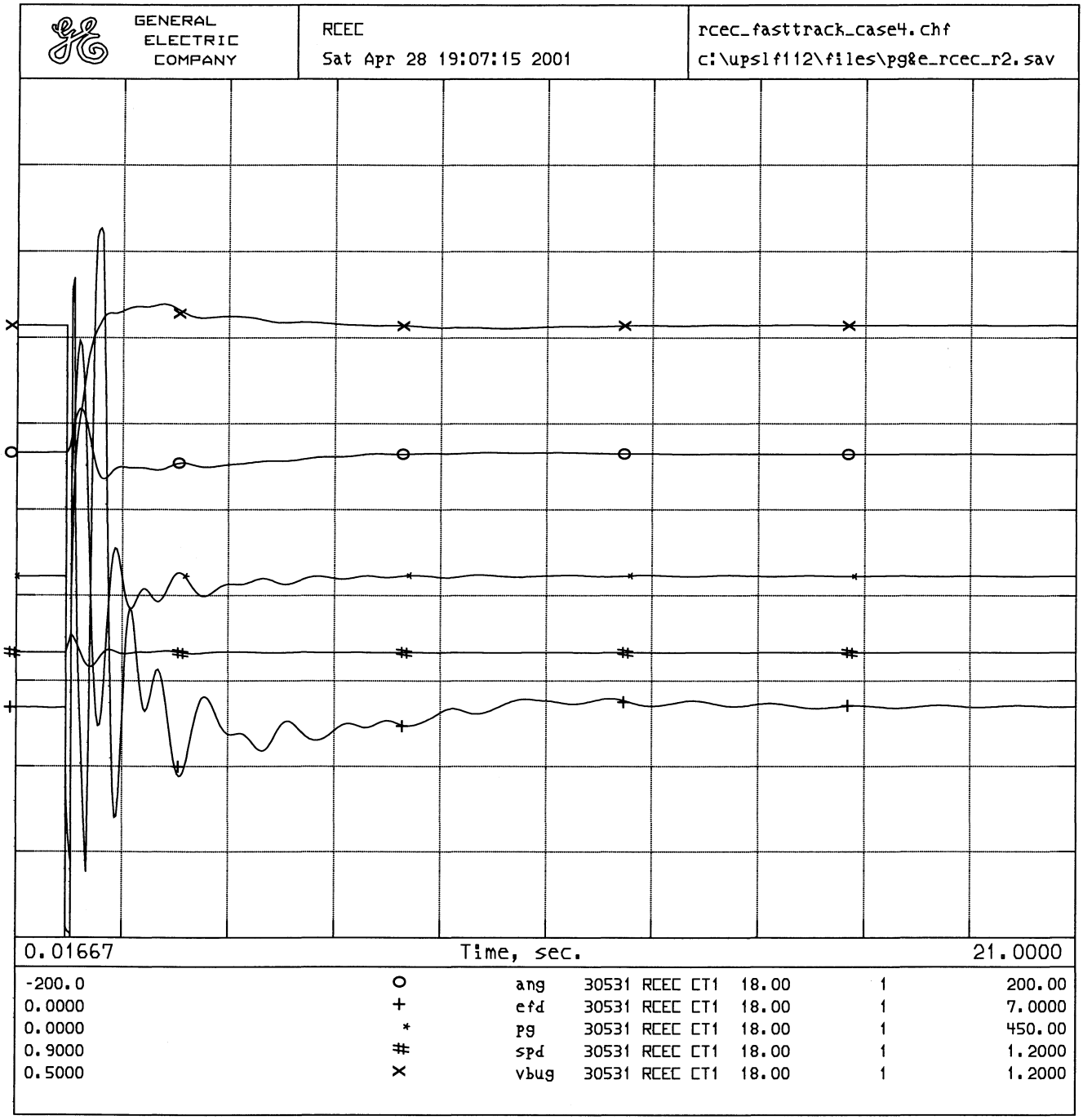


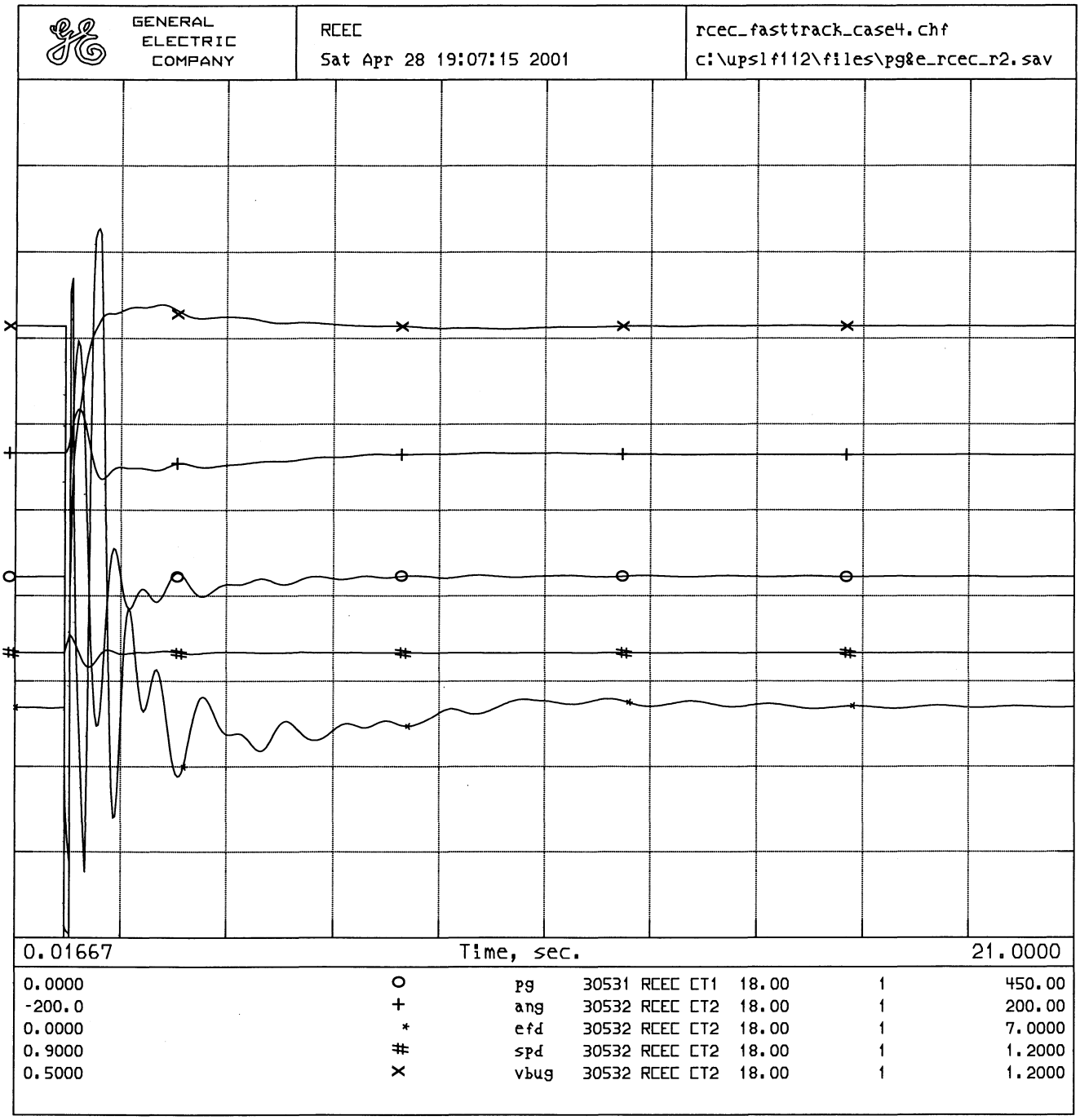
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

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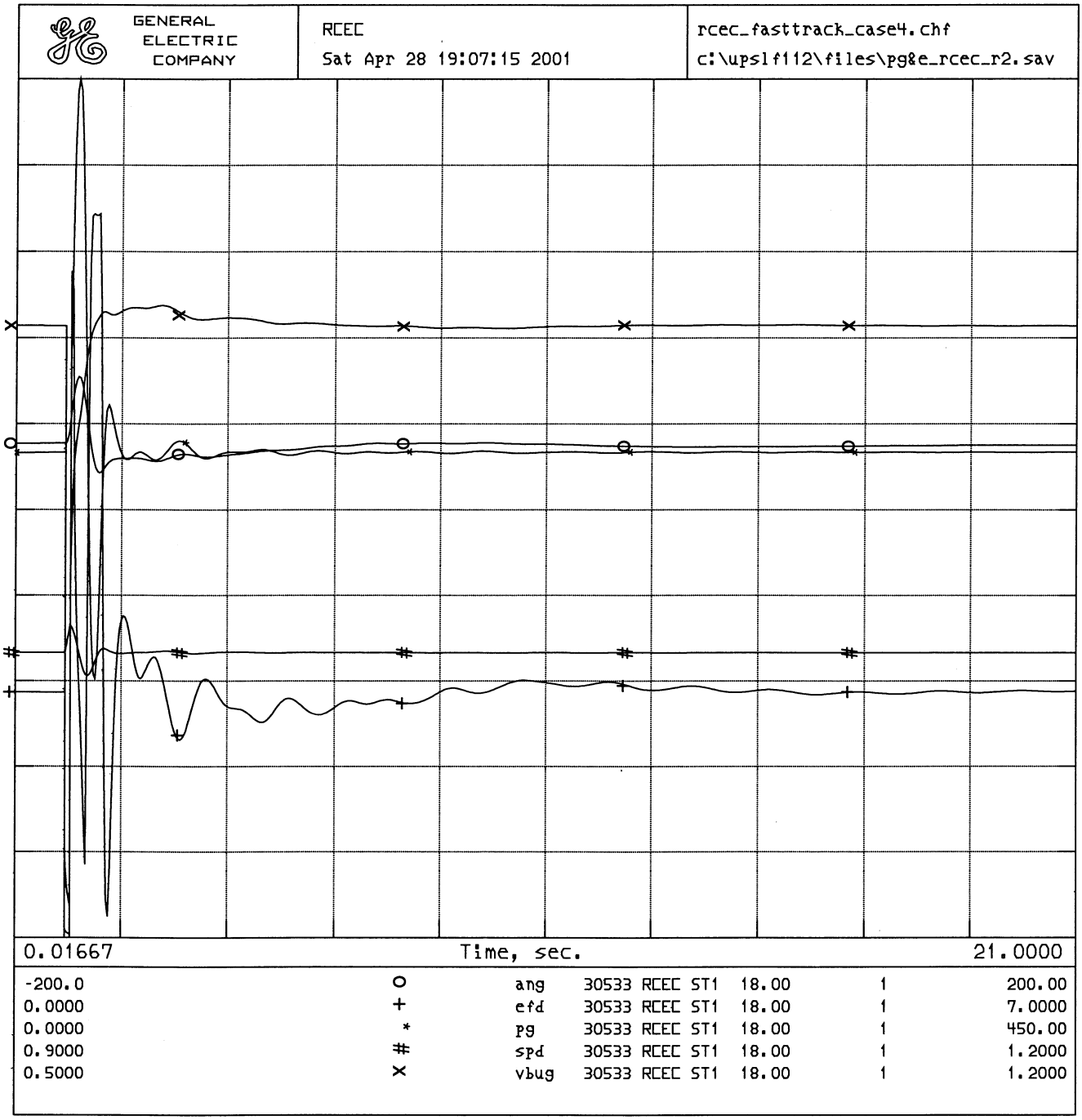
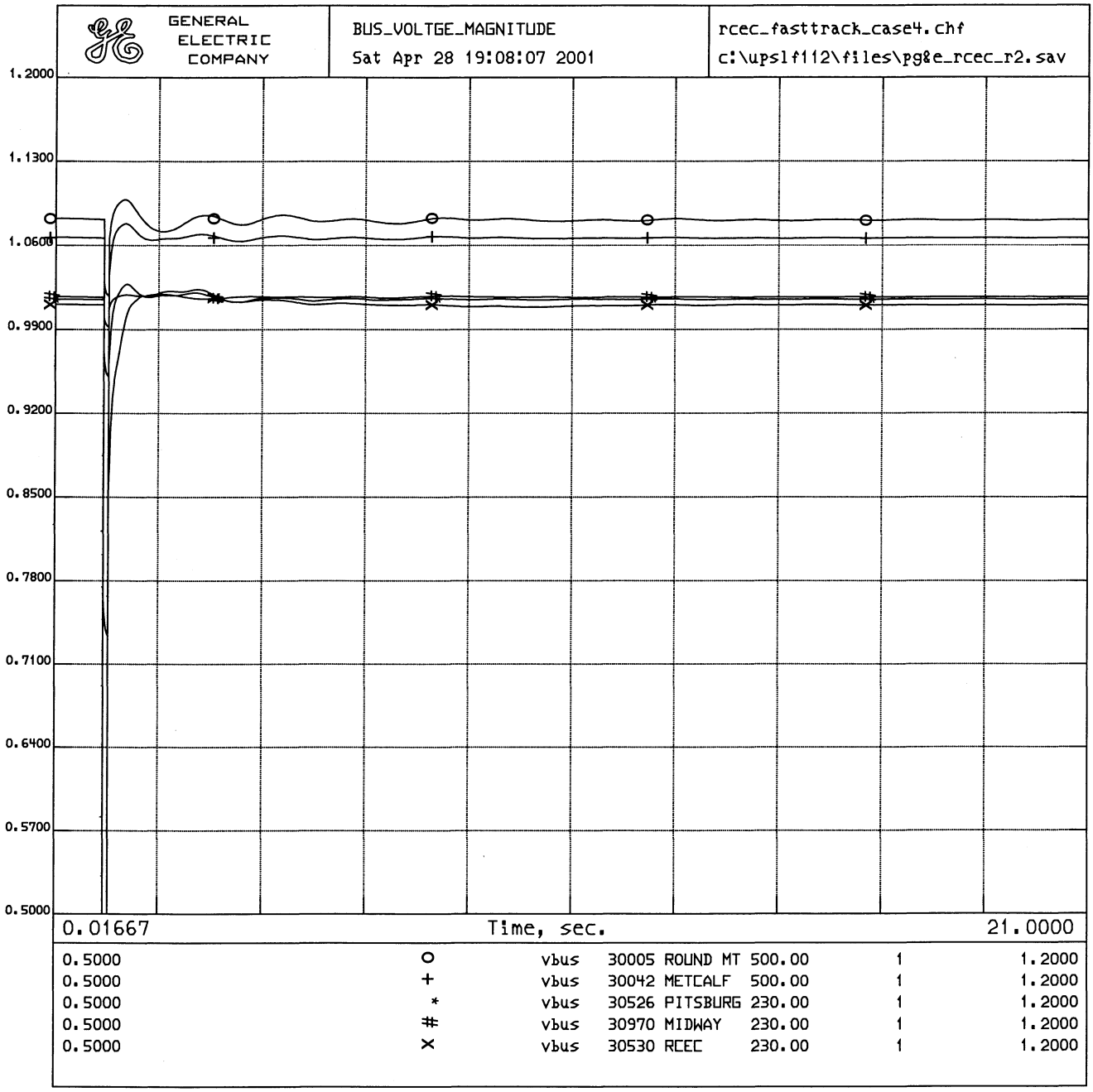


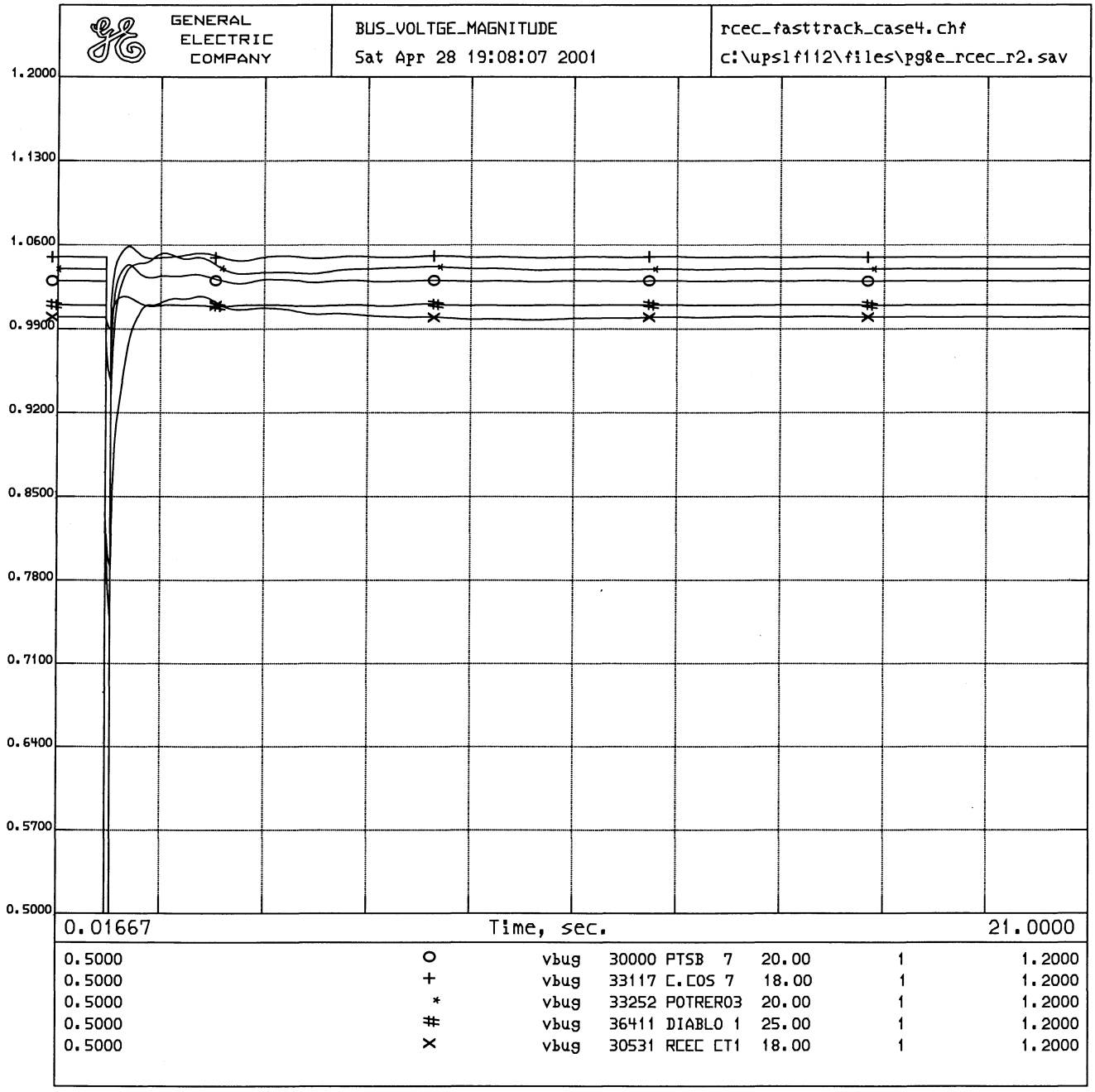
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



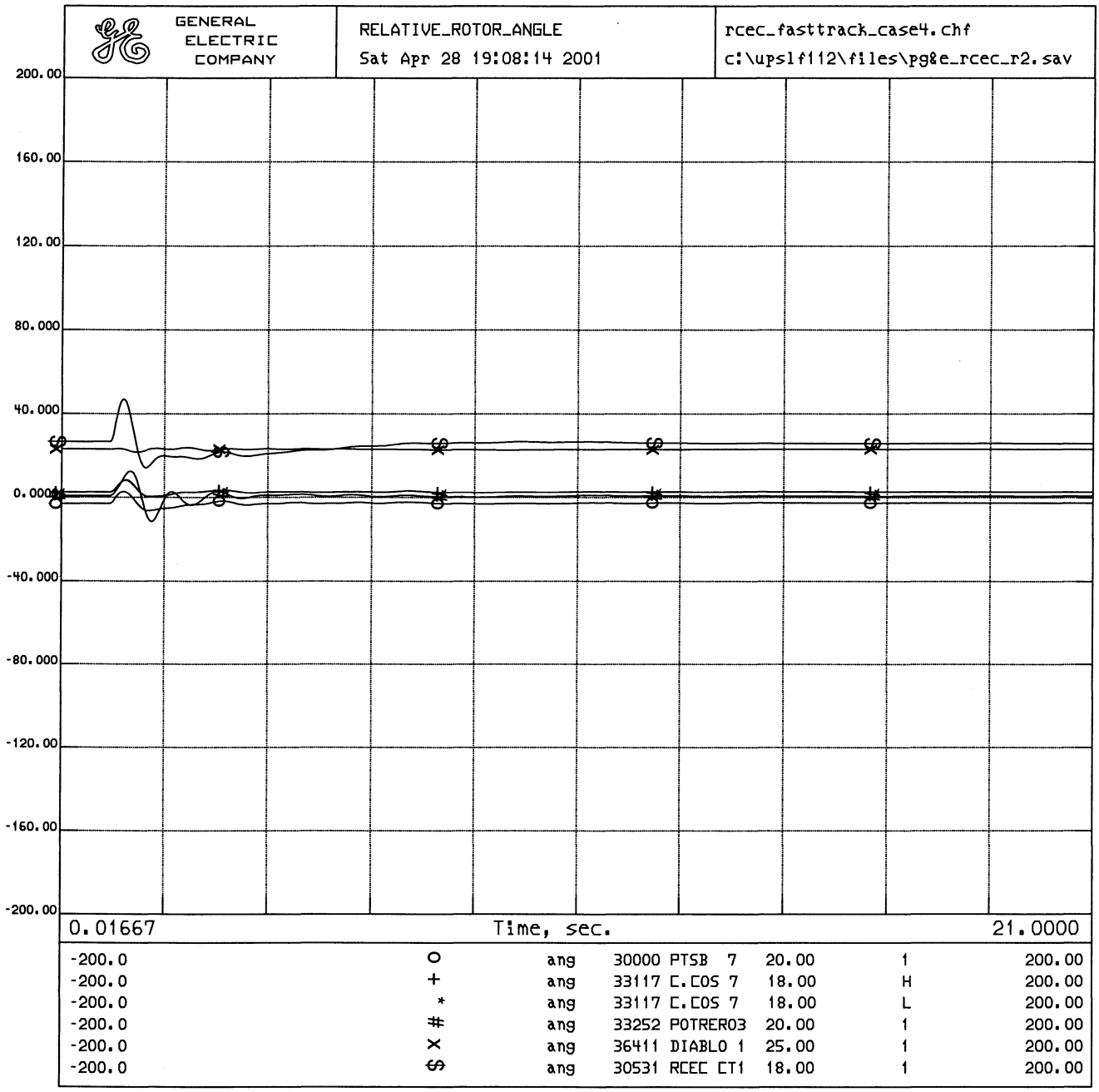
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

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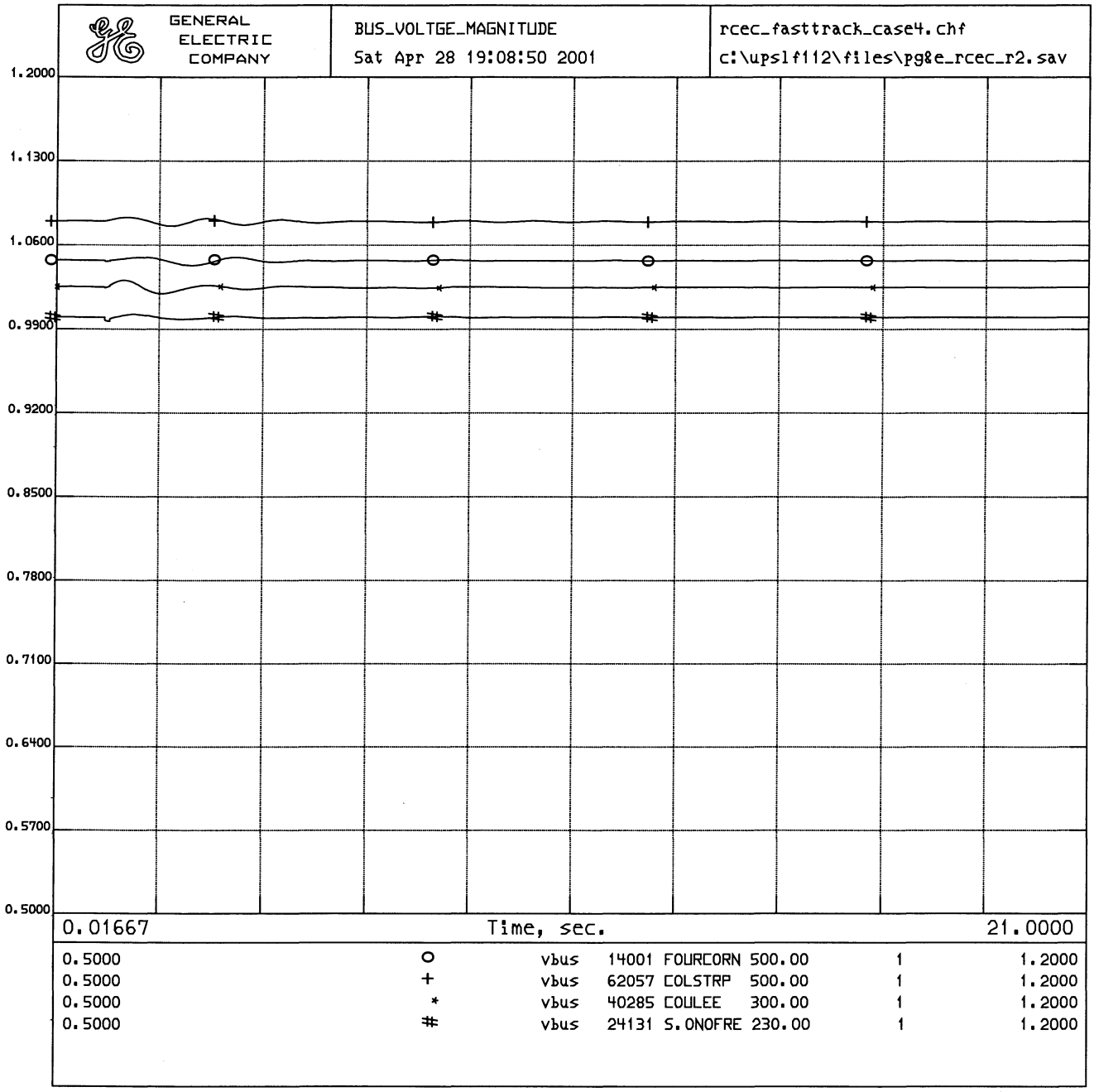

2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
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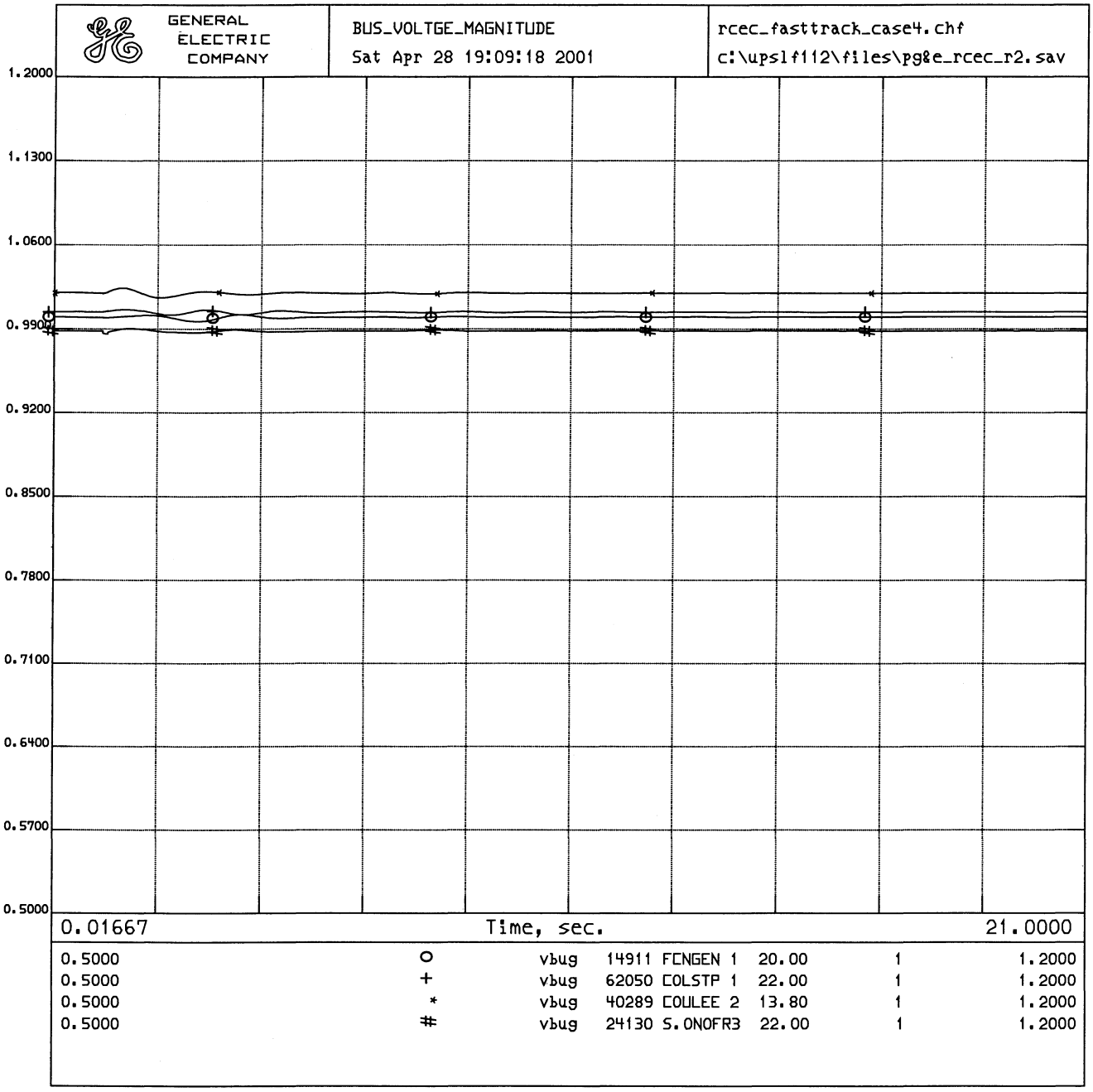
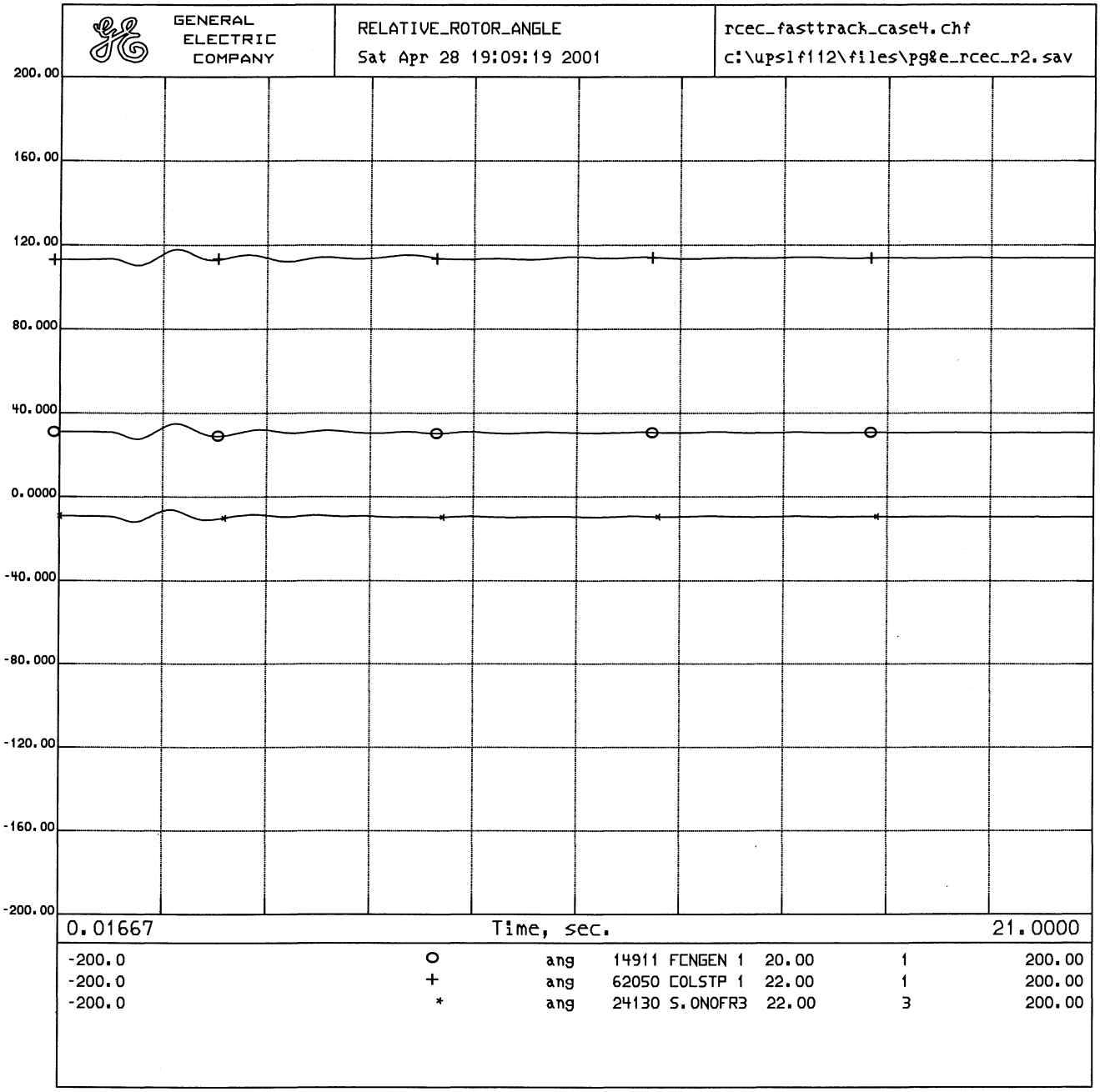


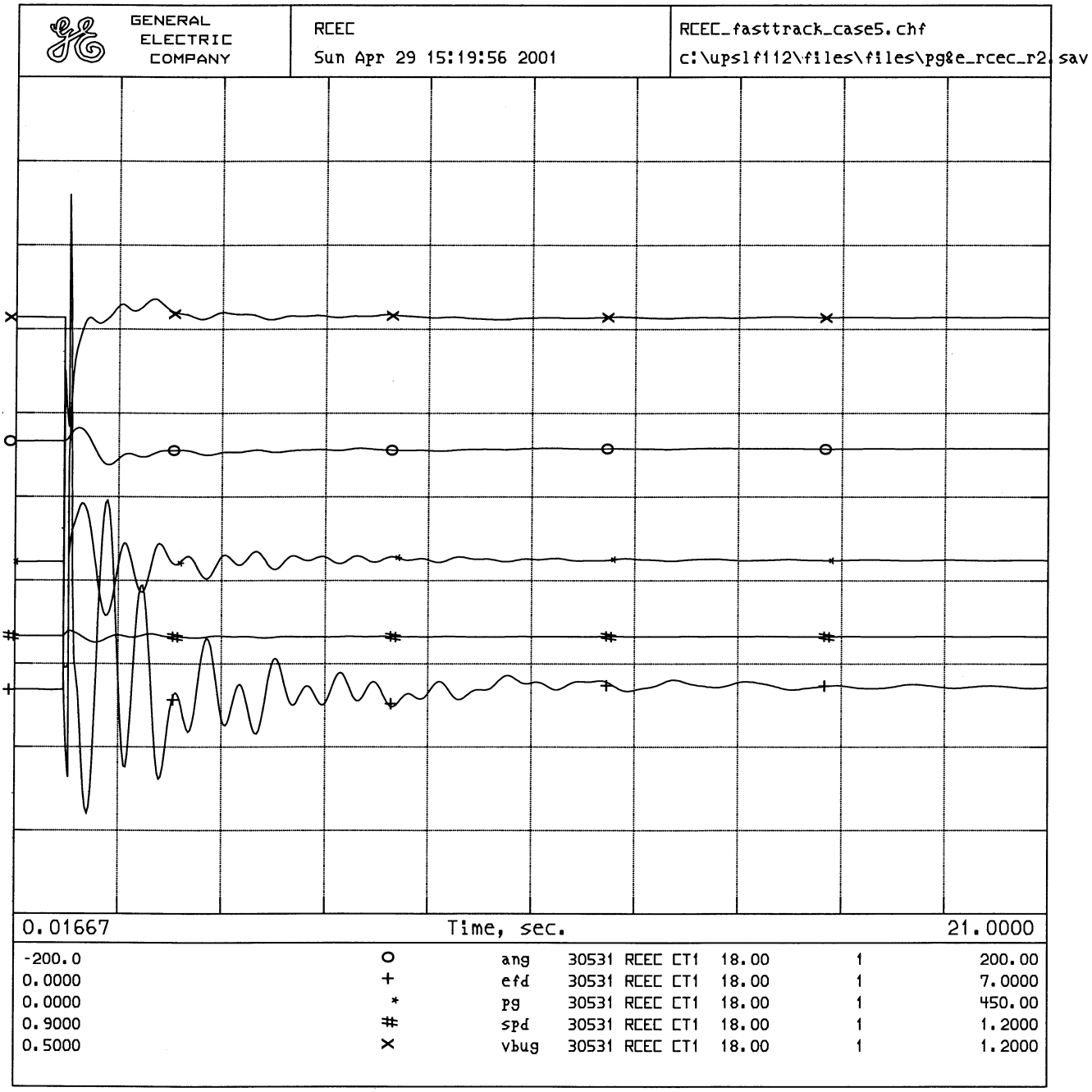
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
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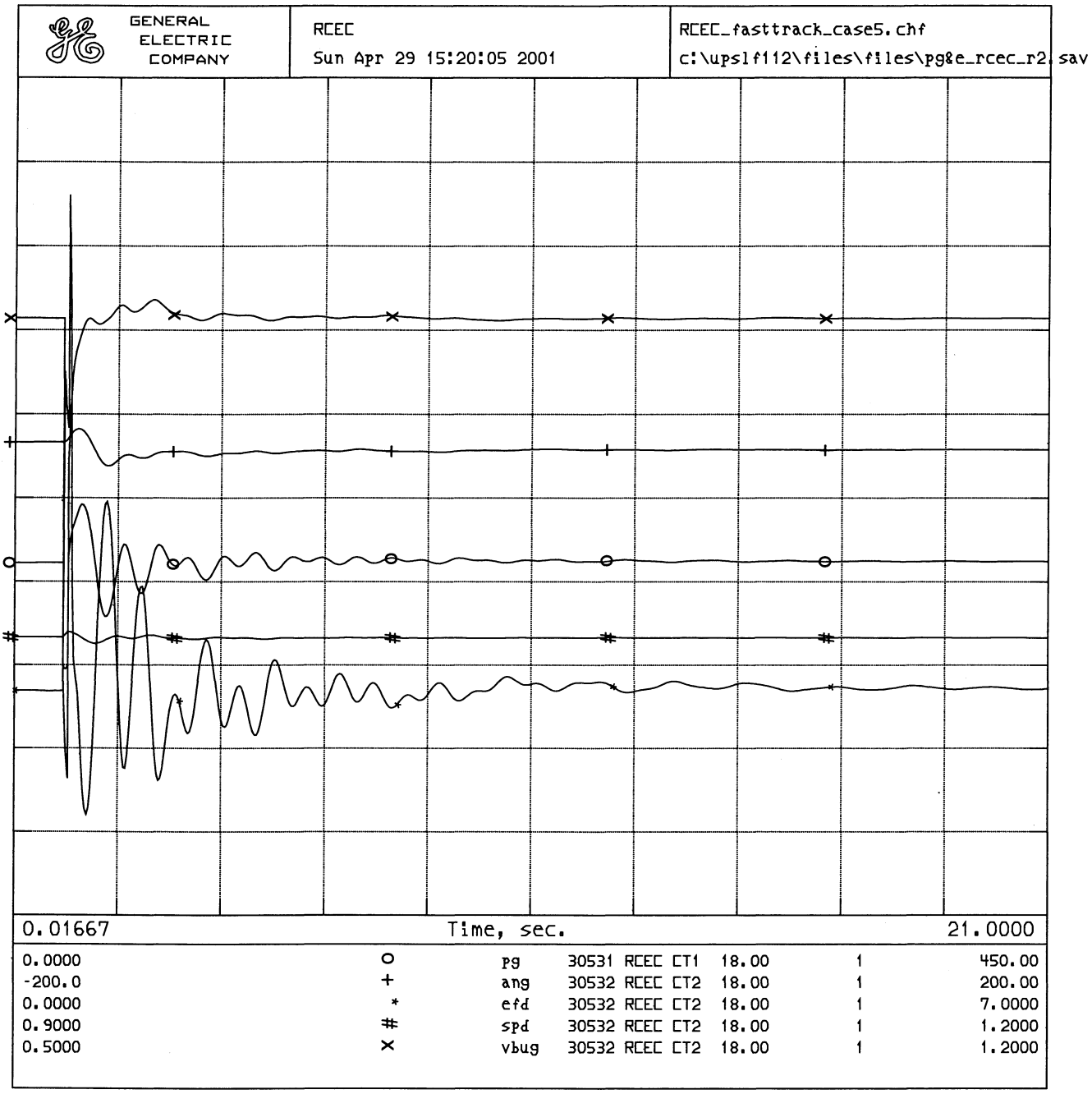
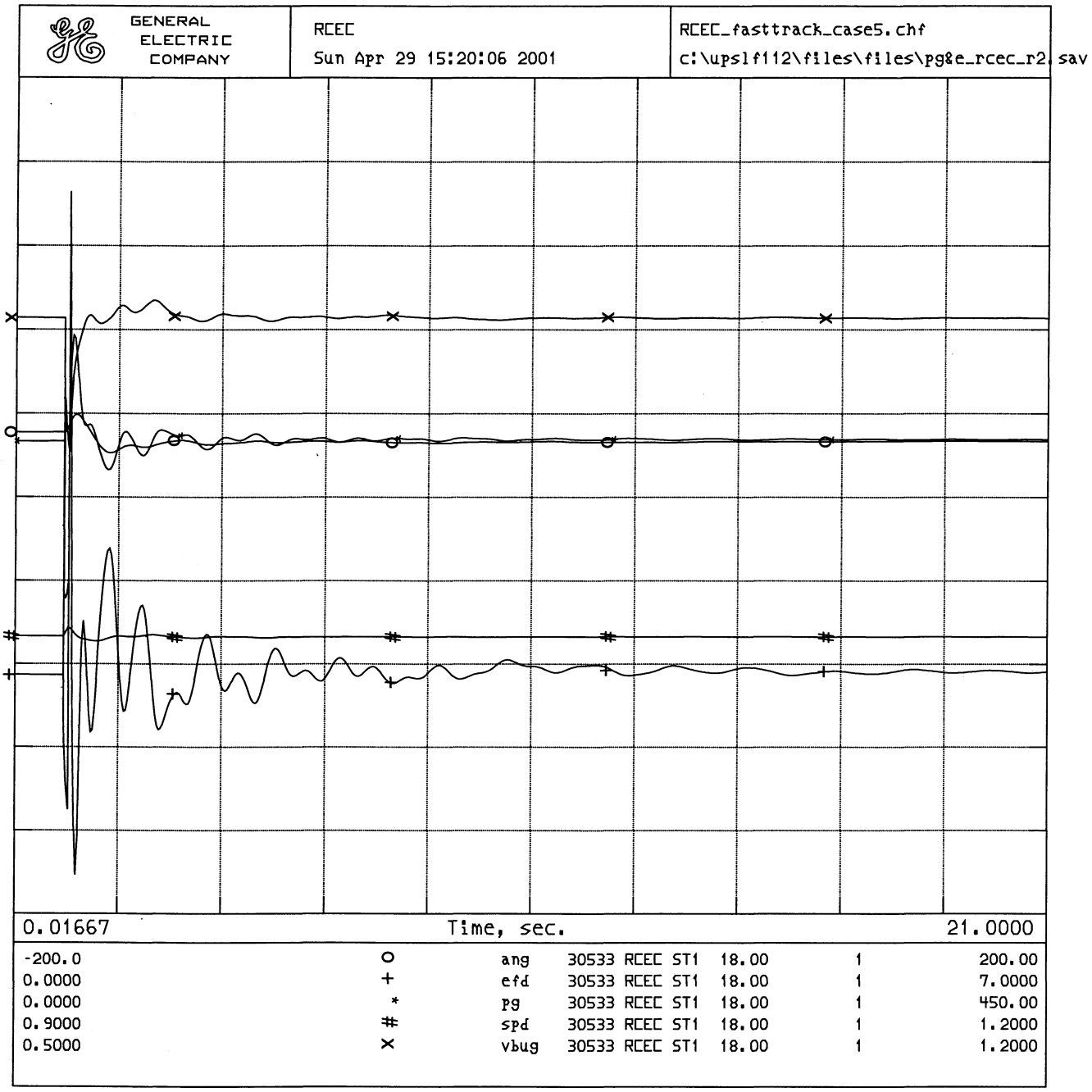
developed from a00sum2001.sav case, inserted smud detail into pg&e case.



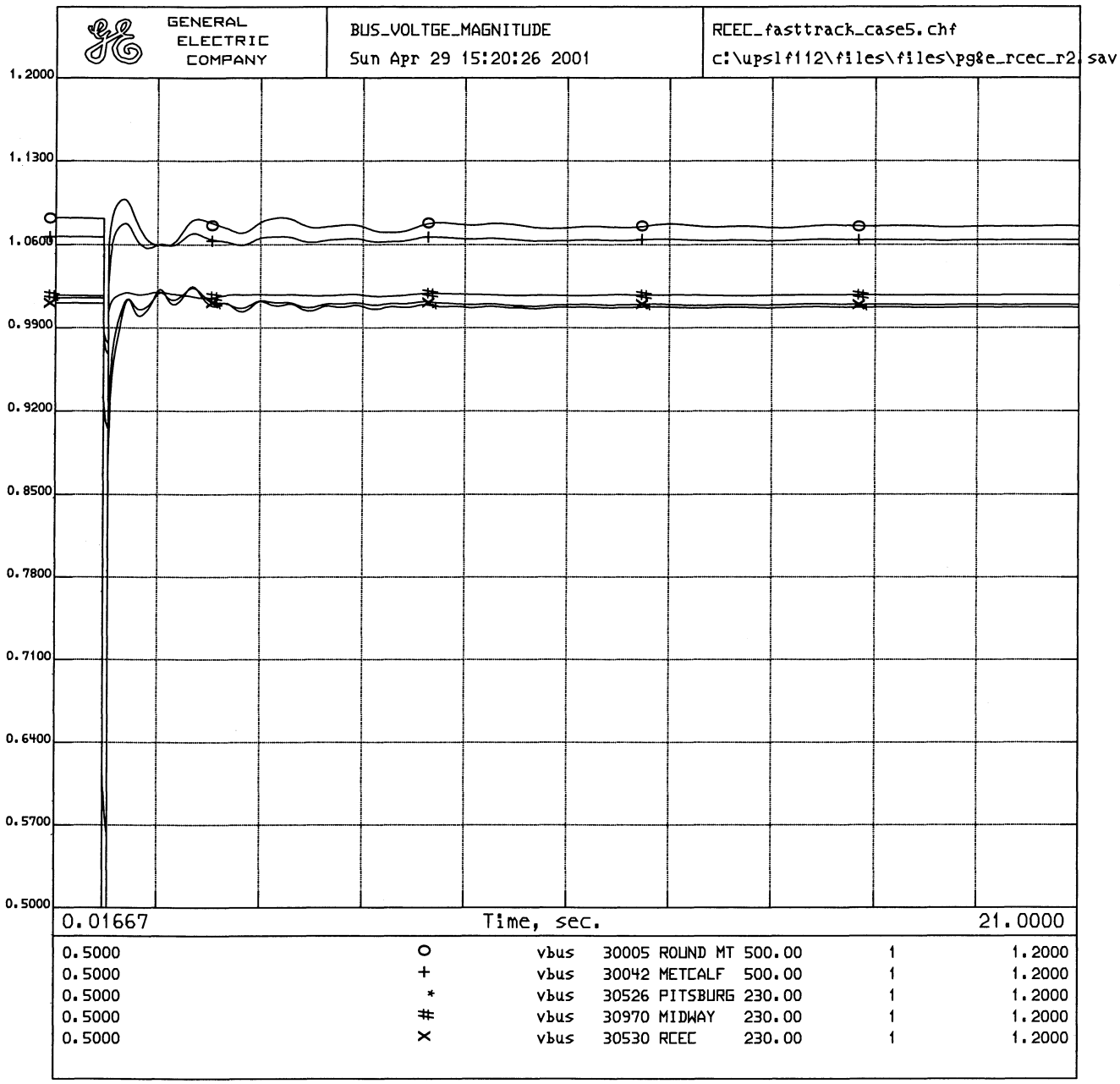
2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



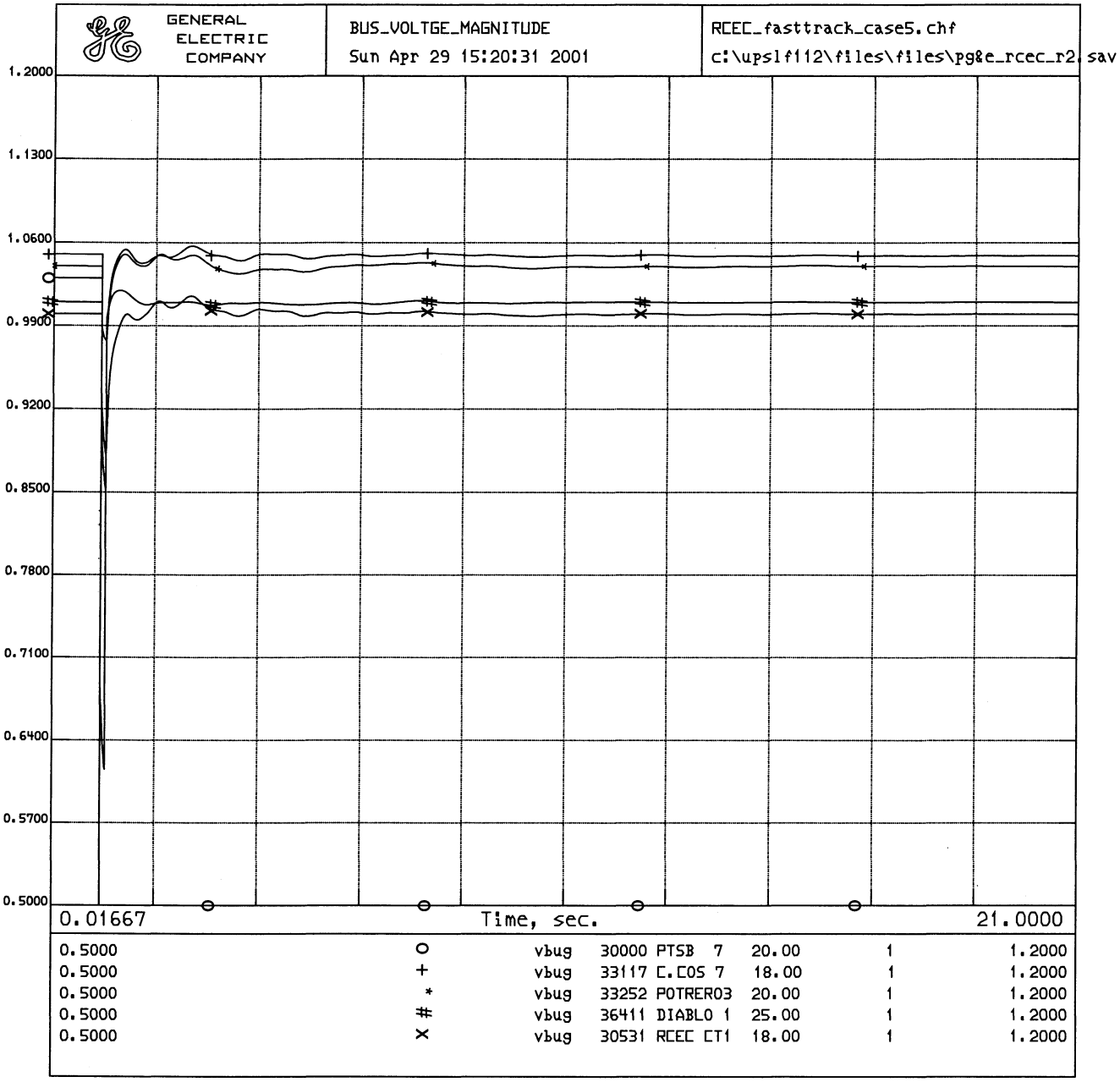
2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



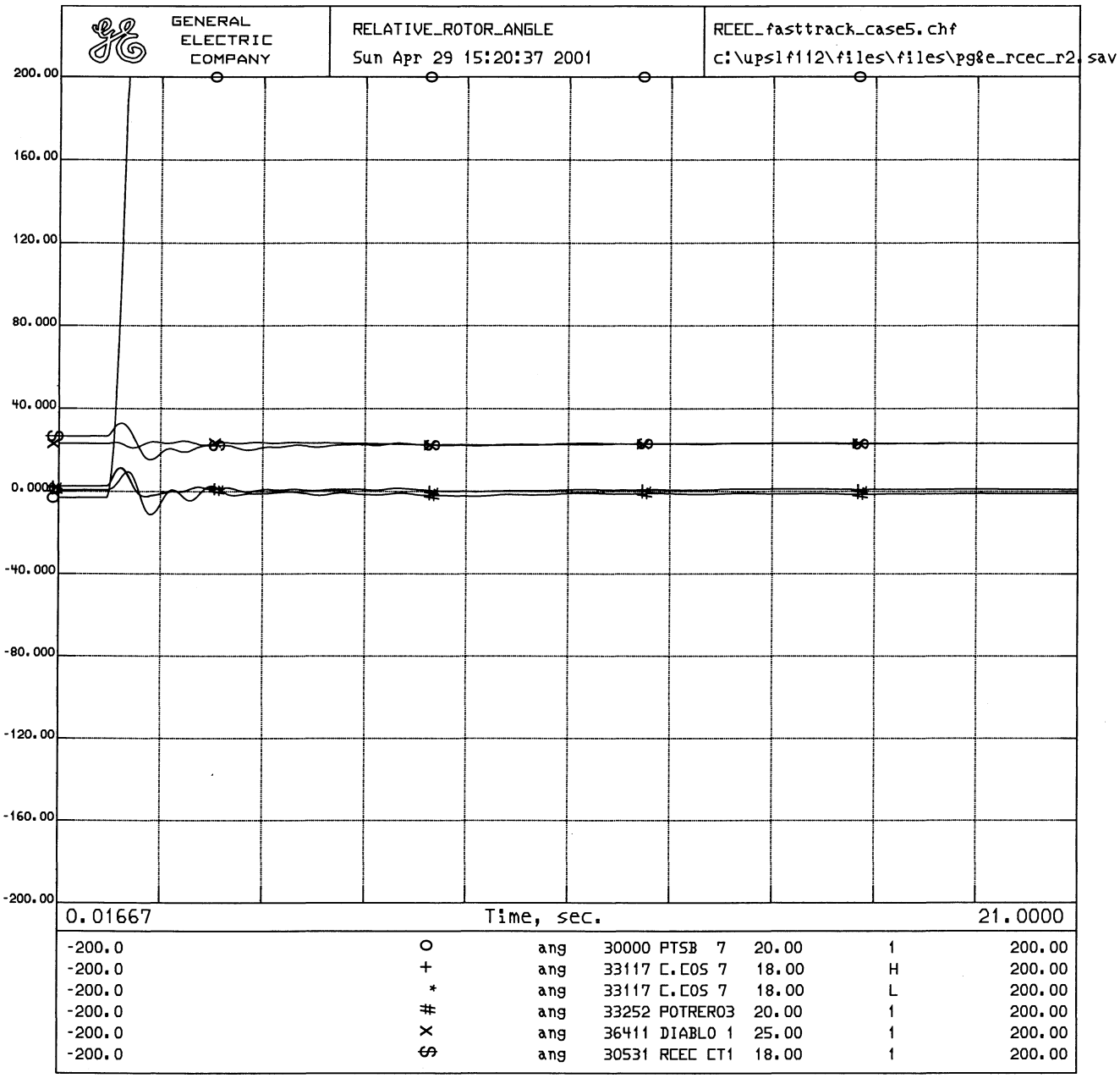
2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



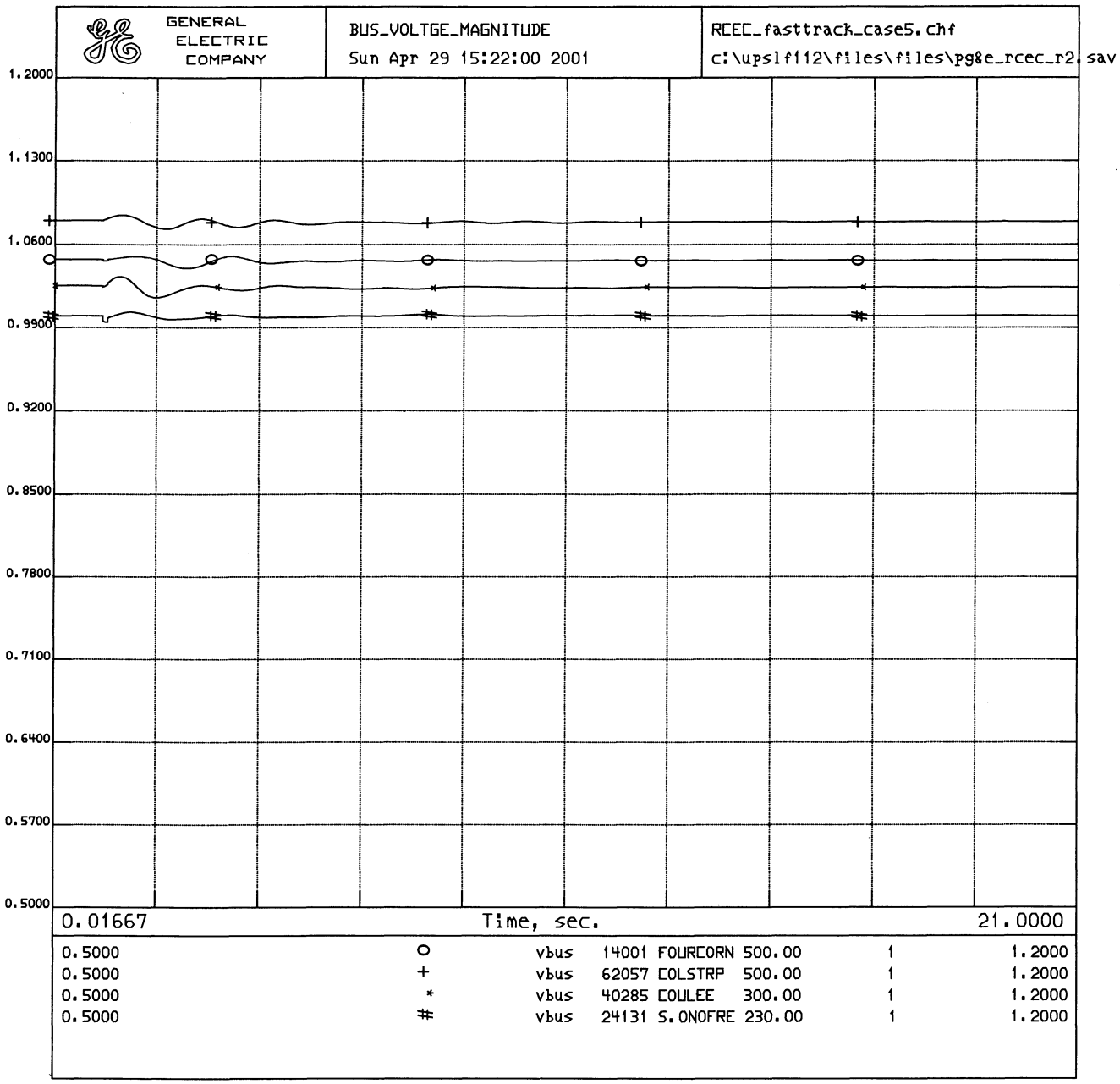
2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
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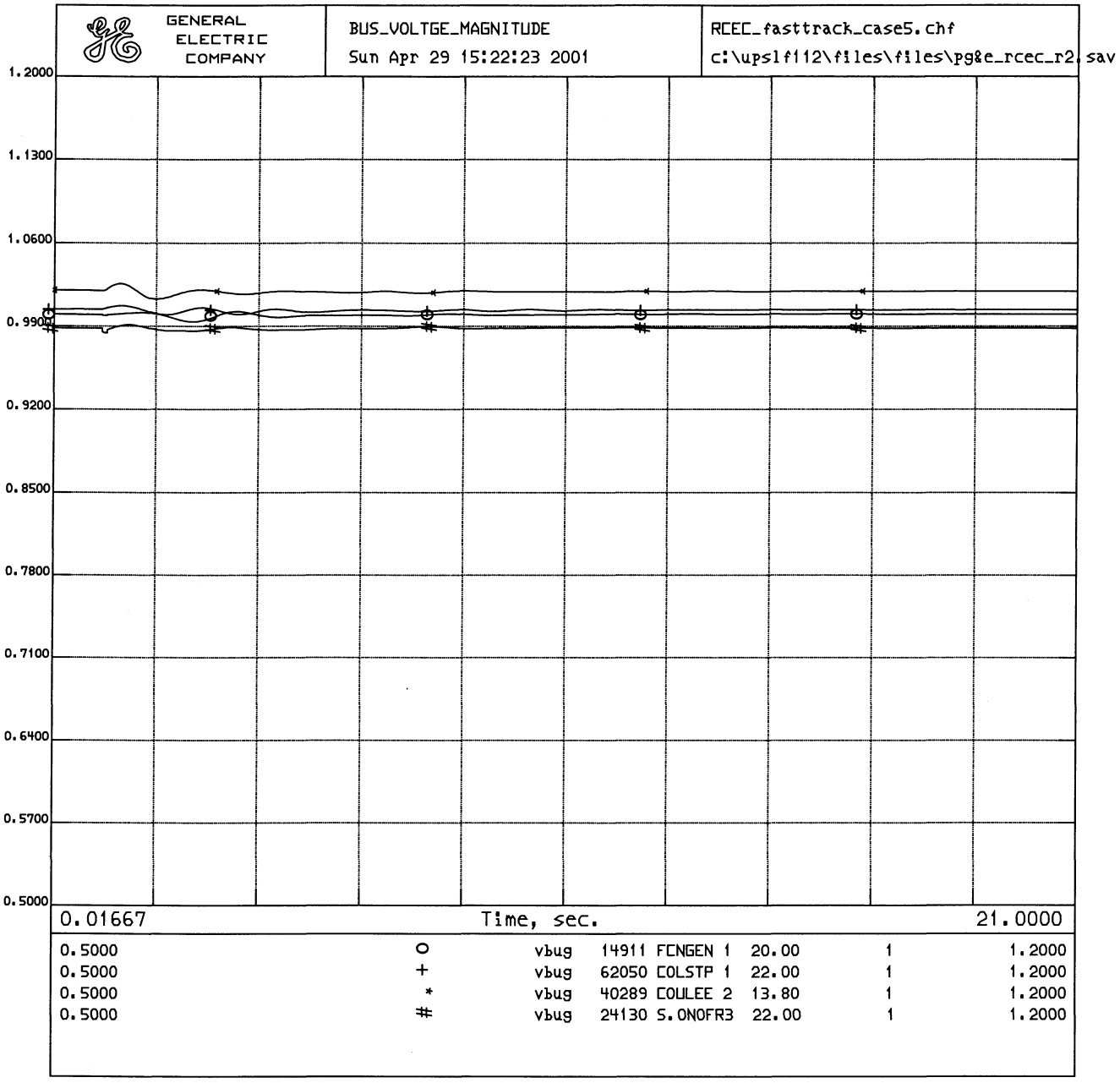
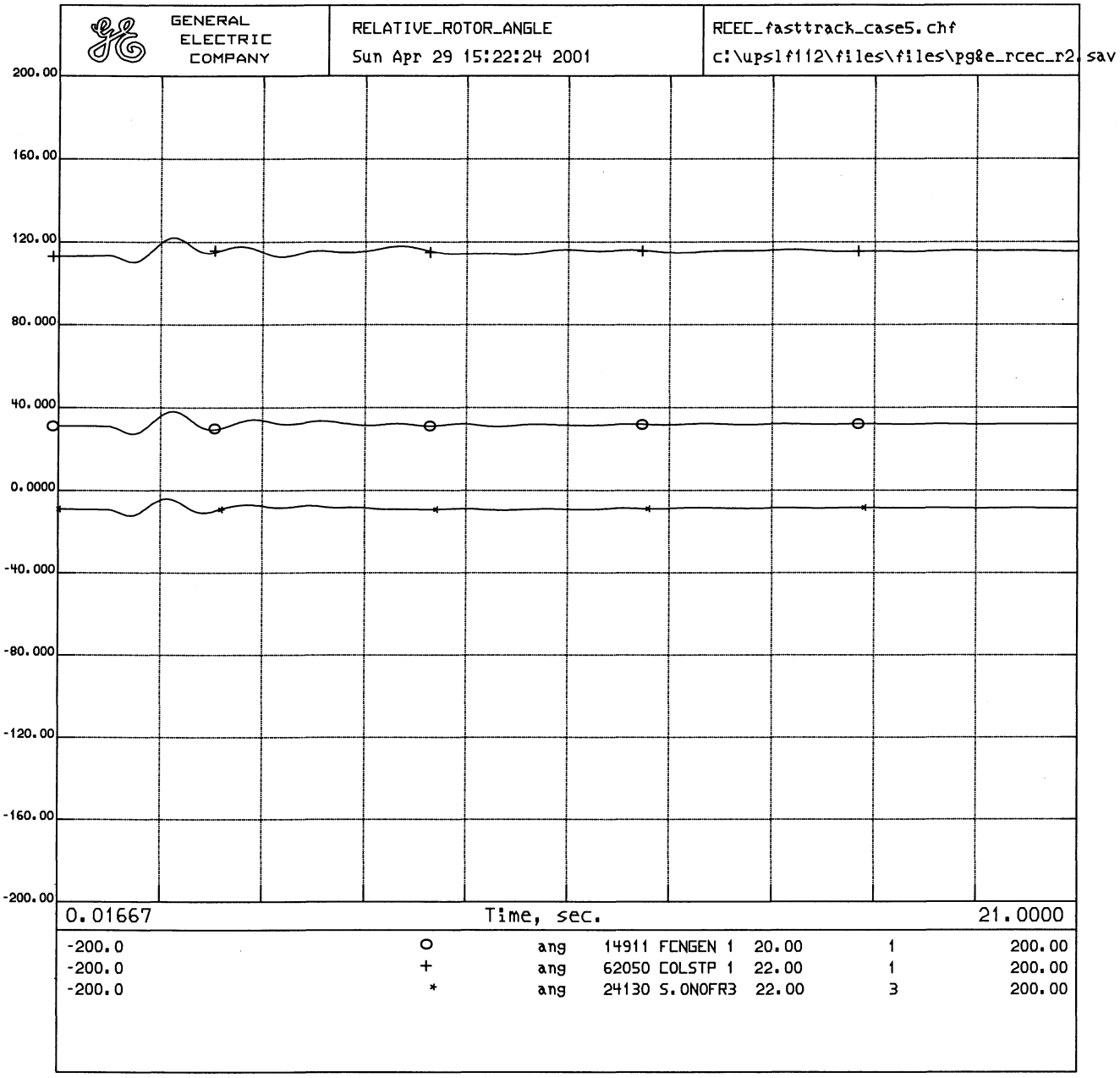
developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

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Appendix 6-H
Dynamic Run Control Files

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```
pg&e_rcec_r2.sav
pg&e_rcec_r4.dyd
TITLE
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt
RUN 20.0
CC ***********************************************
CC
CC
CC Fault RCEC 230kV Bus
CC
FB  0.0  "RCEC    " 230.
CC
CC  Clear fault
CC
CFB 6.0  "RCEC    " 230.
CC
CC Drop the project generators
CC
TG 6.0 "RCEC CT1" 18.0 "1 "
TG 6.0 "RCEC CT2" 18.0 "1 "
TG 6.0 "RCEC ST1" 18.0 "1 "
```

```
pg&e_rcec_r2.sav
pg&e_rcec_r4.dyd
TITLE
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt
RUN 20.0
CC ***********************************************
CC
CC
CC Fault RCEC 230kV Bus
CC
FB  0.0  "RCEC    " 230.
CC
CC  Clear fault
CC
CFB 6.0  "RCEC    " 230.
CC
CC Trip one RCEC-E.SHORE 230 kV line
CC
DL  6.0  "RCEC    " 230 "E. SHORE" 230 "1 "
```

```
pg&e_rcec_r2.sav
pg&e_rcec_r4.dyd
TITLE
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt
RUN 20.0
CC ***********************************************
CC
CC
CC Fault E.SHORE 230kV Bus
CC
FB  0.0  "E. SHORE" 230.
CC
CC  Clear fault
CC
CFB 6.0  "E. SHORE" 230.
CC
CC Trip one E.SHORE-SAN MATEO 230 kV line
CC
DL  6.0  "E. SHORE" 230 "SANMATEO" 230 "1 "
```

```
pg&e_rcec_r2.sav
pg&e_rcec_r4.dyd
TITLE
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt
RUN 20.0
CC ************************************************
CC
CC
CC Fault E. SHORE 230kV Bus
CC
FB  0.0  "E. SHORE" 230.
CC
CC  Clear fault
CC
CFB 6.0  "E. SHORE" 230.
CC
CC Trip one E.SHORE-PITTSBURG 230 kV line
CC
DL  6.0  "PITSBURG" 230 "E. SHORE" 230 "1 "
```

```
pg&e_rcec_r2.sav
pg&e_rcec_r4.dyd
TITLE
2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt
RUN 20.0
CC ************************************************
CC
CC
CC Fault Pittsburg 230kV Bus
CC
FB  0.0  "PITSBURG" 230.
CC
CC  Clear fault
CC
CFB 6.0  "PITSBURG" 230.
CC
CC Trip all Pittsburg 230 kV Bus 1 Section E elements
CC
DL  6.0  "PITSBURG" 230 "TIDEWATR" 230 "1 "
DL  6.0  "ROSSTAP1" 230 "ROSSMOOR" 230 "1 "
DL  6.0  "PITSBURG" 230 "FLOWIND2" 230 "1 "
CC  xfmrs switched w/ alldyns command 'DL'
DL  6.0  "PTSB  7 " 20  "PITSBURG" 230 "1 "
DL  6.0  "PTSB  5 " 18  "PITSBURG" 230 "1 "
DL  6.0  "PTSB  5 " 18  "PITSBURG" 230 "2 "
CC
CC drop Pittsburg unit 7. Pittsburg 5 already off in the LF case
CC
TG  6.0  "PTSB  7 " 20.0 "1 "
```

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Appendix 6-I
Breaker Duties in the Vicinity of the RCEC

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Station	Breaker	kV	Symmetrical Interrupting Rating
Eastshore	202	230	40000
Eastshore	262	230	40000
Eastshore	252	230	40000
Eastshore	302	115	40000
Eastshore	312	115	40000
Eastshore	322	115	40000
Eastshore	332	115	40000
Eastshore	342	115	40000
Eastshore	372	115	40000
Eastshore	382	115	40000
Grant	122	115	16781
Grant	142	115	16781
Mt. Eden	142	115	40000
Mt. Eden	182	115	40000
Dumbarton	112	115	23973
Dumbarton	132	115	23973
Newark	100	115	42021
Newark	110	115	42021
Newark	120	115	42021
Newark	130	115	63000
Newark	140	115	63000
Newark	160	115	42021
Newark	170	115	63000
Newark	180	115	42021
Newark	190	115	42021
Newark	310	115	63000
Newark	320	115	63000
Newark	330	115	63000
Newark	340	115	63000
Newark	350	115	63000
Newark	360	115	63000
Newark	370	115	63000
Newark	380	115	63000
Newark	390	115	42021
Newark	420	115	47751
Newark	430	115	47751
Newark	460	115	50000
Newark	470	115	50000
Newark	480	115	63000
Newark	490	115	42021
Newark	510	115	63000
Newark	520	115	63000
Newark	530	115	42021
Newark	540	115	63000
Newark	720	115	63000
Newark	730	115	63000
Newark	750	115	63000
Newark	760	115	63000
Newark	770	115	47751
Newark	780	115	47751
Newark	910	115	63000
Newark	914	115	63000
San Mateo	212	230	45938

San Mateo	222	230	45938
San Mateo	252	230	45938
San Mateo	262	230	45938
San Mateo	272	230	50000
San Mateo	282	230	63000
San Mateo	312	230	63000
San Mateo	322	230	50000
San Mateo	332	230	50000
San Mateo	342	230	45938
San Mateo	372	230	45938
San Mateo	712	230	45938
San Mateo	722	230	45938
Contra Costa PP	400	230	63000
Contra Costa PP	410	230	63000
Contra Costa PP	420	230	63000
Contra Costa PP	470	230	63000
Contra Costa PP	480	230	63000
Contra Costa PP	500	230	63000
Contra Costa PP	510	230	63000
Contra Costa PP	520	230	63000
Contra Costa PP	570	230	34454
Contra Costa PP	580	230	63000
Contra Costa PP	590	230	63000
Contra Costa PP	600	230	63000
Contra Costa PP	610	230	63000
Contra Costa PP	620	230	63000
Contra Costa PP	630	230	45938
Contra Costa PP	640	230	45938
Contra Costa PP	650	230	50000
Contra Costa PP	660	230	50000
Contra Costa PP	670	230	50000
Contra Costa PP	680	230	50000
Contra Costa PP	690	230	50000
Contra Costa PP	810	230	63000
Contra Costa PP	820	230	63000
Pittsburg PP	402	230	45938
Pittsburg PP	432	230	45938
Pittsburg PP	442	230	45938
Pittsburg PP	452	230	50000
Pittsburg PP	472	230	45938
Pittsburg PP	482	230	45938
Pittsburg PP	492	230	63000
Pittsburg PP	502	230	45938
Pittsburg PP	512	230	45938
Pittsburg PP	522	230	45938
Pittsburg PP	532	230	63000
Pittsburg PP	542	230	63000
Pittsburg PP	572	230	45938
Pittsburg PP	582	230	45938
Pittsburg PP	612	230	45938
Pittsburg PP	622	230	45938
Pittsburg PP	672	230	45938
Pittsburg PP	812	230	63000
Pittsburg PP	822	230	63000

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Appendix 6-J
EMF and Power Line Concepts

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EMF CHARACTERISTICS

The power system frequency in the United States is 60 cycles per second or 60 hertz (Hz). At 60 Hz the electromagnetic field is calculated as two separate fields: an electric field and a magnetic field. These fields are a naturally occurring phenomenon associated with electricity. The electric and magnetic fields have the same frequency as the electricity that creates them. Thus, the fields, which are the subject of this report, are 60 Hz fields. Electric field concepts are presented below, followed by a discussion of magnetic fields.

Electric Fields

The quantity of electricity is defined in terms of electric charge. "Electric charge, like mass, length, and time, is accepted as a fundamentally assumed concept, required by the existence of forces measurable experimentally: other definitions of electromagnetic quantities are developed on the bases of these four concepts."[1]

The potential energy stored in an electric charge is measured in volts. Voltage on a wire is often described as analogous to water pressure in a pipe.

An electric field exists wherever there is an electric charge. The electric field is an invisible force that exists in space between positive and negative electric charges. An electric field has a direction associated with it, from positive charge to negative charge. It is measured in units of kilovolts per meter (kV/m). An electric field is present wherever there is electrical energy, including home wiring, appliances, and power lines. Electric fields have the following characteristics:

1. The strength of the electric field is proportional to the voltage of the electric system causing it. Thus, a high-voltage power line would have a higher electric field than low-voltage house wiring.

2. The strength of the electric field decreases as the distance from the source increases. Thus, moving farther from a power line will reduce the field.

3. An electric field is stopped by ground and can be shielded by enclosing it within a grounded metallic object. Trees, bushes, houses, etc., will also significantly attenuate electric fields.

4. Two electric fields may tend to add together or cancel each other depending upon whether they are in the same or opposite directions.

5. Electric fields will induce a charge on ungrounded metallic objects within the field. Thus, electric utilities take precautions to ground fences and metal buildings that are very close to transmission lines.

---

[1] IEEE Standard Dictionary of Electrical and Electronics Terms

6. People are able to detect the presence of some electric fields by sensation of small body hairs. This detection depends upon the strength of the field and the sensitivity of the person.

Magnetic Fields

A magnetic field is produced whenever electric current flows. Current is the movement of electric charges and is measured in amperes (also called amps). The magnetic field is an invisible force that exists in space around the current source. The unit used to measure magnetic field is milliGauss (mG).

The characteristics of magnetic fields are listed below. In many ways, magnetic fields differ from electric fields described above.

1. The strength of a magnetic field is proportional to current. The relevance of this will be discussed in more detail in the section on power lines.

2. The strength of a magnetic field decreases as the distance from the source increases. Thus, moving farther from a power line will reduce the magnetic field, similar to the electric field.

3. A magnetic field is not stopped by ground and is not significantly attenuated by buildings, trees, etc. It is attenuated only if the current source is enclosed by a magnetic material.

4. Two magnetic fields may tend to add together or cancel each other depending upon whether they are in the same or opposite direction.

5. A magnetic field will induce current in a conducting metallic loop. This is a concern to electric utilities where pipelines or railroads are close to and parallel to power lines. Precautions are taken to prevent the induced currents from causing interference to the corrosion protection system on pipelines or to communication systems on railroads.

6. People are not able to sense the presence of a magnetic field.

A magnetic field will be found near household appliances and home wiring, as well as power lines.

To review the terminology, voltage is a measure of the potential energy of the electrical charge, analogous to the potential energy of water pressure inside a pipe. An electric field is associated with voltage. Current is the movement of electrical charge in a wire, analogous to the flow of water in a pipe. A lamp plugged into the household wall outlet will have voltage to the switch, but current will flow only when the switch is turned on. A magnetic field is associated with current.

Measurement and Calculation of EMF

The measurement of the strength of electric and magnetic fields is made with readily available meters. A different meter is needed to measure each. The Institute of Electrical and Electronic Engineers (IEEE) develops and publishes guidelines and standards for instrumentation and measurement procedures. Near power lines, the standards state that the fields are to be measured at 1 meter (3.28 feet) above ground. The field strengths given in this report are calculated at 1 meter above ground.

The electric and magnetic fields associated with a power line have a special orientation with regard to the power line. The electric field (near the power line) at 1 meter above ground is essentially vertical along the route of the power line. Magnetic fields, on the other hand, may have vertical and horizontal components. It is important, especially when making measurements, that orientation of the field be taken into consideration.

In this report, calculation of magnetic field strengths refers to the maximum field rather than a horizontal or vertical component.

POWER TRANSMISSION CONCEPTS

Power Line Voltages and Currents

The electric and magnetic fields are calculated for typical transmission line configurations. Transmission lines are almost always three-phase (three conductors servicing a particular load or customer). For the calculations in this report we have assumed the three phases to be balanced in voltage and current.

Electric utilities operate power lines at nearly constant voltage; normal operation is typically within 5 percent of the nominal voltage. Similarly, the voltage maintained within a house is nearly constant at 120 volts. The current over a power line, however, will vary considerably as power requirements change. This same situation occurs within a house. The electrical outlets in the home will all supply power at nearly 120 volts, but if no appliance is turned on, then no current flows. However, as refrigerators, lamps, and various appliances are turned on, more and more current flows to provide power. Thus, the current varies considerably depending upon the amount of power being used.

The electric field, which is proportional to voltage, will be nearly constant under a transmission line since the line is held at nearly constant voltage. On the other hand, the magnetic field, which is proportional to current, will vary greatly during the day as the power requirements on the transmission line vary. In discussing the magnetic field near a transmission line it is, therefore, important to distinguish the current that was used to determine the magnetic field level. In this report, discussion of magnetic fields will include reference to the associated current level.

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Appendix 6-K
Electric Field Data Sheets Cross Sections A1, A2, B, and C

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Electric Field Data,
Cross Sections A1 and A2
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE STUDY

LATERAL DISTANCE (feet)	Maximum Field, Cross Section Pre-RCEC (A1) (kV/m)	Maximum Field, Cross Section with RCEC (A2) (kV/m)
-100	0.014	0.330
-95	0.014	0.362
-90	0.015	0.398
-85	0.016	0.438
-80	0.017	0.482
-75	0.018	0.530
-70	0.018	0.582
-65	0.019	0.636
-60	0.019	0.691
-55	0.018	0.743
-50	0.017	0.785
-45	0.016	0.806
-40	0.016	0.789
-35	0.019	0.713
-30	0.031	0.562
-25	0.051	0.348
-20	0.081	0.165
-15	0.125	0.213
-10	0.186	0.285
-5	0.265	0.271
0	0.363	0.235
5	0.471	0.271
10	0.566	0.285
15	0.614	0.213
20	0.585	0.165
25	0.483	0.348
30	0.406	0.562
35	0.481	0.713
40	0.583	0.789
45	0.615	0.806
50	0.568	0.785
55	0.473	0.743
60	0.366	0.691
65	0.267	0.636
70	0.187	0.582
75	0.126	0.530
80	0.082	0.482
85	0.052	0.438
90	0.031	0.398
95	0.020	0.362
100	0.016	0.330

Electric Field Data,
Cross Section B
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE STUDY

LATERAL DISTANCE (feet)	Maximum Field, Cross Section Pre- and/or with RCEC (kV/m)
-100	0.063
-95	0.065
-90	0.066
-85	0.066
-80	0.065
-75	0.061
-70	0.054
-65	0.043
-60	0.029
-55	0.031
-50	0.073
-45	0.139
-40	0.234
-35	0.366
-30	0.539
-25	0.751
-20	0.989
-15	1.224
-10	1.416
-5	1.536
0	1.577
5	1.536
10	1.416
15	1.224
20	0.989
25	0.751
30	0.539
35	0.366
40	0.234
45	0.139
50	0.073
55	0.031
60	0.029
65	0.043
70	0.054
75	0.061
80	0.065
85	0.066
90	0.066
95	0.065
100	0.063

Electric Field Data,
Cross Section C
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE
STUDY

LATERAL DISTANCE (feet)	Maximum Field, Cross Section Pre- and/or with RCEC (kV/m)
-100	0.042
-95	0.037
-90	0.028
-85	0.019
-80	0.030
-75	0.060
-70	0.106
-65	0.170
-60	0.260
-55	0.382
-50	0.546
-45	0.761
-40	1.032
-35	1.356
-30	1.704
-25	2.014
-20	2.188
-15	2.132
-10	1.814
-5	1.330
0	0.996
5	1.330
10	1.814
15	2.132
20	2.188
25	2.014
30	1.704
35	1.356
40	1.032
45	0.761
50	0.546
55	0.382
60	0.260
65	0.170
70	0.106
75	0.060
80	0.030
85	0.019
90	0.028
95	0.037
100	0.042

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 6-L
Audible Noise Data Sheets
Cross Sections A1, A2, B, and C

May 2001

Russell City Energy Center AFC

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AUDIBLE NOISE DATA SHEETS
CROSS SECTIONS A1, A2, B AND C
FOR CALPINE/BECHTEL RCEC

Audible Noise Data,
Cross Sections A1 and A2
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE STUDY

LATERAL DISTANCE (feet)	L5 Rain, Cross Section Pre-RCEC (A1) (dB(A))	L5 Rain, Cross Section with RCEC (A2) (dB(A))
-100	41.6	45.0
-95	41.8	45.3
-90	41.9	45.5
-85	42.1	45.8
-80	42.4	46.1
-75	42.6	46.4
-70	42.8	46.7
-65	43.0	47.0
-60	43.3	47.3
-55	43.5	47.7
-50	43.7	48.1
-45	44.0	48.4
-40	44.3	48.8
-35	44.6	49.2
-30	44.9	49.5
-25	45.2	49.8
-20	45.5	50.0
-15	45.8	50.2
-10	46.2	50.4
-5	46.5	50.4
0	46.8	50.5
5	47.2	50.4
10	47.5	50.4
15	47.7	50.2
20	47.9	50.0
25	48.0	49.8
30	48.1	49.5
35	48.0	49.2
40	47.9	48.8
45	47.7	48.4
50	47.5	48.1
55	47.2	47.7
60	46.8	47.3
65	46.5	47.0
70	46.2	46.7
75	45.8	46.4
80	45.5	46.1
85	45.2	45.8
90	44.9	45.5
95	44.6	45.3
100	44.3	45.0

Audible Noise Data,
Cross Section B
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE
STUDY

LATERAL DISTANCE (feet)	L5 Rain, Cross Section Pre- and/or with RCEC (dB(A))
-100	41.5
-95	41.8
-90	42.0
-85	42.2
-80	42.5
-75	42.8
-70	43.0
-65	43.3
-60	43.6
-55	43.9
-50	44.3
-45	44.6
-40	44.9
-35	45.3
-30	45.6
-25	45.9
-20	46.2
-15	46.5
-10	46.7
-5	46.8
0	46.8
5	46.8
10	46.7
15	46.5
20	46.2
25	45.9
30	45.6
35	45.3
40	44.9
45	44.6
50	44.3
55	43.9
60	43.6
65	43.3
70	43.0
75	42.8
80	42.5
85	42.2
90	42.0
95	41.8
100	41.5

Audible Noise Data,
Cross Section C
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE
STUDY

LATERAL DISTANCE (feet)	L5 Rain, Cross Section Pre- and/or with RCEC (db(A))
-100	54.0
-95	54.2
-90	54.4
-85	54.6
-80	54.9
-75	55.1
-70	55.4
-65	55.7
-60	55.9
-55	56.2
-50	56.5
-45	56.8
-40	57.1
-35	57.4
-30	57.7
-25	58.0
-20	58.2
-15	58.4
-10	58.5
-5	58.5
0	58.6
5	58.5
10	58.5
15	58.4
20	58.2
25	58.0
30	57.7
35	57.4
40	57.1
45	56.8
50	56.5
55	56.2
60	55.9
65	55.7
70	55.4
75	55.1
80	54.9
85	54.6
90	54.4
95	54.2
100	54.0

Russell City Energy Center AFC

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Russell City Energy Center

Appendix 6-M
Magnetic Field Data Sheets
Cross Sections A1, A2, B, and C

May 2001

Russell City Energy Center AFC

May 2001

Magnetic Field Data,
Cross Sections A1 and A2
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE STUDY

LATERAL DISTANCE (feet)	RMS Resultant, Cross Section Pre-RCEC (A1) (mG)	RMS Resultant, Cross Section With RCEC (A2) (mG)
-100	0.27	9.09
-95	0.30	10.19
-90	0.34	11.47
-85	0.38	12.96
-80	0.42	14.70
-75	0.48	16.73
-70	0.54	19.09
-65	0.61	21.85
-60	0.70	25.05
-55	0.81	28.72
-50	0.94	32.89
-45	1.10	37.50
-40	1.29	42.40
-35	1.52	47.33
-30	1.82	51.91
-25	2.18	55.74
-20	2.63	58.63
-15	3.20	60.54
-10	3.91	61.57
-5	4.79	61.95
0	5.86	61.98
5	7.11	61.81
10	8.50	61.29
15	9.89	60.10
20	11.09	58.04
25	11.90	55.02
30	12.18	51.07
35	11.88	46.43
40	11.04	41.46
45	9.82	36.55
50	8.42	31.95
55	7.03	27.81
60	5.78	24.17
65	4.72	21.01
70	3.84	18.30
75	3.13	15.97
80	2.57	13.98
85	2.12	12.28
90	1.76	10.82
95	1.47	9.57
100	1.24	8.49

Magnetic Field Data,
Cross Section B
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE STUDY

LATERAL DISTANCE (feet)	RMS Resultant, Cross Section Pre-RCEC (mG)	RMS Resultant, Cross Section with RCEC (mG)
-100	0.89	4.98
-95	0.98	5.45
-90	1.07	5.99
-85	1.18	6.60
-80	1.31	7.32
-75	1.46	8.14
-70	1.63	9.09
-65	1.83	10.21
-60	2.06	11.51
-55	2.34	13.04
-50	2.66	14.84
-45	3.03	16.92
-40	3.46	19.34
-35	3.95	22.07
-30	4.49	25.07
-25	5.05	28.19
-20	5.58	31.16
-15	6.03	33.64
-10	6.33	35.33
-5	6.49	36.21
0	6.53	36.46
5	6.49	36.23
10	6.34	35.36
15	6.04	33.68
20	5.59	31.22
25	5.06	28.26
30	4.51	25.15
35	3.97	22.15
40	3.48	19.42
45	3.05	17.00
50	2.67	14.91
55	2.35	13.11
60	2.07	11.58
65	1.84	10.27
70	1.64	9.14
75	1.47	8.18
80	1.32	7.36
85	1.19	6.64
90	1.08	6.02
95	0.98	5.48
100	0.90	5.00

Magnetic Field Data,
Cross Section C
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE STUDY

LATERAL DISTANCE (feet)	RMS Resultant, Cross Section Pre-RCEC (mG)	RMS Resultant, Cross Section with RCEC (mG)
-100	9.69	6.10
-95	10.54	6.90
-90	11.50	7.84
-85	12.59	8.95
-80	13.82	10.28
-75	15.22	11.85
-70	16.81	13.75
-65	18.63	16.03
-60	20.70	18.79
-55	23.05	22.13
-50	25.71	26.19
-45	28.68	31.09
-40	31.93	36.95
-35	35.35	43.83
-30	38.74	51.63
-25	41.78	59.97
-20	44.13	68.12
-15	45.64	75.11
-10	46.60	80.17
-5	47.70	83.04
0	49.52	83.81
5	51.99	82.63
10	54.35	79.40
15	55.54	74.03
20	54.88	66.83
25	52.36	58.57
30	48.54	50.20
35	44.11	42.43
40	39.59	35.62
45	35.31	29.84
50	31.43	25.03
55	27.97	21.07
60	24.93	17.81
65	22.28	15.13
70	19.98	12.92
75	17.97	11.10
80	16.22	9.58
85	14.69	8.32
90	13.35	7.26
95	12.17	6.36
100	11.13	5.60

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 7-A
City of Hayward Will-Serve Letter

May 2001

Russell City Energy Center AFC

May 2001

CITY OF
HAYWARD
HEART OF THE BAY

May 4, 2001

Mr. William I. Toman
Development Manager
Calpine/Bechtel Joint Development
6700 Koll Center Parkway, Suite 320
Pleasanton, California 94566

Subject: Water Service to the Proposed Russell City Energy Center

Dear Mr. Toman:

The purpose of this letter is to indicate the City of Hayward's ("City") willingness to serve and to describe the general terms upon which the City would provide water service to the proposed 600 Megawatt Russell City Energy Center (RCEC).

Potable water

- The City will provide potable water for use at the site for domestic needs and as required to meet fire service needs for the RCEC. This service is to be provided on the same terms as service is provided for similar uses throughout the City. We anticipate providing a two-inch service connection and meter to provide domestic service to the site and a ten-inch unmetered connection with leak detector to provide fire flow capabilities.

Process and Cooling Water

- The City is prepared to serve the RCEC with recycled water derived from the effluent of the City's Water Pollution Control Facility (WPCF) in accordance with the following terms and conditions:

  - Calpine will construct and transfer to the City an advanced wastewater treatment (AWT) plant to provide high-quality recycled water for use at the RCEC. The AWT will be designed to mutually acceptable standards to provide approximately 4,000 acre-feet per year of desalinated tertiary effluent to the RCEC at peak flows of up to 4.17 million gallons per day (MGD).

OFFICE OF THE CITY MANAGER
777 B STREET, HAYWARD, CA 94541-5007
TEL: 510/583-4300 • FAX: 510/583-3601 • TDD: 510/247-3340

Mr. William Toman
Calpine/Bechtel Joint Development
May 4, 2001

- The treatment process used to produce the recycled water for the RCEC will produce waste streams that will be further treated prior to discharge from the WPCF. Therefore, the total flow of secondary effluent that will be utilized to produce the recycled peak flow of 4.17 MGD would be approximately 5.73 MGD. The City has sufficient effluent available to ensure the availability of adequate supplies to meet these requirements.

- The City will require Calpine/Bechtel to pay all costs for the AWT, including but not limited to construction, operation and maintenance.

- The City will take necessary steps to secure rights and construct facilities to obtain secondary effluent from the East Bay Dischargers Authority discharge system as a back-up supply of secondary effluent to supply the AWT during periods when maintenance or other outages of the WPCF make the source of supply unavailable. Calpine/Bechtel will pay all costs for this backup connection, including but not limited to construction, operation and maintenance.

The City's willingness to provide this service is dependant upon compliance with the provisions of the California Environmental Quality Act. The detailed commercial terms for operation and maintenance of the AWT plant will be established by a detailed service contract, to be negotiated in the future, which will be subject to approval of the Hayward City Council.

If you have questions or require further information please call me at 510-583-4305.

Sincerely,

Jesús Armas
City Manager

Russell City Energy Center

Appendix 7-B
MSDS Information

May 2001

Russell City Energy Center AFC

May 2001

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

73202 COOLING WATER DISPERSANT

Emergency Telephone Number
Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

SECTION 01 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

TRADE NAME: 73202 COOLING WATER DISPERSANT
DESCRIPTION: A modified polyacrylate

NFPA 704M/HMIS RATING: 1/1 HEALTH 1/1 FLAMMABILITY 0/0 REACTIVITY 0 OTHER
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 02 COMPOSITION AND INFORMATION ON INGREDIENTS

Our hazard evaluation of the ingredient(s) under OSHA's Hazard Communication Rule, 29 CFR 1910.1200 has found none of the ingredient(s) hazardous.

SECTION 03 HAZARD IDENTIFICATION

EMERGENCY OVERVIEW:
CAUTION: May cause irritation to skin and eyes. Avoid contact with skin, eyes and clothing. Do not take internally.

Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

PRIMARY ROUTE(S) OF EXPOSURE: Eye, Skin

EYE CONTACT: May cause irritation with prolonged contact.
SKIN CONTACT: May cause irritation with prolonged contact.

SYMPTOMS OF EXPOSURE: A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS: A review of available data does not identify any worsening of existing conditions.

SECTION 04 FIRST AID INFORMATION

EYES: Flush with water for 15 minutes. Call a physician.
SKIN: Flush with water for 15 minutes.
INGESTION: Do not induce vomiting. Give water. Call a physician.
INHALATION: Remove to fresh air. Treat symptoms. Call a physician.

NALCO CHEMICAL COMPANY ONE NALCO CENTER • NAPERVILLE, ILLINOIS 60563-1198
AREA (630) 305-1000

NOTE TO PHYSICIAN: Based on the individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical condition.

CAUTION: If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.

SECTION 05 FIRE FIGHTING MEASURES

FLASH POINT: None (PMCC) ASTM D-93

EXTINGUISHING MEDIA: This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use water to cool containers exposed to fire.

UNUSUAL FIRE AND EXPLOSION HAZARD: May evolve NOx or SOx under fire conditions.

SECTION 06 ACCIDENTAL RELEASE MEASURES

IN CASE OF TRANSPORTATION ACCIDENTS, CALL THE FOLLOWING 24-HOUR TELEPHONE NUMBER (800) I-M-ALERT or (800) 462-5378.

SPILL CONTROL AND RECOVERY:

Small liquid spills: Contain with absorbent material, such as clay, soil or any commercially available absorbent. Shovel reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to CERCLA in Section 15.

Large liquid spills: Dike to prevent further movement and reclaim into recovery or salvage drums or tank truck for disposal. Refer to CERCLA in Section 15.

SECTION 07 HANDLING AND STORAGE

Storage : Keep container closed when not in use.

SECTION 08 EXPOSURE CONTROLS AND PERSONAL PROTECTION

RESPIRATORY PROTECTION: Respiratory protection is not normally needed. If significant mists or aerosols are generated, wear a NIOSH approved or equivalent respirator.

For large spills, entry into large tanks, vessels or enclosed small spaces with
inadequate ventilation, a positive pressure, self-contained breathing apparatus
is recommended.

VENTILATION: General ventilation is recommended.

PROTECTIVE EQUIPMENT: Wear impermeable gloves, boots, aprons or a slicker suit
to avoid skin contact. Chemical goggles and face shield are also recommended. Examples of impermeable gloves available on the market are neoprene, nitrile, PVC, and natural rubber (compatibility studies have not been performed).

The availability of an eye wash fountain and safety shower is recommended.

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

SECTION 09 PHYSICAL AND CHEMICAL PROPERTIES

COLOR:	Clear to hazy, colorless to brown	
FORM:	Liquid	
SPECIFIC GRAVITY:	1.27 @ 71 Degrees F	ASTM D-1298
pH (NEAT) =	4.5-6.0	ASTM E-70
VISCOSITY:	570 cps @ 71 Degrees F	ASTM D-2983
FREEZE POINT:	13 Degrees F	ASTM D-1177
POUR POINT:	15 Degrees F	ASTM D-97
BOILING POINT:	212 Degrees F @ 760 mm Hg	ASTM D-86
FLASH POINT:	None (PMCC)	ASTM D-93

NOTE: These physical properties are typical values for this product.

SECTION 10 STABLILITY AND REACTIVITY

INCOMPATIBILITY: None known

THERMAL DECOMPOSITION PRODUCTS: In the event of combustion CO, CO2, NOx, SOx may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

SECTION 11 TOXICOLOGICAL INFORMATION

TOXICITY STUDIES: Toxicity studies have not been conducted on this product, but studies have been conducted on a similar product. The results are shown below.

ACUTE ORAL TOXICITY (ALBINO RATS): LD50 = Greater than 5,000 mg/kg
Toxicity Rating: No appreciable toxicity

PRIMARY SKIN IRRITATION TEST (ALBINO RABBITS):
SKIN IRRITATION INDEX DRAIZE RATING: 0.0/8.0 Non-irritating

PRIMARY EYE IRRITATION TEST (ALBINO RABBITS):
EYE IRRITATION INDEX DRAIZE RATING: 4.7/110.0 Minimally irritating
COMMENTS: Slight conjunctivitis was apparent one hour.

SECTION 12 ECOLOGICAL INFORMATION

AQUATIC DATA:

Results below are based on a similar product.

96 hour static acute LC50 to Bluegill Sunfish = Greater than 1,000 ppm

96 hour no observed effect concentration is 1000 ppm based on no mortality or abnormal effects.

TOXICITY RATING: No appreciable toxicity

96 hour static acute LC50 to Rainbow Trout = Greater than 1,000 ppm

96 hour no observed effect concentration is 560 ppm based on no mortality or abnormal effects.

TOXICITY RATING: No appreciable toxicity

OTHER STUDIES:
48 hour static acute LC50 to Daphnia Magna = Greater than 1,000 ppm

48 hour no observed effect concentration is 180 ppm based on no mortality or abnormal effects.

TOXICITY RATING: No appreciable toxicity

If released into the environment, see CERCLA in Section 15.

SECTION 13 DISPOSAL CONSIDERATIONS

DISPOSAL: If this product becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous liquid waste, it should be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no free liquid remains before disposal to an industrial waste landfill. A non-hazardous liquid waste can also be incinerated in accordance with local, state and federal regulations.

SECTION 14 TRANSPORTATION INFORMATION

PROPER SHIPPING NAME/HAZARD CLASS MAY VARY BY PACKAGING, PROPERTIES, AND MODE OF TRANSPORTATION. TYPICAL PROPER SHIPPING NAMES FOR THIS PRODUCT ARE:

ALL TRANSPORTATION MODES : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

SECTION 15 REGULATORY INFORMATION

The following regulations apply to this product.

FEDERAL REGULATIONS:

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:
Based on our hazard evaluation, none of the ingredients in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302:
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312 AND 313:

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355):
This product does not contain ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 and 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370):
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372):
This product does not contain ingredients on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA):
The chemical ingredients in this product are on the 8 (b) Inventory List (40 CFR 710).

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261 SUBPART C & D:
Consult Section 13 for RCRA classification.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15/ formerly Sec. 307, 40 CFR 116/formerly Sec. 311:
None of the ingredients are specifically listed.

CLEAN AIR ACT, Sec. 111 (40 CFR 60), Sec. 112 (40 CFR 61, 1990 Amendments),

Sec. 611 (40 CFR 82, CLASS I and II Ozone depleting substances):
This product does not contain ingredients covered by the Clean Air Act.

STATE REGULATIONS:

CALIFORNIA PROPOSITION 65:
This product does not contain any chemicals which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS:
This product does not contain ingredients listed on the Michigan Critical Materials Register.

STATE RIGHT TO KNOW LAWS:
This product does not contain ingredients listed by State Right To Know Laws.

INTERNATIONAL REGULATIONS:

This is not a WHMIS controlled product under The House of Commons of Canada Bill C-70.

SECTION 16 OTHER INFORMATION

Nalco internal number F105466

SECTION 17 USER'S RESPONSIBILITY

Our Risk Characterization is being determined.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

SECTION 18 REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (CD-ROM version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (CD-ROM version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, Ohio (CD-ROM version), Micromedex, Inc., Englewood, CO.

Shepard's Catalog of Teratogenic Agents (CD-ROM version), Micromedex, Inc., Englewood, CO.

Suspect Chemicals Sourcebook (a guide to industrial chemicals covered under major regulatory and advisory programs), Roytech Publications (a Division of Ariel Corporation), Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, Washington (CD-ROM version), Micromedex, Inc., Englewood, CO.

PREPARED BY: William S. Utley, PhD., DABT, Manager, Product Safety
DATE CHANGED: 11/03/1998 DATE PRINTED: 03/28/1999

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

73202 COOLING WATER DISPERSANT

Emergency Telephone Number
Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

NALCO CHEMICAL COMPANY ONE NALCO CENTER • NAPERVILLE, ILLINOIS 60563-1198
AREA (630) 305-1000

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 73132

EMERGENCY TELEPHONE NUMBER

(800)462-5378 (24 Hours) (800) I-M-ALERT

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO 73132**

APPLICATION : CORROSION INHIBITOR

CHEMICAL DESCRIPTION : Water, Phosphate

COMPANY IDENTIFICATION : Nalco Chemical Company
One Nalco Center
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER : (800)462-5378 (24 Hours) (800) I-M-ALERT

NFPA 704M/HMIS RATING
HEALTH : 0 / 1 FLAMMABILITY : 0 / 0 REACTIVITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous.

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

CAUTION
May cause irritation with prolonged contact.
Do not get in eyes, on skin, on clothing. Do not take internally. Wear suitable protective clothing. Keep container tightly closed. Flush affected area with water.
May evolve oxides of phosphorus (POx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause irritation with prolonged contact.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : > 200 °F / > 93 °C (PMCC)

EXTINGUISHING MEDIA :
Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of phosphorus (POx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Do not touch spilled material. Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by dyking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Avoid eye and skin contact. Do not take internally. Ensure all containers are labelled. Keep the containers closed when not in use.

STORAGE CONDITIONS :
Store the containers tightly closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :
General ventilation is recommended.

RESPIRATORY PROTECTION :
Respiratory protection is not normally needed.

HAND PROTECTION :
Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Colorless
ODOR	
SPECIFIC GRAVITY	1.63 @ 70 °F / 21 °C
DENSITY	13.6 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	12.4
FREEZING POINT	< -50 °F /

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Freezing temperatures

MATERIALS TO AVOID :
None known.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of phosphorus

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Low
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, the presence of the following substances may cause the product to be classified as a hazardous waste by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

Proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are:

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

IMDG Page :
Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, none of the substances in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The chemical substances in this product are on the TSCA 8(b) Inventory (40 CFR 710).

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
None of the substances are specifically listed in the regulation.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
Not considered a WHMIS controlled product.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
All substances in this product are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

Nalco F105525

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposuresof this product. Based on our recommended use of this product, we have characterized the product's general risk. This informationshould provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, Co.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO

Prepared By : Product Safety Department
Date issued : 11/29/1999
Replaces : 12/22/1998

CHEMPAK INDUSTRIES -- SODIUM HYPOCHLORITE AQUEOUS SOLUTION 10%
MATERIAL SAFETY DATA SHEET
NSN: 681000F052486
Manufacturer's CAGE: 0YS14
Part No. Indicator: A
Part Number/Trade Name: SODIUM HYPOCHLORITE AQUEOUS SOLUTION 10%

General Information

Company's Name: CHEMPAK INDUSTRIES INC
Company's Street: 4941 E 39TH AVE
Company's City: DENVER
Company's State: CO
Company's Country: US
Company's Zip Code: 80207-1089
Company's Emerg Ph #: 303-399-1240
Company's Info Ph #: 303-399-1240
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SE
Date MSDS Prepared: 01APR92
Safety Data Review Date: 29JAN97
Preparer's Company: CHEMPAK INDUSTRIES INC
Preparer's St Or P. O. Box: 4941 E 39TH AVE
Preparer's City: DENVER
Preparer's State: CO
Preparer's Zip Code: 80207-1089
MSDS Serial Number: CDBRX

Ingredients/Identity Information

Proprietary: NO
Ingredient: SODIUM HYPOCHLORITE, HYPOCHLOROUS ACID SODIUM SALT
Ingredient Sequence Number: 01
Percent: 10-12
NIOSH (RTECS) Number: NH3486300
CAS Number: 7681-52-9

Proprietary: NO
Ingredient: SODIUM HYDROXIDE, CAUSTIC SODA, LYE *96-4*
Ingredient Sequence Number: 02
Percent: 1-2
NIOSH (RTECS) Number: WB4900000
CAS Number: 1310-73-2

OSHA PEL: 2 MG/CUM
ACGIH TLV: 2 MG/CUM CEILING
Other Recommended Limit: 2MG/M3 CEILING NIOSH

Proprietary: NO
Ingredient: WATER
Ingredient Sequence Number: 03
Percent: 86-89
NIOSH (RTECS) Number: ZC0110000
CAS Number: 7732-18-5

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, PALE YELLOW/GREENISH LIQUID W/A CHLORINE ODOR
Boiling Point: 230F
Vapor Pressure (MM Hg/70 F): 17.5
Specific Gravity: 1.15
Solubility In Water: 100%/WT
pH: (SUPP)

Fire and Explosion Hazard Data

Extinguishing Media: WATER SPRAY, FOG, FOAM, DRY CHEMICAL, CO2/AGENTS
SUITABLE FOR MATERIALS IN SURROUNDING FIRE.
Special Fire Fighting Proc: USE WATER SPRAY TO COOL EXPOSED CONTAINERS/
DILUTE LIQUID & CONTROL VAPORS. USE SCBA & FULL PROTECTIVE EQUIPMENT. AVOID
RUNOFF, DON'T RELEASE TO SEWERS/WATERWAYS
Unusual Fire And Expl Hazrds: SODIUM HYPOCHLORITE SOLUTIONS DECOMPOSE W/
HEAT & CAUSE CONTAINERS TO RUPTURE/EXPLODE. VIGOROUS REACTION W/ORGANIC
MATERIALS/OXIDIZING AGENTS, RESULTING IN FIRE.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): HEAT, LIGHT
Materials To Avoid: STRONG OXIDIZER/CONTAMINATION BY METALS/INCOMP

ATIBLE
W/AMMONIA/UREA/OXIDIZABLE MATERIALS/CHLORINE/LIBERATING ACIDS.(SUP
P
Hazardous Decomp Products: THERMAL: SODIUM HYPOCHLORITE, SODIUM OX
IDE &
CHLORINE.
Hazardous Poly Occur: NO

Health Hazard Data

LD50-LC50 Mixture: ORAL LD50(RAT): 8910 MG/KG PENTAHYDRATE
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: INHALATION: CORROSIVE, SEVERE RESPIR
ATORY
TRACT IRRITATION & PULMONARY EDEMA. SKIN: CORROSIVE, IRRITATION &
BURNS.
EYES: CORROSIVE, SEVERE IRRITATION & BURNS. INGESTION: INFLAMMATIO
N OF THE
MOUTH & DIGESTIVE SYSTEM, BURNS.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: IRRITATION, BURNS, PAIN, INFLAMMATION,
PERFORATION OF THE ESOPHAGUS & STOMACH, VOMITING, CIRCULATORY COLL
APSE,
CONFUSION, DELIRIUM, COMA, ABDOMINAL DISTRESS.
Emergency/First Aid Proc: EYES: FLUSH W/A STREAM OF WATER FOR 15 M
INS.
WASH W/IN 1 MIN TO ACHIEVE MAXIMUM EFFECTIVENESS. SKIN: FLUSH W/CO
OL WATER
& CONTINUE FOR 15 MINS. INHALATION: REMOVE TO FRESH AIR. GIVE OXYG
EN BY
TRAINED PERSONNEL/GIVE MOUTH TO MOUTH RESUSCITATION. INGESTION: NE
VER GIVE
ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. DON'T INDUCE VOMITING.
IF
CONSCIOUS, GIVE LARGE AMOUNTS OF MILK, GELATIN/WATER. (SEE SUPP

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: NOTIFY SAFETY PERSONNEL & USE ADEQUA

TE
VENTILATION. USE PROTECTION WHEN CLEANING. USE NONCOMBUSTIBLE ABSO
RBENT.
DON'T USE SAWDUST. LARGE: DIKE & CONTAIN. NEUTRALIZE W/REDUCING AG
ENTS.
DILUTE W/COPIOUS AMOUNTS OF WATER. DON'T FLUSH TO SEWERS/WATERWAYS
Neutralizing Agent: REDUCING AGENTS.
Waste Disposal Method: DISPOSE OF IAW/FEDERAL, STATE & LOCAL REGUL
ATIONS.
CORROSIVE UN1791.
Precautions-Handling/Storing: DON'T STORE ADJACENT TO CHEMICALS TH
AT MAY
REACT IF SPILLAGE OCCURS. COMPLY W/DOT REGULATIONS WHEN SHIPPED. D
ON'T
REUSE CONTAINERS.
Other Precautions: IF CLOSED CONTAINERS BECOME HEATED, VENT TO REL
EASE
DECOMPOSITION PRODUCTS. DON'T MIX/CONTAMINATE W/AMMONIA, HYDROCARB
ONS,
ACIDS, ALCOHOLS/ETHERS. PRODUCT RESIDUES MAY REMAIN IN CONTAINERS.
 OBSERVE
LABEL PRECAUTIONS; DISPOSE OF CONTAINER.
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Control Measures

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Respiratory Protection: NIOSH/MSHA APPROVED RESPIRATORS SHOULD BE
USED
WHERE AIRBORNE CONTAMINATES MAY OCCUR. FOR EMERGENCY & NON-ROUTINE
OPERATIONS WEAR SCBA. WARNING: AIR PURIFYING RESPIRATORS DON'T PRO
VIDE
PROTECTION IN OXYGEN DEFICIENT ATMOSPHERES.
Ventilation: GOOD GENERAL ROOM/LOCAL EXHAUST AT POINTS OF EMISSION
.
Protective Gloves: IMPERVIOUS/RUBBER/NEOPRENE/VINYL
Eye Protection: CHEMICAL SAFETY GOGGLES
Other Protective Equipment: W/FULL FACE SHIELD, IMPERVIOUS PROTECT
IVE
CLOTHING, RUBBER SAFETY SHOES, EYEWASH & SAFETY/QUICK DRENCH SHOWE
RS.
Work Hygienic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFO
RE
REUSE.
Suppl. Safety & Health Data: PH: 11.5-13. MATERIALS: OXYGEN/METALS
/
NICKEL/COPPER/TIN/MANGANESE & IRON. FIRST AID: IF VOMITING OCCURS,
 KEEP

AIRWAY CLEAR & GIVE MORE MILK, GELATIN SOLUTION/WATER. AVOID VOMIT
ING,
LAVAGE/ACIDIC ANTIDOTES.

Transportation Data

Disposal Data

Label Data

ASHLAND CHEMICAL IC & S DIV -- SULFURIC ACID 93% - SULFURIC ACID, TECHNICAL
MATERIAL SAFETY DATA SHEET
NSN: 6810003687991
Manufacturer's CAGE: 5A188
Part No. Indicator: A
Part Number/Trade Name: SULFURIC ACID 93%

General Information

Item Name: SULFURIC ACID, TECHNICAL
Company's Name: ASHLAND CHEMICAL CO IC AND S DIV
Company's Street: 5200 BLAZER PKY
Company's City: DUBLIN
Company's State: OH
Company's Country: US
Company's Zip Code: 43017
Company's Emerg Ph #: 614-889-3844
Company's Info Ph #: 614-889-3844
Record No. For Safety Entry: 002
Tot Safety Entries This Stk#: 003
Status: SE
Date MSDS Prepared: 05JAN95
Safety Data Review Date: 10OCT96
Supply Item Manager: CX
MSDS Preparer's Name: UNKNOWN
MSDS Serial Number: CBRZC
Specification Number: 0-S-809
Spec Type, Grade, Class: TYPE I CLASS 2
Hazard Characteristic Code: C1
Unit Of Issue: DR
Unit Of Issue Container Qty: 15 GALLONS
Type Of Container: 6HA1 DRUM
Net Unit Weight: 229.6 LBS

Ingredients/Identity Information

Proprietary: NO
Ingredient: SULFURIC ACID (SARA 302/313) (CERCLA)
Ingredient Sequence Number: 01
Percent: 93
NIOSH (RTECS) Number: WS5600000
CAS Number: 7664-93-9
OSHA PEL: 1 MG/M3

ACGIH TLV: 1 MG/M3/3 STEL; 9596
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: WATER
Ingredient Sequence Number: 02
Percent: 4.8-9
NIOSH (RTECS) Number: ZC0110000
CAS Number: 7732-18-5
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

Appearance And Odor: CLEAR & SYRUPY LIQUID.
Boiling Point: 212F,100C
Melting Point: UNKNOWN
Vapor Pressure (MM Hg/70 F): 17.5
Vapor Density (Air=1): UNKNOWN
Specific Gravity: 1.837
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: <1 (ETHYL ETHER=1)
Solubility In Water: COMPLETE
Percent Volatiles By Volume: 5-10
Viscosity: UNKNOWN
Corrosion Rate (IPY): UNKNOWN

Fire and Explosion Hazard Data

Flash Point: NOT APPLICABLE
Extinguishing Media: DRY CHEMICAL.
Special Fire Fighting Proc: WEAR SELF-CONTAINED BREATHING APPARATUS AND
FULL FIRE FIGHTER'S PROTECTIVE GEAR/CHEMICAL PROTECTIVE GEAR. USE WATER TO
COOL FIRE EXPOSED CONTAINERS.
Unusual Fire And Expl Hazrds: NEVER USE WELDING OR CUTTING TORCH ON OR
NEAR DRUM (EVEN EMPTY) BECAUSE PRODUCT (EVEN RESIDUE) CAN IGNITE EXPLOSIVELY.

Reactivity Data

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Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: STRONG ALKALIS, METALS (RELEASES FLAMMABLE/EXP
LOSIVE
HYDROGEN GAS).
Hazardous Decomp Products: ACID VAPORS.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): PRODUCT WILL NOT UNDERGO HAZARDOUS
POLYMERIZATION.
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Health Hazard Data

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LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: INHALATION OF VAPOR/MIST MAY CAUSE S
EVERE
IRRITATION & BURNS TO NOSE,THROAT & RESPIRATORY TRACT.INGESTION MA
Y BE
FATAL OR HARMFUL;CAUSES SEVERE STOMACH & INTESTINAL IRRITATION.EXP
OSURE MAY
CAUSE IRREVERSIBLE DAMAGE TO SKIN & EYES.PROLONGED EXPOSURE TO STR
ONG-
INORGANIC MISTS OF SULFURIC ACID MAY CAUSE CANCER.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: IARC LISTS STRONG-INORGANIC-ACXID MIS
TS
CONTAINING SULFURIC ACID AS A SUSPECTED (2A) CARCINOGEN.
Signs/Symptoms Of Overexp: INHALED-SEVERE IRRITATION & BURNS TO NO
SE,
THROAT,RESPIRATORY TRACT.EYES-STINGING,TEARING,REDNESS,SWELLING,CO
RNEAL
DAMAGE,BLINDNESS.SKIN-REDNESS,SWELLING,BURNS,SEVERE SKIN DAMAGE.IN
GESTED-
NAUSEA,VOMITING,DIARRHEA,ABDOMINAL PAIN,VOMITING OF BLOOD,BURNS/TI
SSUE
DESTRUCTION IN MOUTH/THROAT/DIGESTIVE TRACT,LOW BLOOD PRESSURE
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES-IMMEDIATELY FLUSH WITH WATER FOR 15
MINUTES, HOLD LIDS APART. SEEK MEDICAL ATTN. SKIN-REMOVE CONTAMINA
TED

CLOTHES. FLUSH WITH LOTS OF WATER. SEEK MEDICAL ATTN. INHALED-REMO
VE TO
FRESH AIR. ADMINISTER OXYGEN OR ARTIFICIAL RESPIRATION AS NEEDED.
SEEK
MEDICAL ATTN. INGESTED-DO NOT INDUCE VOMITING! SEEK IMMEDIATE MEDI
CAL ATTN.
IF CONSCIOUS, RINSE MOUTH & GIVE WATER OR MILK TO DRINK.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: COVER WITH SODIUM BICARBONATE OR SOD
A ASH/
FLAKED LIME MIXTURE (50-50). MIX AND ADD WATER IF NEEDED. SCOOP UP
SLURRY
AND WASH SITE WITH SODA ASH SOLUTION. PROPER MIXING PROCEDURES ARE
ESSENTIAL. ONLY TRAINED PERSONNEL SHOULD PERFORM THIS TASK.
Neutralizing Agent: SODIUM BICARBONATE OR SODA ASH/FLAKED LIME MIX
TURE.
Waste Disposal Method: DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE
AND
FEDERAL ENVIRONMENTAL REGULATIONS.
Precautions-Handling/Storing: STORE IN A COOL, DRY PLACE AWAY FROM
INCOMPATIBLE MATERIALS.
Other Precautions: CONTAINERS OF THIS PRODUCT MAY BE HAZARDOUS WHE
N
EMPTIED. SINCE EMPTYS MAY CONTAIN RESIDUE, ALL HAZARD PRECAUTIONS
MUST BE
OBSERVED. ADDITION OF WATER RELEASES HEAT WHICH CAN CAUSE VIOLENT
BOILING &
SPUTTERING. ADD SLOWLY & IN SMALL AMOUNTS

Control Measures

Respiratory Protection: IF ENGINEERING CONTROLS FAIL OR NON-ROUTIN
E USE OR
AN EMERGENCY OCCURS; WEAR AN MSHA/NIOSH APPROVED RESPIRATOR WITH A
CID MIST
CARTRIDGE OR AN AIR-SUPPLIED RESPIRATOR OR SCBA, AS REQUIRED. USE
IAW 29
CFR 1910.134.
Ventilation: USE ADEQUATE MECHANICAL VENTILATION OR LOCAL EXHAUST
TO
MAINTAIN EXPOSURE BELOW TLV(S).
Protective Gloves: NEOPRENE, PVC.

Eye Protection: SAFETY GLASSES/CHEMICAL SPLASH GOGGLES.
Other Protective Equipment: NONE SPECIFIED BY MANUFACTURER. DLA-HM IS: EYE
WASH STATION & SAFETY SHOWER AVAILABLE.
Work Hygienic Practices: WASH HANDS AFTER HANDLING AND BEFORE EATI NG,
DRINKING, OR SMOKING. LAUNDER CONTAMINATED CLOTHES BEFORE REUSE.
Suppl. Safety & Health Data: MSDS PRESENTED BY CAGE 5A188 FOR CONT RACT
NUMBER SP0450-96-ML905.

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Transportation Data

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Trans Data Review Date: 96284
DOT PSN Code: NUC
DOT Proper Shipping Name: SULFURIC ACID
DOT Class: 8
DOT ID Number: UN1830
DOT Pack Group: II
DOT Label: CORROSIVE
IMO PSN Code: OFJ
IMO Proper Shipping Name: SULPHURIC ACID
IMO Regulations Page Number: 8230
IMO UN Number: 1830
IMO UN Class: 8
IMO Subsidiary Risk Label: -
IATA PSN Code: XIX
IATA UN ID Number: 1830
IATA Proper Shipping Name: SULPHURIC ACID
IATA UN Class: 8
IATA Label: CORROSIVE
AFI PSN Code: XIX
AFI Prop. Shipping Name: SULPHURIC ACID
AFI Class: 8
AFI ID Number: UN1830
AFI Pack Group: II
AFI Special Prov: A3,A7,N34
AFI Basic Pac Ref: A12.3
Additional Trans Data: PER SAMMS CTDF: CONTAINER SHALL CONFORM TO A UN
CERTIFIED 6HA1 COMPOSITE PACKAGE. PLASTIC RECEPTICLE WITH OUTER SH ELL STEEL
DRUM. MARK IAW ALL UN REQUIREMENTS. DRUM CERTIFICATION SHALL BE EM BOSSED.

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Disposal Data

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Label Data

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Label Required: YES
Technical Review Date: 10OCT96
Label Status: F
Common Name: SULFURIC ACID 93%
Signal Word: DANGER!
Acute Health Hazard-Moderate: X
Contact Hazard-Severe: X
Fire Hazard-None: X
Reactivity Hazard-Slight: X
Special Hazard Precautions: CORROSIVE!INHALATION OF VAPOR/MIST MAY CAUSE
SEVERE IRRITATION/BURNS TO NOSE/THROAT/RESPIRATORY TRACT.INGESTION MAY BE
FATAL/HARMFUL;CAUSES SEVERE STOMACH IRRITATION.MAY CAUSE DAMAGE TO SKIN &
EYES.PROLONGED EXPOSURE MISTS OF SULFURIC ACID MAY CAUSE CANCER.TARGET
ORGANS:SKIN,EYES,LUNGS.1ST AID:EYES-FLUSH WITH WATER FOR 15 MINUTES,HOLD
LIDS APART.SEEK MEDICAL ATTN.SKIN-REMOVE CONTAMINATED CLOTHES.FLUSH WITH
LOTS OF WATER.SEEK MEDICAL ATTN.INHALED-REMOVE TO FRESH AIR.GIVE OXYGEN OR
ARTIFICIAL RESPIRATION AS NEEDED.SEEK MEDICAL ATTN.INGESTED-DO NOT INDUCE
VOMITING!SEEK IMMEDIATE MEDICAL ATTN.IF CONSCIOUS,RINSE MOUTH & GIVE WATER
OR MILK TO DRINK
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: ASHLAND CHEMICAL CO IC AND S DIV
Label Street: 5200 BLAZER PKY
Label City: DUBLIN
Label State: OH
Label Zip Code: 43017
Label Country: US
Label Emergency Number: 614-889-3844
Year Procured: 1996

Russell City Energy Center

Appendix 8.1-A
Detailed Emissions Calculations

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Table 8.1A-1a. Summary of startup emissions data - pounds per hour.

Project	Notes	POC	CO	NO_x	SO_x	PM_{10}
Crockett Cogeneration						
6/96 avg.	Source Tests[a]	54	46	59	-	-
6/97 avg.		<1	31	41	-	-
min run		<1	27	9	-	-
max run		59	49	95	-	-
Crockett Cogeneration	FDOC[b]	170	385	160	-	-
SF Energy	FDOC	299	437	77	-	-
Sutter						
Cold Start	From	-	838	175	-	-
Hot Start	Westinghouse	-	902	170	-	-
Sutter						
Cold Start	FDOC[c]	1.1	838	175	2.7	9.0
Hot Start		1.1	902	170	2.7	9.0
Westinghouse						
Cold Start	[d]	292	1722	183	3	28
Warm Start		296	1625	221	3	25
Hot Start		442	2142	217	4	33
Bechtel - DEC						
Cold Start	From	437	3317	168	-	7
Hot Start	Westinghouse [e]	520	7343	189	-	8
Used in RCEC AFC						
Cold Start	[f]	16	838	80	1.4	9
Hot Start		16	902	80	1.4	9

Notes:
[a]Minimum and maximum values are based on the six individual runs that comprise the two sets of tests.
[b]Permit conditions have not been carried forward into the permit to operate, and are no longer in effect.
[c]Values shown are from the engineering analysis; there are no proposed permit conditions for startup emissions limits in the proposed FDOC.
[d] Westinghouse provided data for the DEC plant (3 turbines) on a lbs/start basis. The above lbs/hr values were calculated assuming a 3 hour starting period per turbine for a cold start; 2 hours for a warm start; and 1 hour for a hot start. Data do not reflect the performance of oxidation catalysts or CO catalysts.
[e]Bechtel estimates are 140 minutes for cold start for first engine; 40 minutes for cold start for second and third engines; and 30 minutes for hot start for each engine.
[f]POC values are two times full load emission rates. CO values are equivalent to values proposed for Sutter project. NO_x values are 30 percent higher than the higher of the two Crockett test averages, rounded up to the nearest 5 lbs/hr. SO_x and PM_{10} values are the full load emission rates.

Table 8.1A-1b. Summary of Startup Emissions Data - pounds per start per turbine.

Project	Notes	POC	CO	NO_x	SO_x	PM_{10}
Crockett Cogeneration						
6/96 avg.	Source Tests[a]	71	62	79	-	-
6/97 avg.		1	41	54	-	-
min run		<1	36	12	-	-
max run		79	66	127	-	-
Crockett Cogeneration	FDOC[b]	340	770	320	-	-
SF Energy	FDOC[c]	299	437	77	-	-
Sutter						
Cold Start	From	-	611	2932	-	-
Hot Start	Westinghouse	-	339	1804	-	-
Sutter						
Cold Start	Proposed	3	2514	525	8	27
Hot Start	FDOC[d]	1	902	170	3	9
Westinghouse						
Cold Start	[e]	875	5167	550	8	83
Warm Start		592	3250	442	5	50
Hot Start		442	2142	217	4	33
Bechtel - DEC						
Cold Start	From	1019	7740	391	-	17
Hot Start	Westinghouse	520	3671	189	-	4
Used in RCEC AFC						
Cold Start	[f]	48	2514	240	4.2	27
Hot Start		16	902	80	1.4	9

Notes:
[a]Data extrapolated from reported hourly values by ratio of 80/60.
[b]Values based on maximum two hours per startup.
[c]Values based on maximum one hour per startup.
[d]Values based on maximum three hours per cold start, one hour per hot start.
[e]Westinghouse provided data for the DEC plant (3 turbines). Data do not reflect the performance of oxidation catalysts or CO catalysts.
[f]Based on maximum three hours per cold start, one hour per hot start.

Table 8.1A-2. Detailed calculations for maximum hourly, daily, and annual criteria pollutant emissions.

Maximum Hourly, Daily and Annual Emissions	Base Load			Cold Start		Hot Start		NOx			SO2
	max. hour	hrs/day	hrs/yr	hrs/day	hrs/yr	hrs/day	hrs/yr	Base Load lb/hr	Cold Start lb/hr	Hot Start lb/hr	lb/hr
Turbine 1, no DB	1	4	6844	3	156	1	260	19.5	80	80	1.40
Turbine 2, no DB	0	2	6844	3	156	1	260	19.5	80	80	1.40
Turbine 1, w/ DB&PA	0	16	1500	0	0	0	0	21.4	0	0	1.50
Turbine 2, w/ DB&PA	1	16	1500	0	0	0	0	21.4	0	0	1.50
Emergency generator	1	1	200	0	0	0	0	1.77	0	0	0.004
Fire pump engine	1	1	30	0	0	0	0	3.90	0	0	0.106
Cooling tower	1	24	8760	0	0	0	0	0	0	0	0

	CO			POC			
	Base Load lb/hr	Cold Start lb/hr	Hot Start lb/hr	Base Load lb/hr	Cold Start lb/hr	Hot Start lb/hr	PM10 lb/hr
Turbine 1, no DB	28.8	838.0	902.0	2.6	16.0	16.0	9.0
Turbine 2, no DB	28.8	838.0	902.0	2.6	16.0	16.0	9.0
Turbine 1, w/ DB&PA	31.7	0	0	2.8	0.0	0.0	12.0
Turbine 2, w/ DB&PA	31.7	0	0	2.8	0.0	0.0	12.0
Emergency generator	3.02	0	0	1.42	0.0	0.0	0.0006
Fire pump engine	2.35	0	0	0.48	0.0	0.0	0.13
Cooling tower	0	0	0	0.0	0.0	0.0	0.69

	NOx			SO2			CO			POC			PM10		
	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy
Turbine 1, no DB	80.0	398.0	83.4	1.4	11.2	5.1	902.0	3,531.2	281.2	16.0	74.2	12.1	9.0	72.0	32.7
Turbine 2, no DB	0.0	359.0	83.4	0.0	8.4	5.1	0.0	3,473.6	281.2	0.0	69.1	12.1	0.0	54.0	32.7
Turbine 1, w/ DB	0.0	342.4	16.1	0.0	24.0	1.1	0.0	507.2	23.8	0.0	44.8	2.1	0.0	192.0	9.0
Turbine 2, w/ DB	21.4	342.4	16.1	1.5	24.0	1.1	31.7	507.2	23.8	2.8	44.8	2.1	12.0	192.0	9.0
Emergency generator	0.0	0.0	0.18	0.0	0.0	0.0004	3.0	3.0	0.3	1.4	1.4	0.142	0.0	0.0	0.0001
Fire pump engine	3.9000	3.9000	0.0585	0.1060	0.1060	0.0016	0.0000	0.0000	0.0353	0.0000	0.0000	0.0072	0.0000	0.0000	0.0019
Cooling tower	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	16.4	3.0
Total	105.3 lb/hr	1445.7 lb/day	134.6 tpy	3.0 lb/hr	67.7 lb/day	12.4 tpy	936.7 lb/hr	8,022.2 lb/day	610.2 tpy	20.2 lb/hr	234.3 lb/day	28.5 tpy	21.7 lb/hr	526.4 lb/day	86.3 tpy

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NOTES FOR TABLE 8.1A-2

Calculation of Maximum Hourly, Daily and Annual Emissions

Calculation of Maximum Hourly Emissions

a. Turbines/HRSGs

As hourly NO_x, CO and POC emissions from the turbines are higher during startup than during full load operation, highest hourly emissions occur while one turbine is in startup mode. Except for startup, maximum hourly emissions from the turbines occur while operating at full load and 94 degF with power augmentation and duct firing. Emissions under this operating mode are higher than under part load or low temperature operations as the duct burner operates only at full load and high temperature conditions. Emissions under full and part load conditions at maximum and minimum site temperature conditions are shown in Tables 8.1A-3a and 3b.

Only one turbine at a time will be in startup mode. Therefore highest hourly emissions from the turbines will occur when one turbine is starting up and the other is operating at full load with power augmentation and duct firing.

b. Auxiliary Boiler

No auxiliary boiler is proposed for the RCEC project.

c. Emergency Generator and Fire Pump

The emergency generator and the fire pump will not operate simultaneously. Maximum hourly NO_x and SO_2 emissions will occur while the fire pump is operating; highest hourly CO and PM_{10} emissions occur when the emergency generator is operating. Emissions from these units are shown in Table 8.1A-2. Toxic pollutant emissions from these devices are shown in Tables 8.1A-7, and 8.1A-8.

d. Cooling Tower

Maximum hourly emissions occur while the cooling tower is operating at full capacity.

Calculation of Maximum Daily Emissions

a. Turbines/HRSGs

As discussed above for the hourly emissions calculations, hourly NO_x, CO and POC emissions are highest during startup. The operating conditions having the next highest hourly emissions are full load operation at 94 degF with power augmentation and duct firing, followed by full load operation at 34 degF. Duct burner operation will not exceed 16 hours a day. Therefore maximum daily turbine emissions will occur on a day when each turbine has one hot and one cold start, operates at full load with power augmentation and duct firing for 16 hours, and operates at full load without power augmentation and duct burning for the rest of the day. Again, both turbines will not be in startup mode simultaneously; there will be a two-hour period between starting the first and second turbines.

b. Auxiliary Boiler

No auxiliary boiler is proposed for the RCEC project.

c. Emergency Generator and Fire Pump

The emergency generator and fire pump will operate a maximum of one hour per day for testing, and the two units will not be tested on the same day. Therefore maximum daily emissions correspond to one hour of operation of the unit that has the higher emissions.

d. Cooling Tower

Maximum daily cooling tower emissions will occur while the cooling tower is in operation for 24 hours.

8.1A.1.3 Maximum Annual Emissions

a. Turbines/HRSGs

Each turbine is assumed to have a maximum of 52 cold starts (156 hours) and 260 hot starts (260 hours) each year. Duct firing will be limited to the equivalent of 1500 full load hours per year per turbine. Therefore the calculation of maximum annual emissions from each turbine is based on the following assumptions:

156 hours of cold start operation
260 hours of hot start operation
1500 hours of operation with power augmentation and duct firing
6844 hours of operation at full load, 34 degF

b. Auxiliary Boiler

No auxiliary boiler is proposed for the RCEC project.

c. Emergency Generator and Fire Pump

The emergency generator and fire pump will operate a maximum of 200 and 30 hours respectively per year each. Annual emissions are based on this yearly operation.

Table 8.1A-3a. Gas turbines: parameters for screening modeling.

Case	Ambient Temp, deg F	Load, %	Exhaust Temp, deg K	Diameter, m	Exhaust Flow, m3/s	Exhaust Velocity, m/s	Exhaust Velocity, ft/sec	Stack Temp, deg F	Stack Diam, ft	Exhaust Flow, acfm
2	34	100% no DB, no PA	349.67	5.486	495.79	20.97	68.80	170	18	1,050,510
3	34	70% no DB, no PA	349.67	5.486	408.56	17.28	56.70	170	18	865,700
11	94	100% no DB, no PA	349.67	5.486	461.89	19.54	64.10	170	18	978,700
12	94	70% no DB, no PA	349.67	5.486	376.14	15.91	52.20	170	18	797,000
14	59	100% w/PA and DB	349.67	5.486	505.83	21.40	70.20	170	18	1,071,800
16	94	100% w/PA and DB	349.67	5.486	488.56	20.67	67.80	170	18	1,035,200

Case	NOx, g/s	SO2, g/s	CO, g/s	PM10, g/s	NOx, lb/hr	SO2, lb/hr	CO, lb/hr	PM10, lb/hr
2	2.407	0.176	3.566	1.134	19.10	1.400	28.30	9.00
3	1.814	0.126	2.684	1.134	14.40	1.000	21.30	9.00
11	2.205	0.164	3.276	1.134	17.50	1.300	26.00	9.00
12	1.588	0.113	2.356	1.134	12.60	0.900	18.70	9.00
14	2.696	0.189	3.994	1.512	21.40	1.500	31.70	12.00
16	2.596	0.189	3.856	1.512	20.60	1.500	30.60	12.00

Table 8.1A-3b. Exhaust and emissions characteristics for screening modeling analysis.

	Case 2	Case 3	Case 11	Case 12	Case 14	Case 16
	Low Temp Full Load w/o DB&PA	Low Temp Part Load	High Temp Full Load w/o DB&PA	High Temp Part Load	Annual Avgerage Temp Full Load w/ DB&PA	High Temp Full Load w/ DB&PA
Ambient Temp, F	34	34	94	94	59	94
RH, %	81	25	21	21	81	21
GT Load	100%	70%	100%	70%	100%	100%
Evap Cooler	off	off	on	off	on	on
Power Aug	off	off	off	off	on	on
GT heat input, MMBtu/hr	1979.4	1481.3	1819.7	1301.5	2017.2	1938.4
DB heat input, MMBtu/hr	0.0	0.0	0.0	0.0	200.0	200.0
Stack flow, lb/hr	3,892,145	3,214,566	3,611,972	2,956,737	3,882,594	3,741,967
Stack temp, F	170	170	170	170	170	170
Stack exhaust, vol %						
O2	12.5	13.22	12.33	13.45	10.54	10.42
CO2	3.79	3.47	3.73	3.3	4.16	4.16
H2O	8.07	7.43	9.38	7.71	14.29	14.91
Stack velocity, fps	68.8	56.7	64.1	52.2	70.2	67.8
NOx, lb/hr	19.1	14.4	17.5	12.6	21.4	20.2
NOx, ppmvd @ 15% O2 (2)	2.5	2.5	2.5	2.5	2.5	2.5
CO, lb/hr	28.3	21.3	26	18.7	31.7	29.9
CO, ppmvd @ 15% O2 (2)	6.0	6.0	6.0	6.0	6.0	6.0
VOC, lb/hr	2.5	1.9	2.3	1.7	2.8	2.7
VOC, ppmvd @ 15% O2 (2)	1.0	1.0	1.0	1.0	1.0	1.0
PM10, lb/hr (2)	9.0	9.0	9.0	9.0	12.0	12.0
SO2, lb/hr (3)	1.400	1.000	1.300	0.900	1.500	1.500
NH3, lb/hr	14.1	10.6	13	9.3	15.8	15.3
NH3, ppmvd @ 15% O2 (2)	5.0	5.0	5.0	5.0	5.0	5.0

Notes: 1. DB&PA: duct burner and power augmentation

Table 8.1A-4 (cont'd). Calculation of noncriteria pollutant emissions from cooling tower (1).

Calculation of Noncriteria Pollutant Emissions from Cooling Tower (cooling tower)						Modeled Emission Rates (each cell)		Modeled Concentrations (total all cells)	
Constituent	Concentration in Cooling Tower Return Water		Emissions, lb/hr	Emissions, lb/day	Emissions, ton/yr	One-hour Emissions, g/s	Annual Emissions, g/s	One-hour Impacts, ug/m3	Annual Impacts, ug/m3
Ammonia	4	ppm	1.37E-03	3.29E-02	6.00E-03	1.73E-05	1.73E-05	(2)	(2)
Arsenic	0	ppm	--	--	--	--	--	--	--
Cadmium	0	ppm	--	--	--	--	--	--	--
Chromium (III)	0	ppm	--	--	--	--	--	--	--
Copper	0	ppm	--	--	--	--	--	--	--
Lead	0	ppm	--	--	--	--	--	--	--
Mercury	0	ppm	--	--	--	--	--	--	--
Nickel	0	ppm	--	--	--	--	--	--	--
Silver	0	ppm	--	--	--	--	--	--	--
Zinc	0	ppm	--	--	--	--	--	--	--
PAHs	--		--	--	--	--	--	--	--

Notes: (1) Emissions calculated from maximum drift rate of 342.39 lb/hr.

(2) Modeled with turbines (see previous).

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Table 8.1A-5
Ammonia Emissions Calculations

Calculation of ammonia emissions from the gas turbines and duct burners is based on the proposed ammonia slip limit of 5 ppmvd.

Gas Turbines

Data supplied by Bechtel/Calpine pertaining to the operational scenarios for the gas turbines and duct burners indicates the following with respect to ammonia emissions for each gas turbine.

Table 8.1A-5. Ammonia emissions.

Scenario	Emissions
Maximum hourly, Case 14 W/Duct Burners, Pwr Aug, at 59 deg F	15.8 lbs/hr
Maximum annual, based on proposed Annual operating scenario.	65.39 tons/yr
Annualized hourly emissions, at 8760 hrs/yr	14.93 lbs/hr

Table 8.1A-6. Calculation of cooling tower emissions.

Cooling Tower Flow Characteristics: (from Bechtel, 4/27/01)	
Water Flow Rate, 10E6 lbm/hr	68.48
Water Flow Rate, gal/min	137,012
Drift Rate, %	0.0005
Drift, lbm water/hr	342.39
PM10 Emissions based on TDS Level	
TDS level, ppm	2000
PM10, lb/hr	0.685
PM10, tpy	3.00
PM10 Emissions for Modeling	
PM10 Emissions per cell, g/s	8.63E-03

Tower Description:	10 Cells
	Non-contact, closed circuit, counter flow
	Forced draft
	ACFM per cell = 1,478,900 (approx.)

Table 8.1A-7. Gaseous fuel IC engine air toxic emissions calculations.

Fuel Type:	Natural Gas		Max Hrs/Day:	1			Normalized Conc's	
Scf/Hr:	6302		Max Hrs/Yr:	200			ug/m3	ug/m3
MMcf/Hr:	0.006302						3238.32642	92.92491
MMcf/Yr:	1.2604						1-Hr	Annual
Substance	EF lbs/mmcf	lbs/hr	lbs/yr	tons/yr	Max Hr. g/sec	Annual g/sec	Impact ug/m3	Impact ug/m3
Acenaphtene	1.51E-04	9.52E-07	1.90E-04	9.52E-08	1.20E-07	2.74E-09	3.89E-04	2.55E-07
Acenapthylene	5.25E-04	3.31E-06	6.62E-04	3.31E-07	4.17E-07	9.53E-09	1.35E-03	8.85E-07
Anthracene	1.19E-04	7.50E-07	1.50E-04	7.50E-08	9.46E-08	2.16E-09	3.06E-04	2.01E-07
Benzo-a-anthracene	5.88E-05	3.71E-07	7.41E-05	3.71E-08	4.67E-08	1.07E-09	1.51E-04	9.91E-08
BaP	2.70E-06	1.70E-08	3.40E-06	1.70E-09	2.15E-09	4.90E-11	6.95E-06	4.55E-09
Benzo-a-fluoranthene	4.09E-05	2.58E-07	5.16E-05	2.58E-08	3.25E-08	7.42E-10	1.05E-04	6.90E-08
Benzo-ghi-perylene	7.54E-06	4.75E-08	9.50E-06	4.75E-09	5.99E-09	1.37E-10	1.94E-05	1.27E-08
Benzo-k-fluoranthene	7.83E-06	4.93E-08	9.87E-06	4.93E-09	6.22E-09	1.42E-10	2.02E-05	1.32E-08
Chrysene	1.43E-05	9.01E-08	1.80E-05	9.01E-09	1.14E-08	2.59E-10	3.68E-05	2.41E-08
Dibenz-ah-anthracene	2.70E-06	1.70E-08	3.40E-06	1.70E-09	2.15E-09	4.90E-11	6.95E-06	4.55E-09
Fluoranthene	2.91E-04	1.83E-06	3.67E-04	1.83E-07	2.31E-07	5.28E-09	7.49E-04	4.91E-07
Fluorene	4.36E-04	2.75E-06	5.50E-04	2.75E-07	3.47E-07	7.91E-09	1.12E-03	7.35E-07
Indeno-123cd-pyrene	7.17E-06	4.52E-08	9.04E-06	4.52E-09	5.70E-09	1.30E-10	1.85E-05	1.21E-08
Naphthalene	2.51E-02	1.58E-04	3.16E-02	1.58E-05	1.99E-05	4.55E-07	6.46E-02	4.23E-05
Phenanthrene	1.85E-03	1.17E-05	2.33E-03	1.17E-06	1.47E-06	3.36E-08	4.76E-03	3.12E-06
Pyrene	1.87E-04	1.18E-06	2.36E-04	1.18E-07	1.49E-07	3.39E-09	4.81E-04	3.15E-07
Ethylbenzene	7.11E-02	4.48E-04	8.96E-02	4.48E-05	5.65E-05	1.29E-06	1.83E-01	1.20E-04
13 Butadiene	3.67E-01	2.31E-03	4.63E-01	2.31E-04	2.92E-04	6.66E-06	9.45E-01	6.19E-04
Acetaldehyde	5.29E-01	3.33E-03	6.67E-01	3.33E-04	4.20E-04	9.60E-06	1.36E+00	8.92E-04
Acrolein	5.90E-02	3.72E-04	7.44E-02	3.72E-05	4.69E-05	1.07E-06	1.52E-01	9.95E-05
Benzene	2.18E-01	1.37E-03	2.75E-01	1.37E-04	1.73E-04	3.96E-06	5.61E-01	3.68E-04
Formaldehyde	4.71E+00	2.97E-02	5.94E+00	2.97E-03	3.74E-03	8.55E-05	1.21E+01	7.94E-03
Propylene	5.38E+00	3.39E-02	6.78E+00	3.39E-03	4.28E-03	9.76E-05	1.38E+01	9.07E-03
Toluene	2.39E-01	1.51E-03	3.01E-01	1.51E-04	1.90E-04	4.34E-06	6.15E-01	4.03E-04
Xylenes	6.46E-01	4.07E-03	8.14E-01	4.07E-04	5.13E-04	1.17E-05	1.66E+00	1.09E-03

EFs: CARB-CATEF Database (mean values for source type and category)

Table 8.1A-8. Liquid Fuel IC engine air toxics emissions calculations.

Fuel Type:	**Diesel**	**Max Hrs/Day:**		**1**			**Normalized Conc's**	
Gal/Hr:	**15.4**	**Max Hrs/Yr:**		**30**			**ug/m3**	**ug/m3**
Mgal/Hr:	**0.0154**						**1504.05872**	**48.75942**
Mgal/Yr:	**0.462**						**1-Hr**	**Annual**
	EF				**Max Hr.**	**Annual**	**Impact**	**Impact**
Substance	**lbs/Mgal**	**lbs/hr**	**lbs/yr**	**tons/yr**	**g/sec**	**g/sec**	**ug/m3**	**ug/m3**
Acenaphtene	6.71E-04	1.03E-05	3.10E-04	1.55E-07	1.30E-06	4.46E-09	1.96E-03	2.18E-07
Acenapthylene	1.02E-03	1.57E-05	4.71E-04	2.36E-07	1.98E-06	6.78E-09	2.98E-03	3.31E-07
Anthracene	2.23E-04	3.43E-06	1.03E-04	5.15E-08	4.33E-07	1.48E-09	6.51E-04	7.23E-08
Benzo-a-anthracene	9.60E-05	1.48E-06	4.44E-05	2.22E-08	1.86E-07	6.38E-10	2.80E-04	3.11E-08
BaP	7.90E-05	1.22E-06	3.65E-05	1.82E-08	1.53E-07	5.25E-10	2.31E-04	2.56E-08
Benzo-a-fluoranthene	1.12E-04	1.72E-06	5.17E-05	2.59E-08	2.18E-07	7.45E-10	3.27E-04	3.63E-08
Benzo-ghi-perylene	9.00E-05	1.39E-06	4.16E-05	2.08E-08	1.75E-07	5.99E-10	2.63E-04	2.92E-08
Benzo-k-fluoranthene	7.83E-05	1.21E-06	3.62E-05	1.81E-08	1.52E-07	5.21E-10	2.29E-04	2.54E-08
Chrysene	1.30E-04	2.00E-06	6.01E-05	3.00E-08	2.52E-07	8.65E-10	3.80E-04	4.22E-08
Dibenz-ah-anthracene	8.20E-05	1.26E-06	3.79E-05	1.89E-08	1.59E-07	5.45E-10	2.40E-04	2.66E-08
Fluoranthene	3.30E-04	5.08E-06	1.52E-04	7.62E-08	6.41E-07	2.19E-09	9.64E-04	1.07E-07
Fluorene	9.65E-04	1.49E-05	4.46E-04	2.23E-07	1.87E-06	6.42E-09	2.82E-03	3.13E-07
Indeno-123cd-pyrene	8.45E-05	1.30E-06	3.90E-05	1.95E-08	1.64E-07	5.62E-10	2.47E-04	2.74E-08
Naphthalene	1.60E-02	2.46E-04	7.39E-03	3.70E-06	3.11E-05	1.06E-07	4.67E-02	5.19E-06
Phenanthrene	3.54E-03	5.45E-05	1.64E-03	8.18E-07	6.88E-06	2.35E-08	1.03E-02	1.15E-06
Pyrene	2.64E-04	4.07E-06	1.22E-04	6.10E-08	5.13E-07	1.76E-09	7.71E-04	8.56E-08
Ethylbenzene	6.76E-03	1.04E-04	3.12E-03	1.56E-06	1.31E-05	4.50E-08	1.97E-02	2.19E-06
13 Butadiene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Acetaldehyde	3.47E-03	5.34E-05	1.60E-03	8.02E-07	6.74E-06	2.31E-08	1.01E-02	1.13E-06
Acrolein	1.07E-03	1.65E-05	4.94E-04	2.47E-07	2.08E-06	7.12E-09	3.13E-03	3.47E-07
Benzene	1.81E-01	2.79E-03	8.36E-02	4.18E-05	3.52E-04	1.20E-06	5.29E-01	5.87E-05
Formaldehyde	5.10E-02	7.85E-04	2.36E-02	1.18E-05	9.90E-05	3.39E-07	1.49E-01	1.65E-05
Propylene	3.41E-01	5.25E-03	1.58E-01	7.88E-05	6.62E-04	2.27E-06	9.96E-01	1.11E-04
Toluene	6.10E-02	9.39E-04	2.82E-02	1.41E-05	1.18E-04	4.06E-07	1.78E-01	1.98E-05
Xylenes	2.10E-02	3.23E-04	9.70E-03	4.85E-06	4.08E-05	1.40E-07	6.13E-02	6.81E-06
Hexane	1.39E-03	2.14E-05	6.42E-04	3.21E-07	2.70E-06	9.24E-09	4.06E-03	4.51E-07
Arsenic	1.60E-03	2.46E-05	7.39E-04	3.70E-07	3.11E-06	1.06E-08	4.67E-03	5.19E-07
Beryllium	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cadmium	1.50E-03	2.31E-05	6.93E-04	3.47E-07	2.91E-06	9.98E-09	4.38E-03	4.86E-07
Hex Chromium	1.00E-04	1.54E-06	4.62E-05	2.31E-08	1.94E-07	6.65E-10	2.92E-04	3.24E-08
Copper	4.10E-03	6.31E-05	1.89E-03	9.47E-07	7.96E-06	2.73E-08	1.20E-02	1.33E-06
Lead	8.30E-03	1.28E-04	3.83E-03	1.92E-06	1.61E-05	5.52E-08	2.42E-02	2.69E-06
Manganese	3.10E-03	4.77E-05	1.43E-03	7.16E-07	6.02E-06	2.06E-08	9.06E-03	1.01E-06
Mercury	2.00E-03	3.08E-05	9.24E-04	4.62E-07	3.88E-06	1.33E-08	5.84E-03	6.49E-07
Nickel	3.90E-03	6.01E-05	1.80E-03	9.01E-07	7.57E-06	2.59E-08	1.14E-02	1.26E-06
Selenium	2.20E-03	3.39E-05	1.02E-03	5.08E-07	4.27E-06	1.46E-08	6.43E-03	7.13E-07
Zinc	2.24E-02	3.45E-04	1.03E-02	5.17E-06	4.35E-05	1.49E-07	6.54E-02	7.26E-06
Diesel PM	8.3E+00	1.28E-01	3.8E+00	1.91E-03	1.61E-02	5.51E-05	2.42E+01	2.69E-03

EFs: CARB-CATEF Database (mean values for source type and category)
Metals EFs from VCAPCD, 1/8/96

Table 8.1A-9. Approximate dailiy and annual turbine/duct burner fuel use.
Russell City Energy Center

	Operating Hours			Max Hourly Fuel Use, MMBtu
	max. hour	hrs/day	hrs/yr	
Turbine 1, no DB	0	24	6844	1979.4
Turbine 2, no DB	0	24	6844	1979.4
Aux Boiler*	0	0	0	0
Turbine 1, w/ DB	1	16	1500	2217.2
Turbine 2, w/ DB	1	16	1500	2217.2
T1-Start/Shutdown	0	0	416	1481.3
T2-Start/Shutdown	0	0	416	1481.3

	Fuel Use		
	MMBtu/hr	MMBtu/day	MMBtu/yr
Turbine 1, no DB	1979.4	47,505.6	13,547,014
Turbine 2, no DB	1979.4	47,505.6	13,547,014
Aux Boiler*	0	0.0	0
Turbine 1, w/ DB	2,217.2	35,475.2	3,325,800
Turbine 2, w/ DB	2,217.2	35,475.2	3,325,800
Startup/Shutdown	1,481.3	4,443.9	1,232,442
Total, GTs	**9,874.5**	**170,405.5**	**34,978,068.8**
Total, One GT		85,202.8	17,489,034

Due to the wide variations in the capability of the turbines and duct burners with respect to daily and annual operations, the values presented above are approximations only.

* No Aux Boiler proposed for this facility.

Russell City Energy Center AFC

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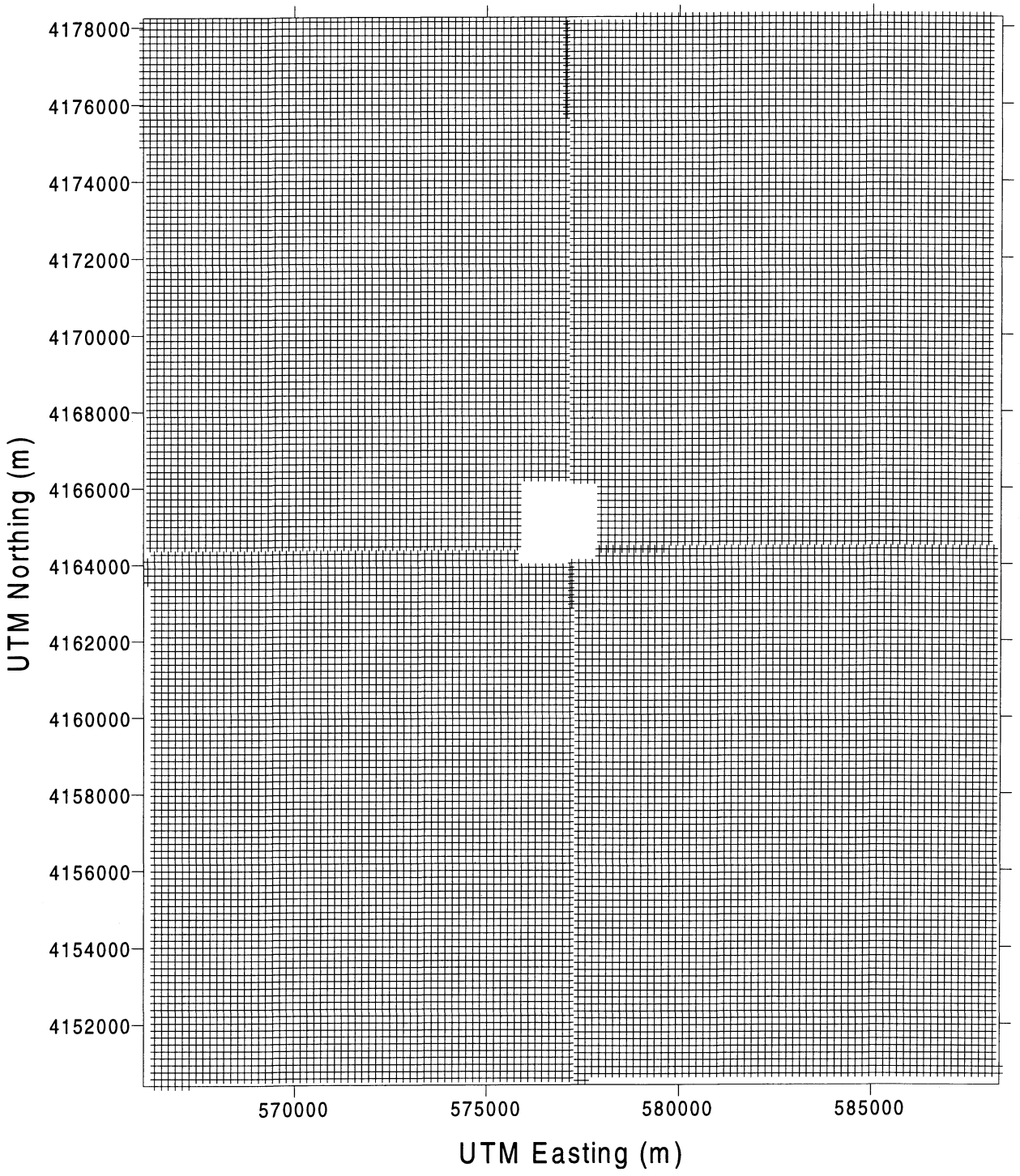
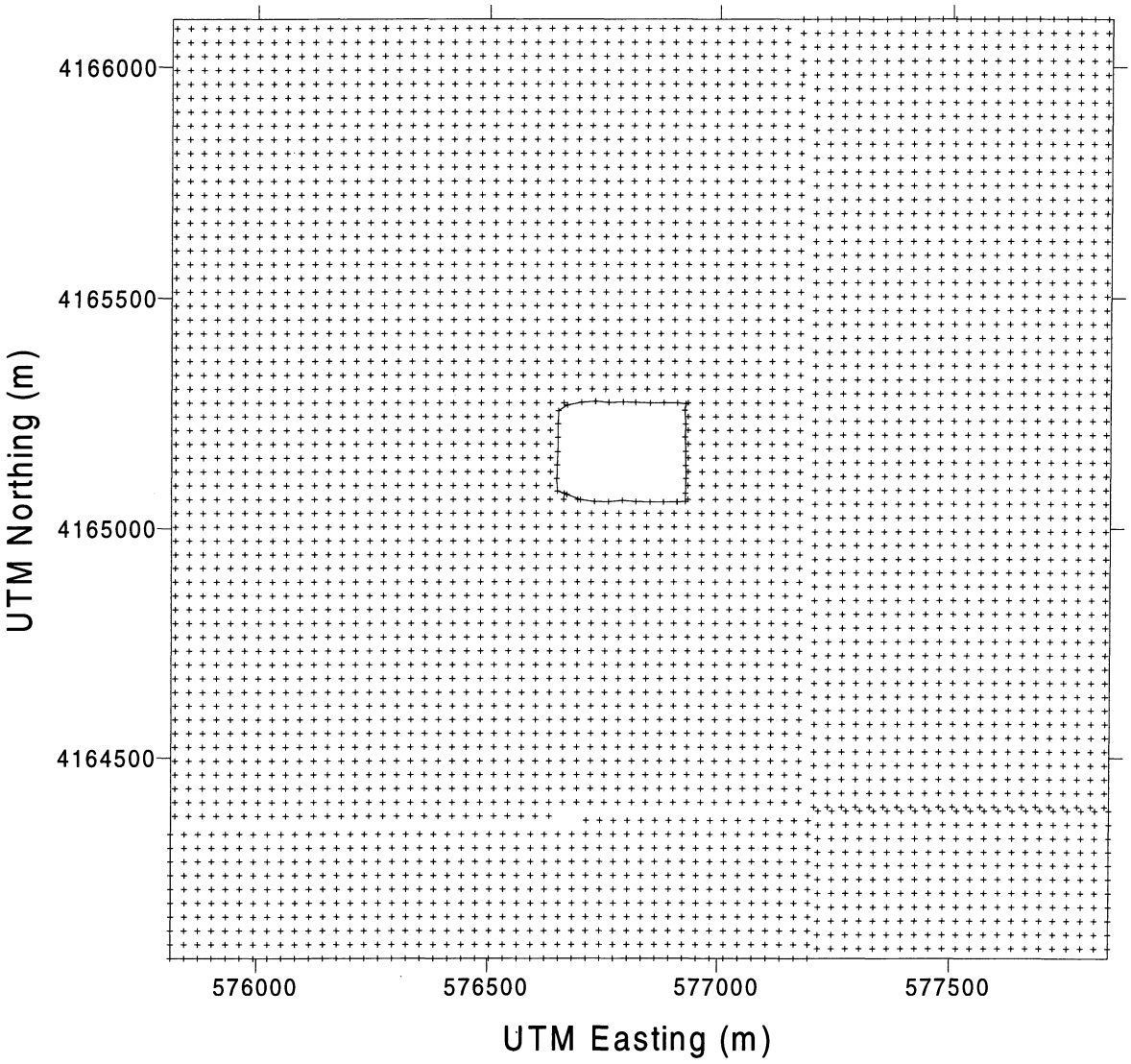
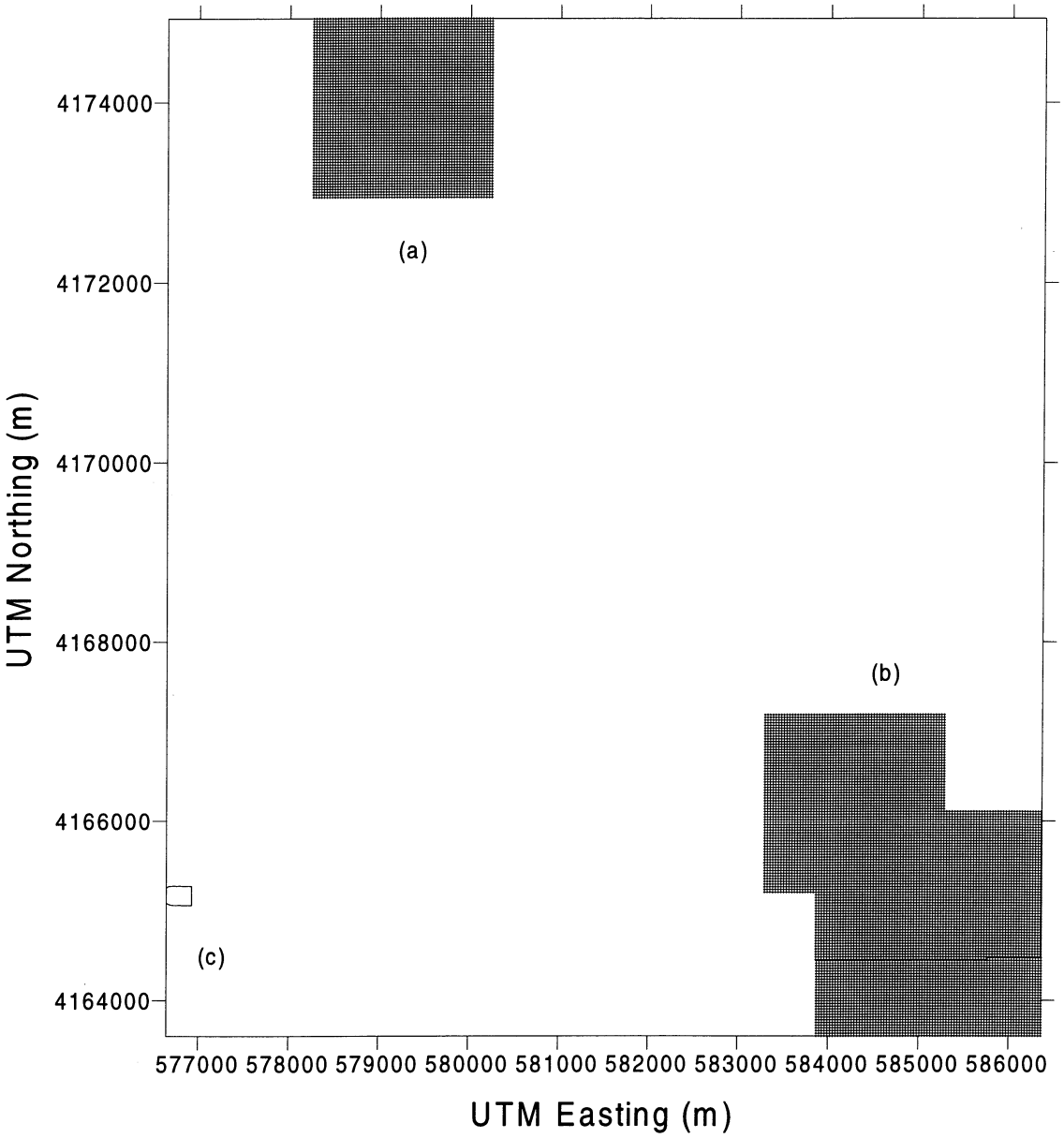
Calpine - Russell City Energy Center
Coarse ISCST Receptor Grid



Calpine -- Russell City Energy Center
Downwash ISCST Receptor Grid

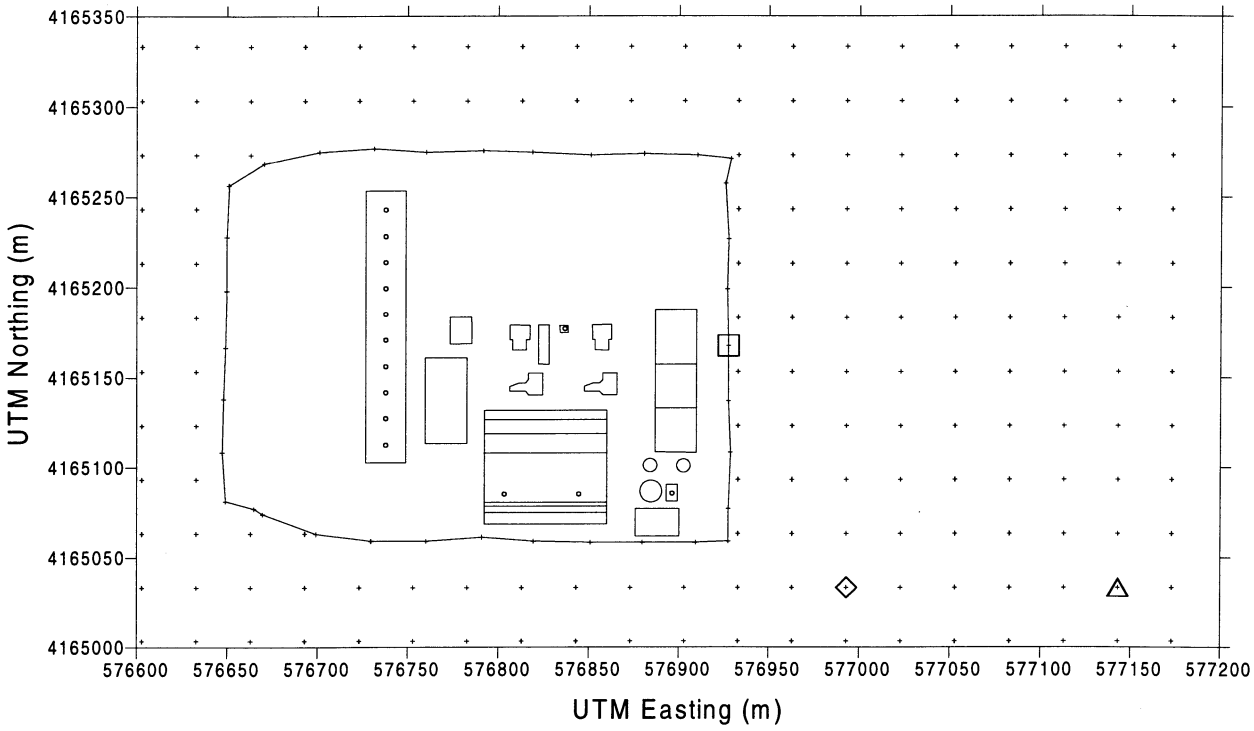


Calpine - Russell City Energy Center
Fine ISCST Receptor Grids



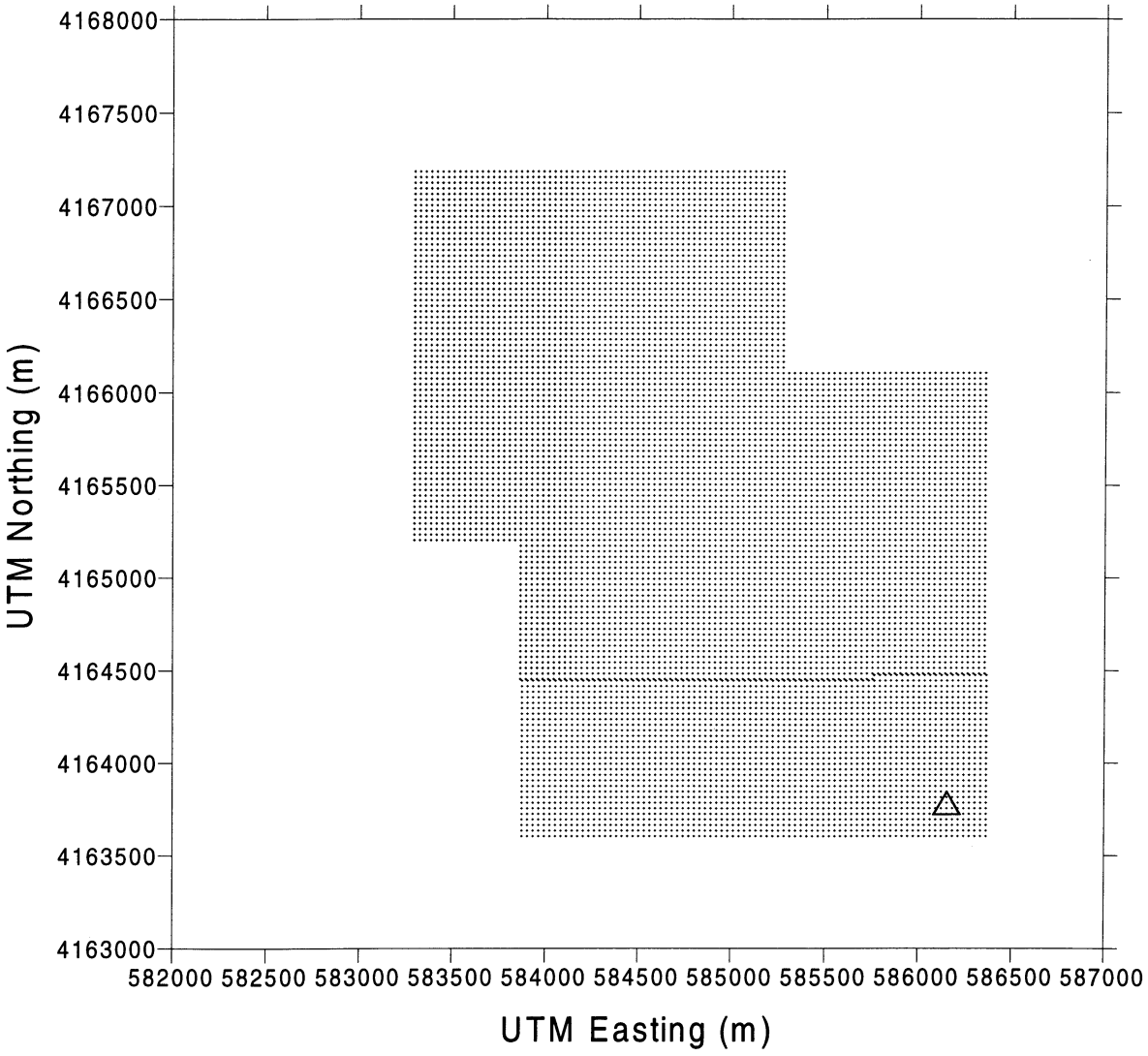
(a) Fine grid for 1-hour NO2-OLM Commissioning Concentrations
(b) Fine grid for 1990 Annual Concentrations for Turbines Only (Air Toxics), Ammonia, and SO2 and 3-hour Turbine Only Concentrations
(c) Facility Outline

Calpine -- Russell City Energy Center
Maximum Air Toxic Impact Locations



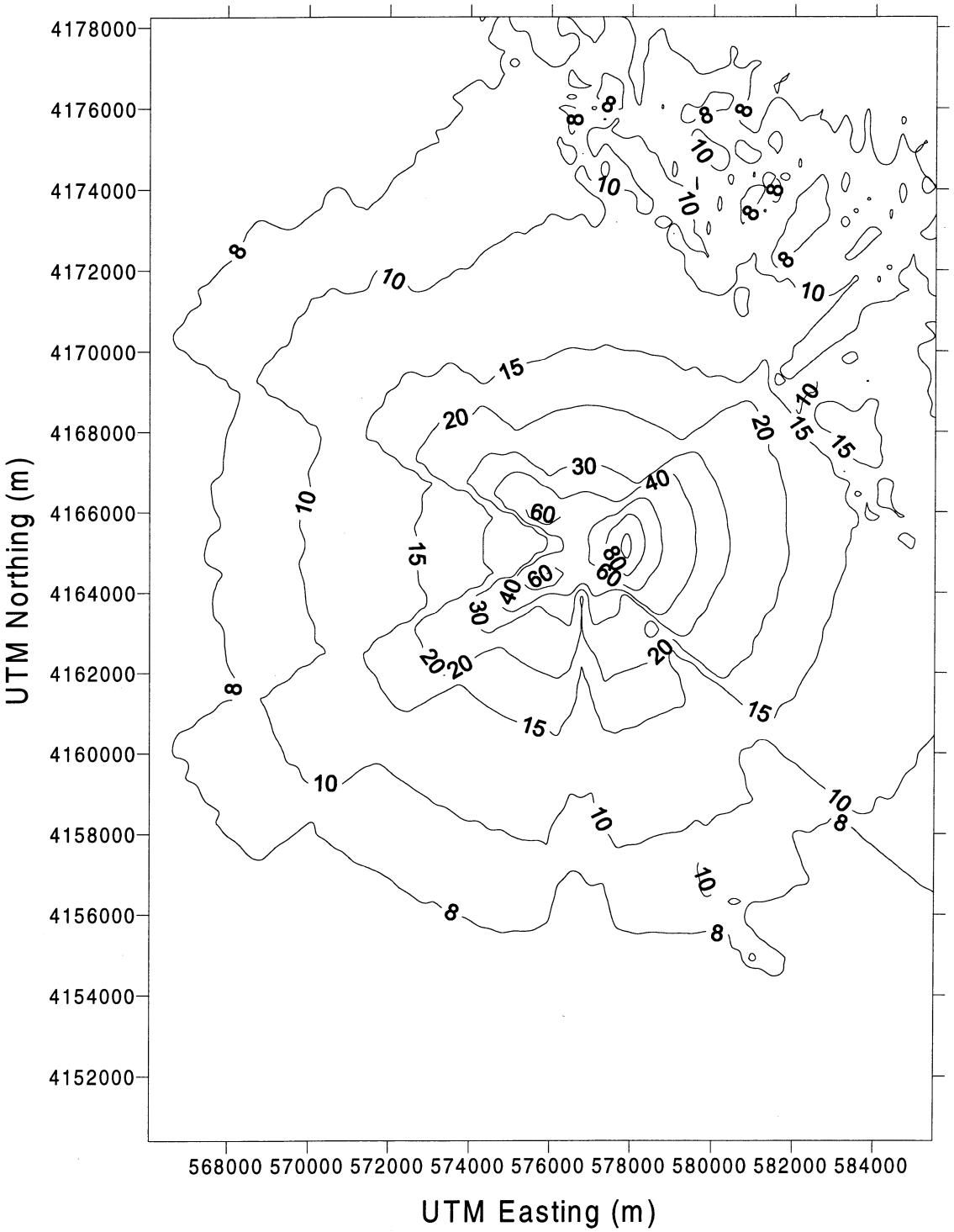
Triangle = 1-hour Turbine/Ammonia Maxima
Diamond = 1-hour and Annual Firepump Maxima
Square = 1-hour and Annual Emergency Generator Maxima

Calpine - Russell City Energy Center
Maximum Air Toxic Impact Locations

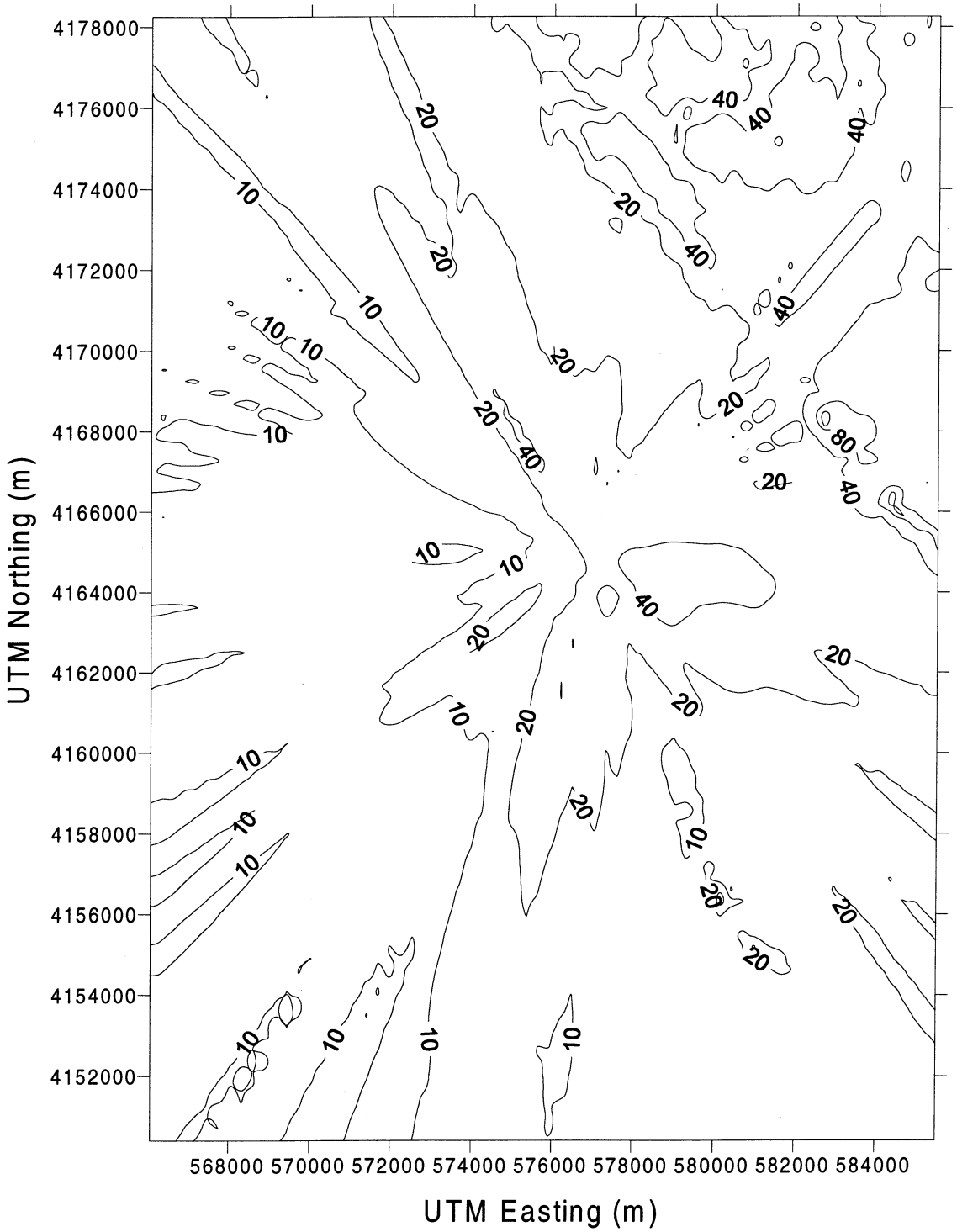


Triangle = Annual Turbine/Ammonia Maxima

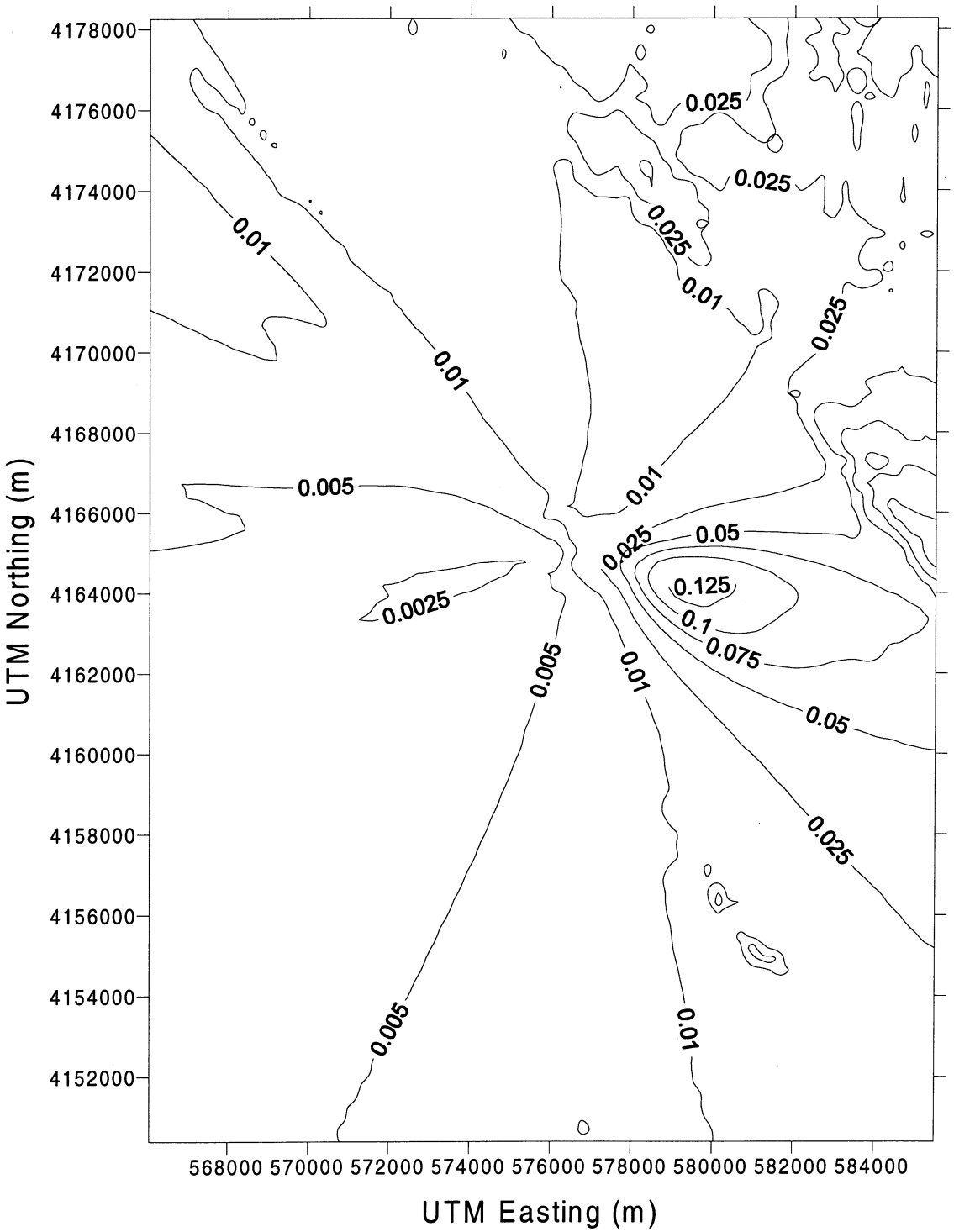
Calpine - Russell City Energy Center
Maximum 1-hour CO Concentrations (ug/m3)



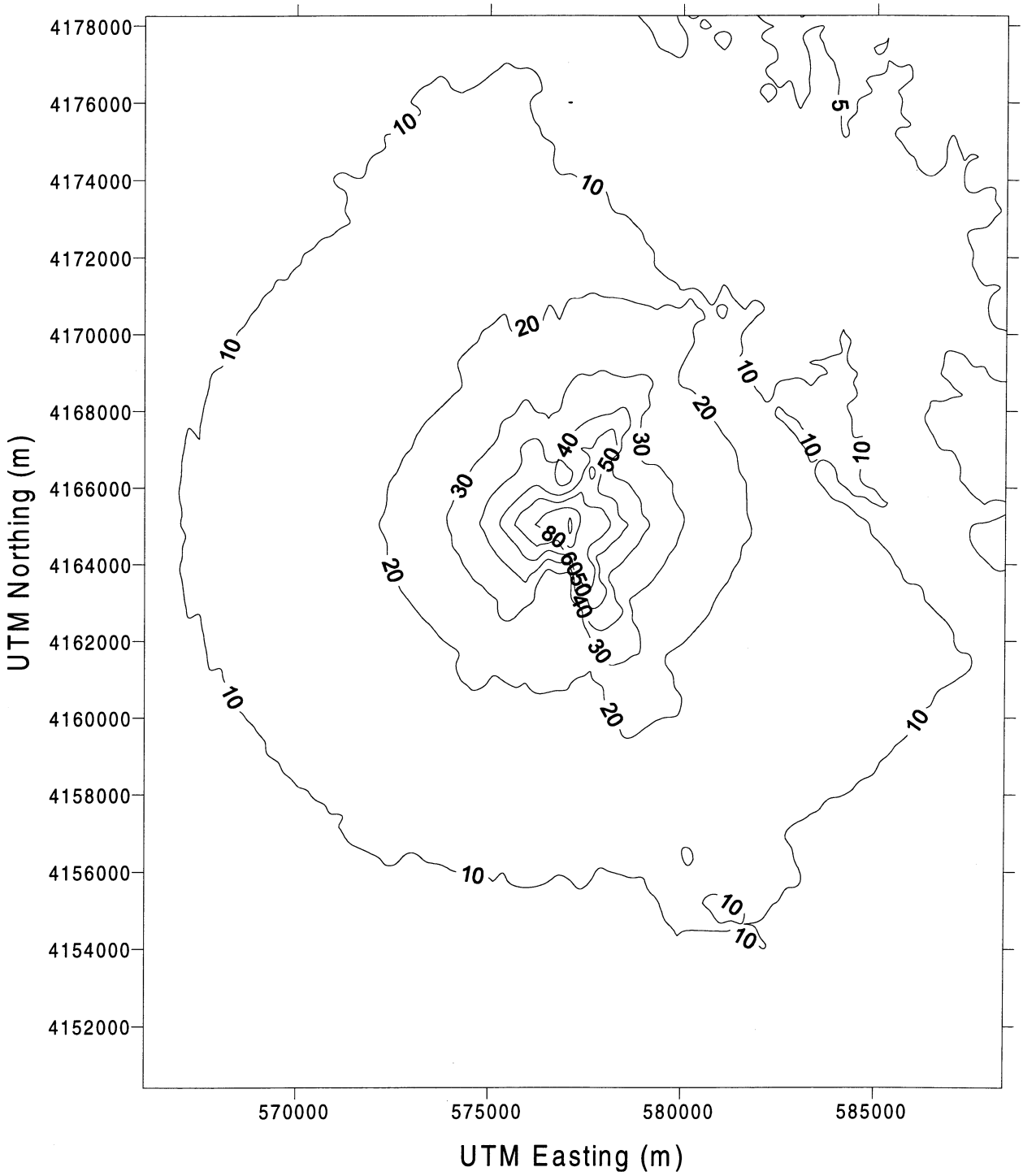
Calpine - Russell City Energy Center
Maximum 8-hour CO Concentrations (ug/m3)



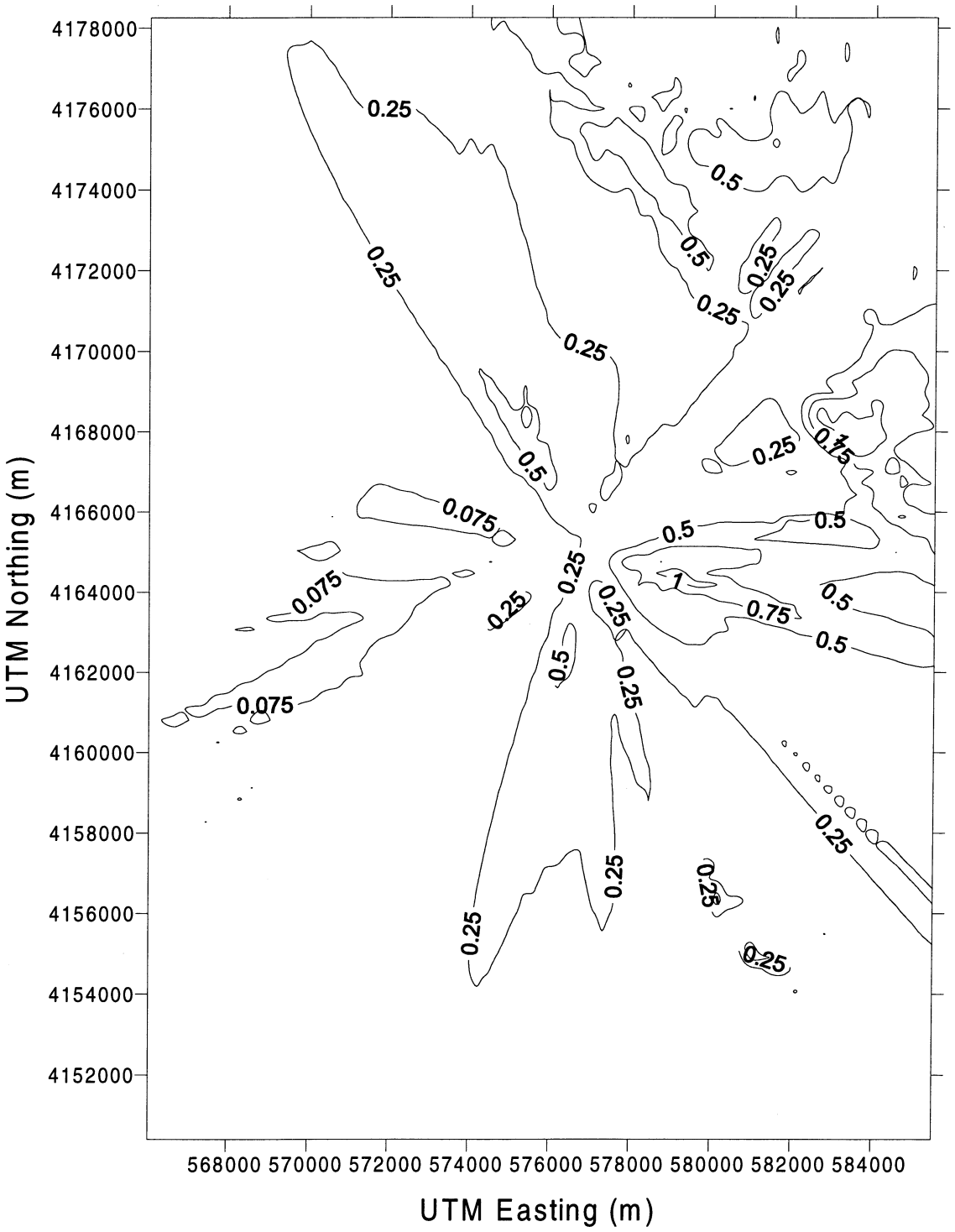
Calpine - Russell City Energy Center
Maximum Annual NO2 Concentrations (ug/m3)
based on 75% Ambient Ratio Method



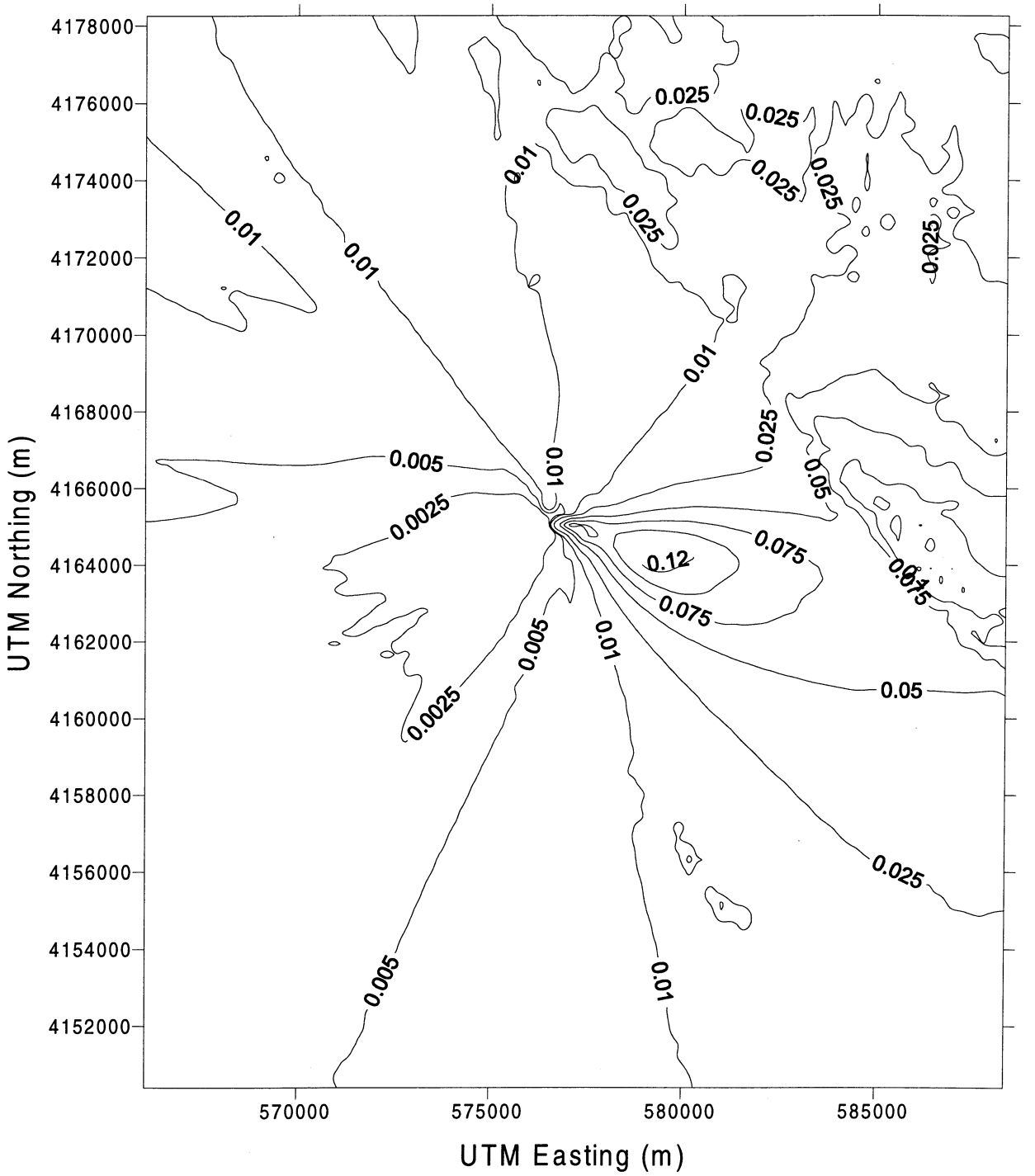
Calpine - Russell City Energy Center
Maximum 1-hour NO2 Concentrations (ug/m3)
based on Ozone Limiting Method



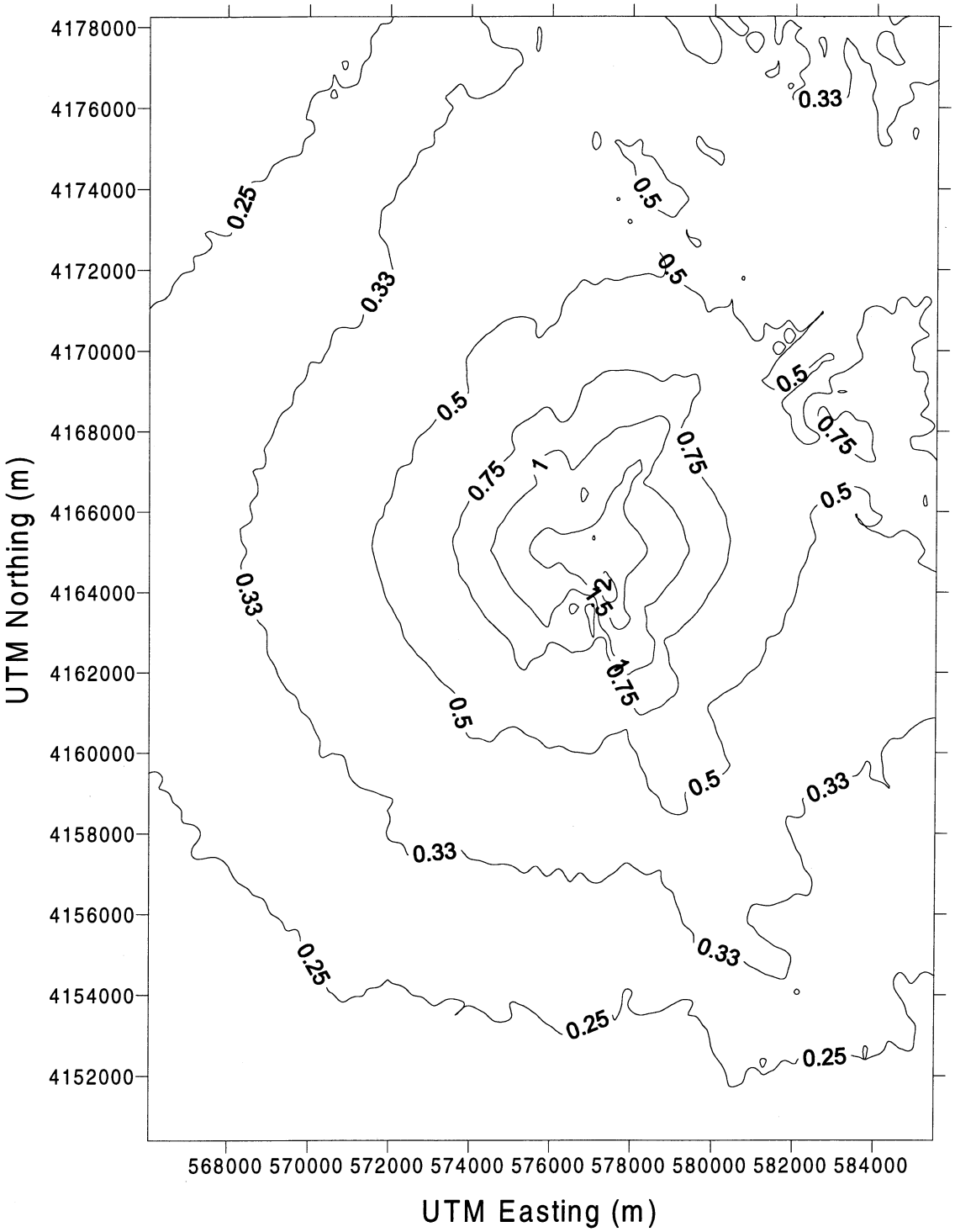
Calpine - Russell City Energy Center
Maximum 24-hour PM10 Concentrations (ug/m3)



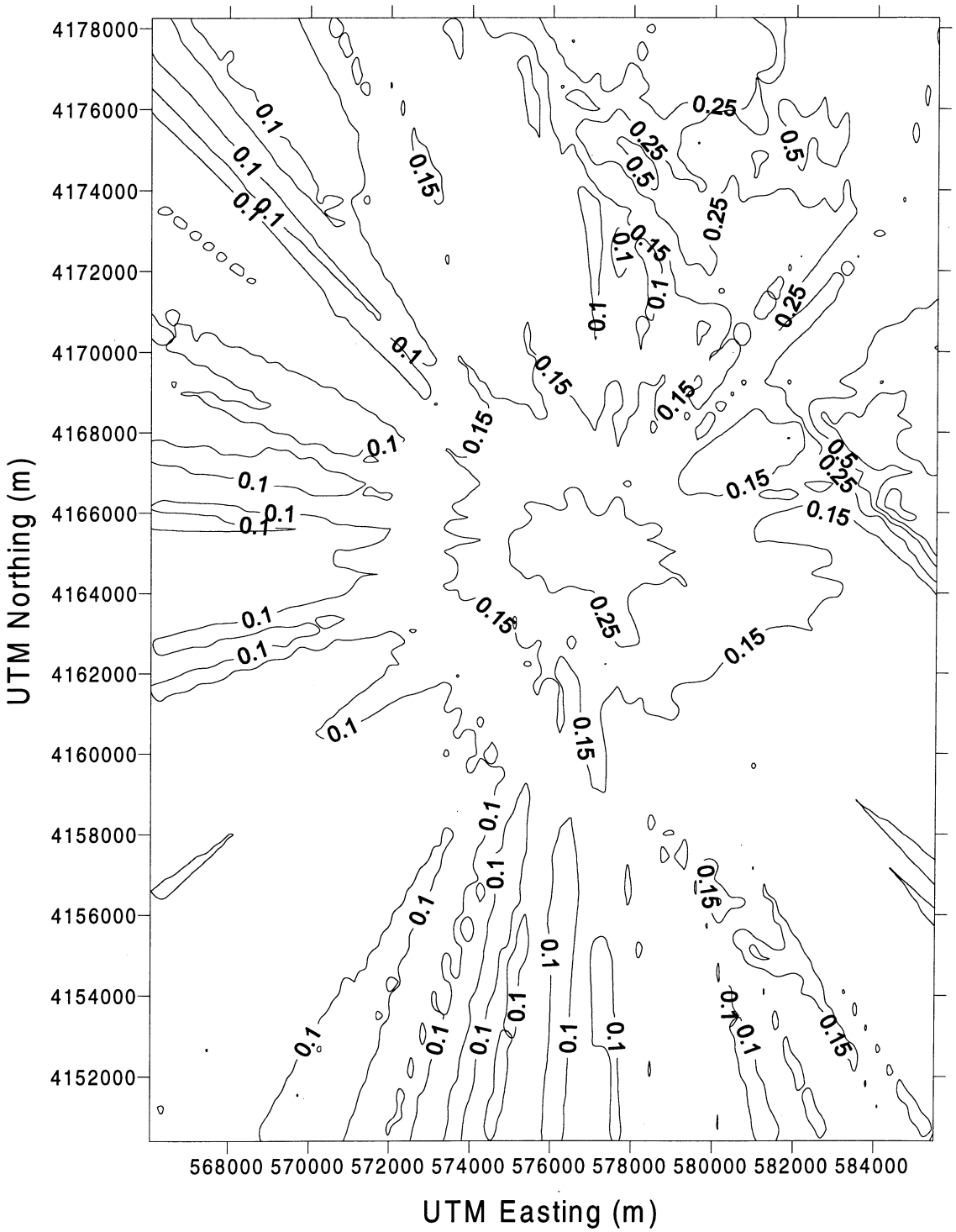
Calpine - Russell City Energy Center
Maximum Annual PM10 Concentrations (ug/m3)



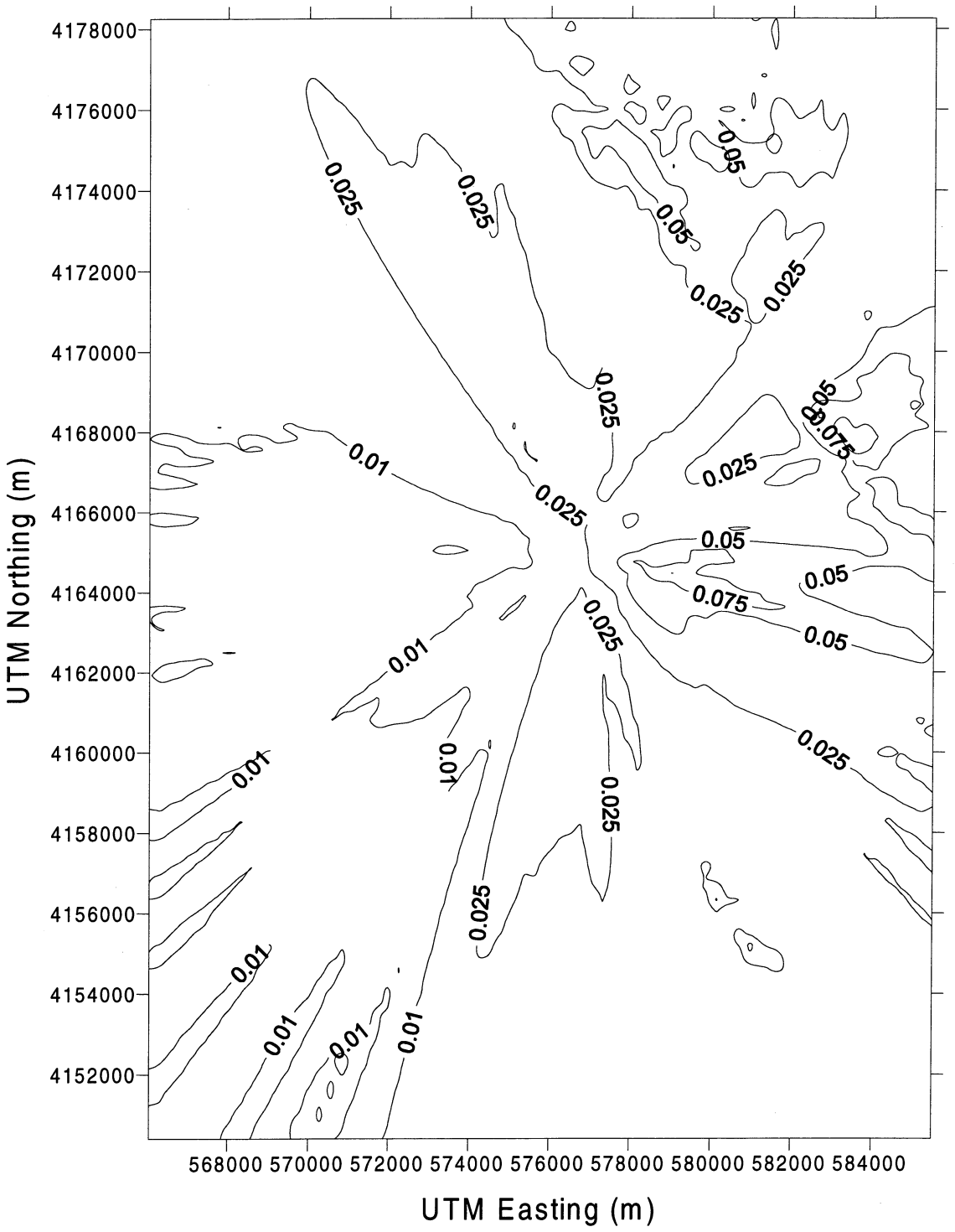
Calpine - Russell City Energy Center
Maximum 1-hour SO2 Concentrations (ug/m3)



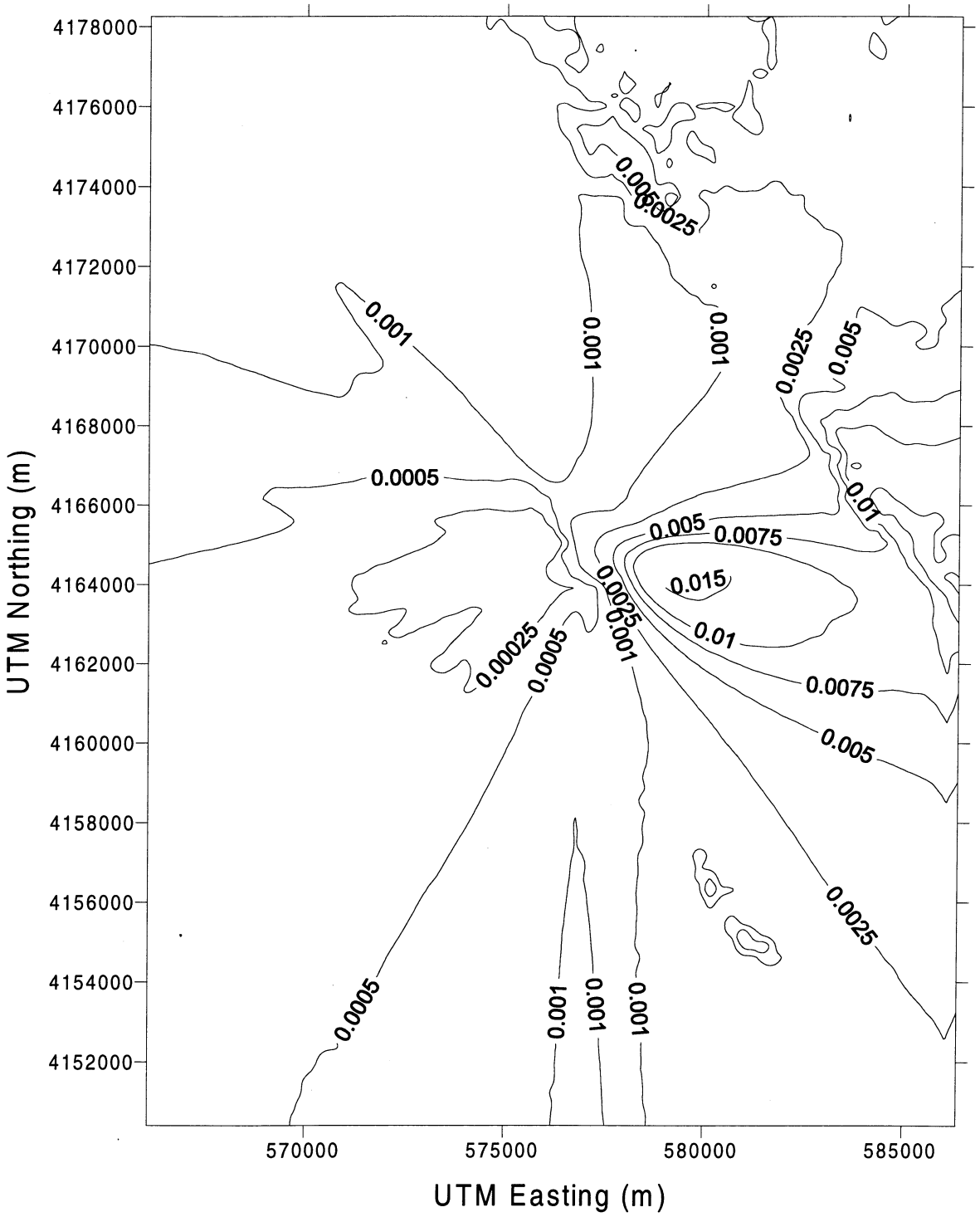
Calpine - Russell City Energy Center
Maximum 3-hour SO2 Concentrations (ug/m3)



Calpine - Russell City Energy Center
Maximum 24-hour SO2 Concentrations (ug/m3)



Calpine - Russell City Energy Center
Maximum Annual SO2 Concentrations (ug/m3)



Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 8.1-B
Modeling Analysis

May 2001

Russell City Energy Center AFC

May 2001

Table 8.1B-1A. Russell City Energy Center onsite structure coordinates.

East Stack UTM:	4165085.2 N	West Stack UTM:	4165084.11 N
	576844.48 E		576803.39 E
	Grid Center 0,0		

Structure/Building/Tank	State Plane Coors. E	State Plane Coors. N	Resultant UTM Coors. E	Resultant UTM Coors. N	GEP/BPIP
Steam Turbine	6207336.78	1914794.74	576759.64	4165161.00	Yes
Ht=31 ft	6207412.96	1914794.74	576782.86	4165161.00	
L=40 ft	6207412.96	1914638.82	576782.86	4165113.47	
W=22 ft.	6207336.78	1914638.82	576759.64	4165113.47	
Turbine East	6207608.54	1914765.46	576842.47	4165152.07	No
Ht=	6207621.73	1914765.46	576846.49	4165152.07	
L=75 ft.	6207620.99	1914743.50	576846.27	4165145.38	
W=34.5 ft.	6207624.65	1914743.50	576847.38	4165145.38	
	6207624.65	1914732.52	576847.38	4165142.03	
	6207632.71	1914731.79	576849.84	4165141.81	
	6207632.71	1914698.84	576849.84	4165131.77	
	6207622.46	1914698.84	576846.71	4165131.77	
	6207623.19	1914679.08	576846.94	4165125.74	
	6207606.34	1914679.08	576841.80	4165125.74	
	6207609.27	1914698.85	576842.69	4165131.77	
	6207598.28	1914699.58	576839.34	4165131.99	
	6207597.55	1914743.50	576839.12	4165145.38	
	6207608.54	1914742.77	576842.47	4165145.16	
Turbine West	6207473.76	1915766.19	576801.39	4165457.10	No
Ht=	6207486.21	1914765.46	576805.19	4165152.07	
L=75 ft.	6207486.21	1914744.23	576805.19	4165145.60	
W=34.5 ft.	6207490.61	1914744.23	576806.53	4165145.60	
	6207490.61	1914732.52	576806.53	4165142.03	
	6207497.93	1914732.52	576808.76	4165142.03	
	6207497.93	1914698.84	576808.76	4165131.77	
	6207487.68	1914698.84	576805.63	4165131.77	
	6207489.88	1914679.81	576806.30	4165125.97	
	6207472.30	1914678.35	576800.95	4165125.52	
	6207473.76	1914698.84	576801.39	4165131.77	
	6207463.51	1914698.84	576798.27	4165131.77	
	6207463.51	1914743.50	576798.27	4165145.38	
	6207474.50	1914743.50	576801.62	4165145.38	
HRSG East	6207670.80	1914662.24	576861.45	4165120.61	Yes
Ht=100 ft w/o enclosure	6207670.80	1914510.72	576861.45	4165074.43	
L=122 ft.	6207623.92	1914511.45	576847.16	4165074.65	
W=41.7 ft.	6207623.92	1914555.36	576847.16	4165088.03	
	6207606.34	1914555.37	576841.80	4165088.04	
	6207605.61	1914511.45	576841.58	4165074.65	
	6207576.31	1914511.45	576832.65	4165074.65	
	6207576.31	1914662.24	576832.65	4165120.61	

Table 8.1B-1A Structure/Building/Tank	State Plane Coors. E	State Plane Coors. N	Resultant UTM Coors. E	Resultant UTM Coors. N	
HRSG West					
Ht=100 ft. w/o enclosure	6207536.02	1914662.24	576820.37	4165120.61	Yes
L=122 ft.	6207536.02	1914512.18	576820.37	4165074.87	
W=41.7 ft.	6207489.88	1914512.18	576806.30	4165074.87	
	6207489.88	1914554.64	576806.30	4165087.82	
	6207470.83	1914555.37	576800.50	4165088.04	
	6207470.83	1914512.18	576800.50	4165074.87	
	6207441.53	1914512.18	576791.57	4165074.87	

	6207440.80	1914662.24	576791.34	4165120.61	
CT Main XFMR East					
Ht=28 ft.	6207674.46	1914854.76	576862.56	4165179.29	Yes
L=45 ft.	6207674.46	1914827.68	576862.56	4165171.04	
W=35 ft.	6207668.60	1914827.68	576860.78	4165171.04	
	6207668.60	1914807.92	576860.78	4165165.01	
	6207644.43	1914808.65	576853.41	4165165.24	
	6207644.43	1914827.68	576853.41	4165171.04	
	6207640.03	1914827.68	576852.07	4165171.04	
	6207639.30	1914854.30	576851.85	4165179.15	
CT Main XFMT West					
Ht=26 ft.	6207526.50	1914853.30	576817.47	4165178.85	Yes
L=45 ft.	6207525.77	1914826.95	576817.24	4165170.82	
W=36 ft.	6207519.91	1914826.95	576815.46	4165170.82	
	6207519.91	1914808.65	576815.46	4165165.24	
	6207495.00	1914808.65	576807.86	4165165.24	
	6207495.00	1914826.95	576807.86	4165170.82	
	6207490.61	1914826.95	576806.53	4165170.82	
	6207490.61	1914854.03	576806.53	4165179.07	
ST Main XFMR					
Ht=26 ft.	6207421.02	1914868.67	576785.32	4165183.53	Yes
L=50 ft.	6207421.75	1914820.36	576785.54	4165168.81	
W=40 ft.	6207382.20	1914819.63	576773.48	4165168.58	
	6207382.20	1914868.67	576773.48	4165183.53	
NH3 Storage Dike					
Ht=5 ft.	6207409.30	1914594.90	576781.74	4165100.09	No
L=44 ft.	6207409.30	1914556.83	576781.74	4165088.48	
W=15 ft.	6207390.99	1914556.83	576776.16	4165088.48	
	6207390.99	1914594.90	576776.16	4165100.09	
Switch Gear Bldg	6207560.93	1914854.11	576827.96	4165179.09	Yes
Ht=20 ft.	6207560.93	1914782.37	576827.96	4165157.23	
L=70 ft.	6207541.88	1914783.10	576822.15	4165157.45	
W=20 ft.	6207541.88	1914854.11	576822.15	4165179.09	
Cooling Tower	6207293.57	1915090.25	576746.47	4165251.07	Yes
Ht=54 ft.	6207294.30	1914611.07	576746.69	4165105.02	
L=480 ft.	6207236.43	1914611.81	576729.05	4165105.24	
W=48 ft	6207235.70	1915089.80	576728.83	4165250.93	
Cells	6207264.99	1915063.45	576737.76	4165242.90	
Ht=64 ft.	6207264.99	1915015.13	576737.76	4165228.17	
Diam=28 ft.	6207264.99	1914968.28	576737.76	4165213.89	
	6207264.99	1914920.70	576737.76	4165199.39	
	6207264.99	1914873.85	576737.76	4165185.11	
	6207264.99	1914827.00	576737.76	4165170.83	
	6207264.99	1914778.69	576737.76	4165156.11	
	6207264.99	1914731.26	576737.76	4165141.65	
	6207264.99	1914684.41	576737.76	4165127.37	
	6207264.99	1914636.10	576737.76	4165112.64	
CT Air Inlet East	6207683.99	1914766.40	576865.47	4165152.36	Yes
Ht=44 ft.	6207683.99	1914726.87	576865.47	4165140.31	
W=40 ft.	6207658.35	1914726.87	576857.65	4165140.31	
L=40 ft.	6207652.50	1914733.46	576855.87	4165142.32	
	6207625.39	1914733.46	576847.61	4165142.32	
	6207625.39	1914742.98	576847.61	4165145.22	
	6207640.77	1914748.83	576852.30	4165147.00	
	6207652.50	1914748.83	576855.87	4165147.00	

	6207658.35	1914754.69	576857.65	4165148.79	
	6207658.35	1914766.40	576857.65	4165152.36	
CT Air Inlet West	6207549.21	1914766.40	576824.39	4165152.36	Yes
Ht=44 ft.	6207549.21	1914726.87	576824.39	4165140.31	
W=40 ft.	6207523.57	1914726.87	576816.57	4165140.31	
L=40 ft.	6207518.20	1914734.19	576814.94	4165142.54	
	6207489.88	1914734.19	576806.30	4165142.54	
	6207489.88	1914742.24	576806.30	4165145.00	
	6207505.99	1914748.83	576811.21	4165147.00	
	6207518.44	1914748.83	576815.01	4165147.00	
	6207523.57	1914755.42	576816.57	4165149.01	
	6207523.57	1914766.40	576816.57	4165152.36	
DeMin H20 East	6207805.58	1914598.03	576902.53	4165101.04	Yes
Ht=25 ft.					
Diam=25 ft.					
DeMin H20 West	6207744.78	1914598.76	576884.00	4165101.26	Yes
Ht=25 ft.					
Diam=25 ft.					
GT Stack East	6207615.13	1914546.06	576844.48	4165085.20	
Ht=145 ft.					
Diam=18 ft.					
GT Stack West	6207480.35	1914546.06	576803.40	4165085.20	
Ht=145 ft.					
Diam=18 ft.					
Warehouse/Maint. Bldg	6207829.02	1914887.20	576909.67	4165189.18	Yes
Ht=20 ft.	6207829.02	1914782.65	576909.67	4165157.31	
L=100 ft.	6207754.25	1914782.67	576886.88	4165157.32	
W=75 ft.	6207754.30	1914882.20	576886.90	4165187.66	
Admin Bldg	6207829.02	1914782.65	576909.67	4165157.31	Yes
Ht=20 ft.	6207829.02	1914702.86	576909.67	4165132.99	
L=80 ft.	6207754.30	1914702.86	576886.90	4165132.99	
W=75 ft.	6207754.25	1914782.67	576886.88	4165157.32	
H2O Treatment Bldg	6207829.02	1914702.86	576909.67	4165132.99	Yes
Ht=20 ft.	6207829.02	1914622.34	576909.67	4165108.45	
L=80 ft.	6207754.30	1914623.06	576886.90	4165108.67	
W=75 ft.	6207754.30	1914702.86	576886.90	4165132.99	
Fire Water Tank	6207746.25	1914551.18	576884.45	4165086.76	Yes
Ht=33 ft.					
Diam=40 ft.					
Blr Feedwater/Chem Bldg	6207541.88	1914580.47	576822.15	4165095.69	No
Ht=20 ft.	6207542.62	1914535.81	576822.38	4165082.08	
L=42.5 ft.	6207508.19	1914536.54	576811.88	4165082.30	
W=33 ft.	6207508.92	1914580.47	576812.11	4165095.69	
Blr Feedwater Bldg	6207676.66	1914575.34	576863.23	4165094.12	No
Ht=20 ft.	6207677.40	1914548.26	576863.46	4165085.87	
L=32.5 ft.	6207626.12	1914548.26	576847.83	4165085.87	
W=33 ft.	6207626.12	1914580.47	576847.83	4165095.69	
	6207659.08	1914580.47	576857.88	4165095.69	
	6207660.55	1914575.30	576858.32	4165094.11	

Emer Gen Set Bldg		6207594.62	1914852.92	576838.23	4165178.73	Yes
Ht=8.5 ft.		6207595.35	1914840.48	576838.45	4165174.94	
L=15.5 ft.		6207580.70	1914840.48	576833.99	4165174.94	
W=6.5 ft		6207579.98	1914852.65	576833.77	4165178.65	
Stack		6207589.51	1914847.32	576836.67	4165177.02	
Ht=10 ft.						
Diam=1 ft.						
Fire Pump/Engine House		6207794.59	1914563.04	576899.18	4165090.38	Yes
Ht=16 ft.		6207794.59	1914533.03	576899.18	4165081.23	
L=30 ft.		6207774.82	1914533.02	576893.15	4165081.23	
W=20 ft.		6207774.82	1914563.04	576893.15	4165090.38	
Stack		6207784.89	1914547.34	576896.22	4165085.59	
Ht=10 ft.						
Diam=1 ft.						
Gas Compressor Bldg		6207797.52	1914519.64	576900.07	4165077.15	Yes
Ht=16 ft.		6207797.52	1914469.13	576900.07	4165061.75	
L=80 ft.		6207717.68	1914469.13	576875.74	4165061.75	
W=50 ft.		6207717.69	1914519.64	576875.74	4165077.15	
Switchyard Control Room		6207377.80	1915006.94	576772.14	4165225.68	No
Ht=16 ft.		6207377.80	1914958.62	576772.14	4165210.95	
L=50 ft.		6207357.29	1914958.62	576765.89	4165210.95	
W=20 ft.		6207358.02	1915006.20	576766.11	4165225.45	
Gas Scrubber East		6207597.55	1914781.47	576839.12	4165156.95	No
Ht=16 ft.		6207597.55	1914730.96	576839.12	4165141.56	
		6207586.56	1914730.96	576835.77	4165141.56	
		6207586.56	1914781.70	576835.77	4165157.02	
Gas Scrubber West		6207463.51	1914781.47	576798.27	4165156.95	No
Ht=16 ft.		6207463.51	1914730.96	576798.27	4165141.56	
		6207451.79	1914730.96	576794.69	4165141.56	
		6207451.79	1914781.47	576794.69	4165156.95	
Fence Corners	NE	6207886.01	1915163.28	576927.04	4165273.33	
	SE	6207887.40	1914456.39	576927.47	4165057.87	
	SW-1	6207164.72	1914460.78	576707.20	4165059.21	
	SW-2	6206969.87	1914536.91	576647.80	4165082.41	
	NW-1	6206977.20	1915103.50	576650.04	4165255.11	
	NW-2	6207022.61	1915140.10	576663.88	4165266.26	
	NW-3	6207194.02	1915170.84	576716.13	4165275.63	
T22 H2O Treat. Area		6207214.21	1915106.60	576722.28	4165256.05	Yes
Ht=20 ft.		6207214.21	1914807.20	576722.28	4165164.80	
L=		6206994.46	1914807.20	576655.30	4165164.80	
W=		6206994.46	1915106.60	576655.30	4165256.05	
Open HRSG West	Part 1	6207488.31	1914678.01	576805.83	4165125.42	Yes
Ht=45 ft.		6207500.76	1914631.16	576809.62	4165111.14	
L=50 ft.		6207459.74	1914631.16	576797.12	4165111.14	
W=44 ft.		6207470.73	1914678.01	576800.47	4165125.42	
	Part 2	6207500.76	1914631.16	576809.62	4165111.14	
Ht=100 ft.		6207501.49	1914560.15	576809.84	4165089.49	
L=72 ft.		6207457.54	1914560.15	576796.45	4165089.49	
W=44 ft.		6207459.74	1914631.16	576797.12	4165111.14	
Open HRSG East	Part 1	6207622.36	1914679.47	576846.68	4165125.86	Yes
Ht=45 ft.		6207635.54	1914631.69	576850.70	4165111.30	

L=50 ft.		6207593.79	1914631.31	576837.98	4165111.18
W=44 ft.		6207606.24	1914679.47	576841.77	4165125.86
	Part 2	6207635.54	1914631.69	576850.70	4165111.30
Ht=100 ft.		6207637.74	1914560.15	576851.37	4165089.49
L=72 ft.		6207593.06	1914560.15	576837.75	4165089.49
W=44 ft.		6207593.79	1914631.31	576837.98	4165111.18

All data derived from Table 8.1B-1B and CAD Drawing file (russellv14.dwg).

Table 8.1B-1B. RCEC structure size and height data.
Input assumptions for AFC and design.

	RCEC	
Item	**Dimensions**	**Remarks**
Equipment grade elevation	10'	
HRSG oper grating	82'	
HRSG highest drum	90'	
HRSG top of casing	74'	
HRSG top -works support steel	115'	
HRSG top of highest relief valves and vent	125'	
HRSG Sreening	3 sides 98' wide by 180' long by 120' high- max	
HRSG inlet duct to stack wall	127' long	
HRSG duct Width	31.5' wide	
Stack dimensions / height	18' dia / 145' h	
CTG noise barrier	NA	
Steam turbine operating deck	37'	
Gas Turbine air inlets, top, bottom, width	44', 8', 40'	See Note 2
Steam Turbine Condenser height	28'h x 22'w x 40'h	
Steam Turbine weather / noise enclosure height	31'	See Note 2
Steam turbine generator enclosure height	25'	
Steam Turbine generator noise barrier	NA	
Steam turbine generator cooler height	30'	
Raw / fire water storage tank volume, gal	270,000	240,000 for fire water
Raw / fire water storage tank diameter / height	40' Dia / 33' H	32' h = 300,000 gal
Demineralized storage tank volume, gal	153,000	
Demineralized storage tank diameter / height	25' Dia / 25' H	
Cooling tower	10 cell 54'H x (56' basin & 48' structure)W x 480'-6"L	See Note 4: Plume abated 54' to deck & fan cone 10' tall
Admin / control bld	20' h x 80' x 75'	See Notes 1
Warehouse / maintenance	20' h x 75' x 100'	See Notes 1
Water treatment bld	20' h x 80' x 75'	See Notes 1
Fire pump house	16' h x 20' x 30'	
Gas compressor bld	16' h x 80' x 50'	
Circ water pump house	16' hx 43' x 70'	See note 3
Switchyard control house	16'h x 20' x 50'	
Boiler Feed pump Room - w/o chem feed	20' h x 32.5' x 33'	
Boiler Feed pump Room - w/ chem feed	20' h x 42.5' x 33'	
Switchgear / battery building	20' h x 20'w x 70' l	
emergency generator building	8.5' h x 6.5 ' x 15.5'	
STG Transformer pit / fire wall	26'h x 36 ' x 28' wall	
CTG transformer pit / fire wall	26'h x 36 ' x 28' wall	
Ammonia storage tank	10.8' dia. x 40' long	
Ammonia storage tank dike	5' h x 15' x 44'	
Note 1: One common building 75' wide by 250' long		
Note 2: Outdoor plant arrangement		
Note 3: Circ. Water pumps inside building - noise considersations.		
Note 4: Cooling tower dimensions for plume free design point between 30 F and 45 F @ 90% RH		
Square Footages to nearest 100 ft2		
Admin / control = 6000		
Warehouse = 7500		
Water treat = 6000		
Gas comp = 4000		
BFP A / B = 1000 / 1400		
Fire Pump = 600		
Circ Water pump building = 3000		

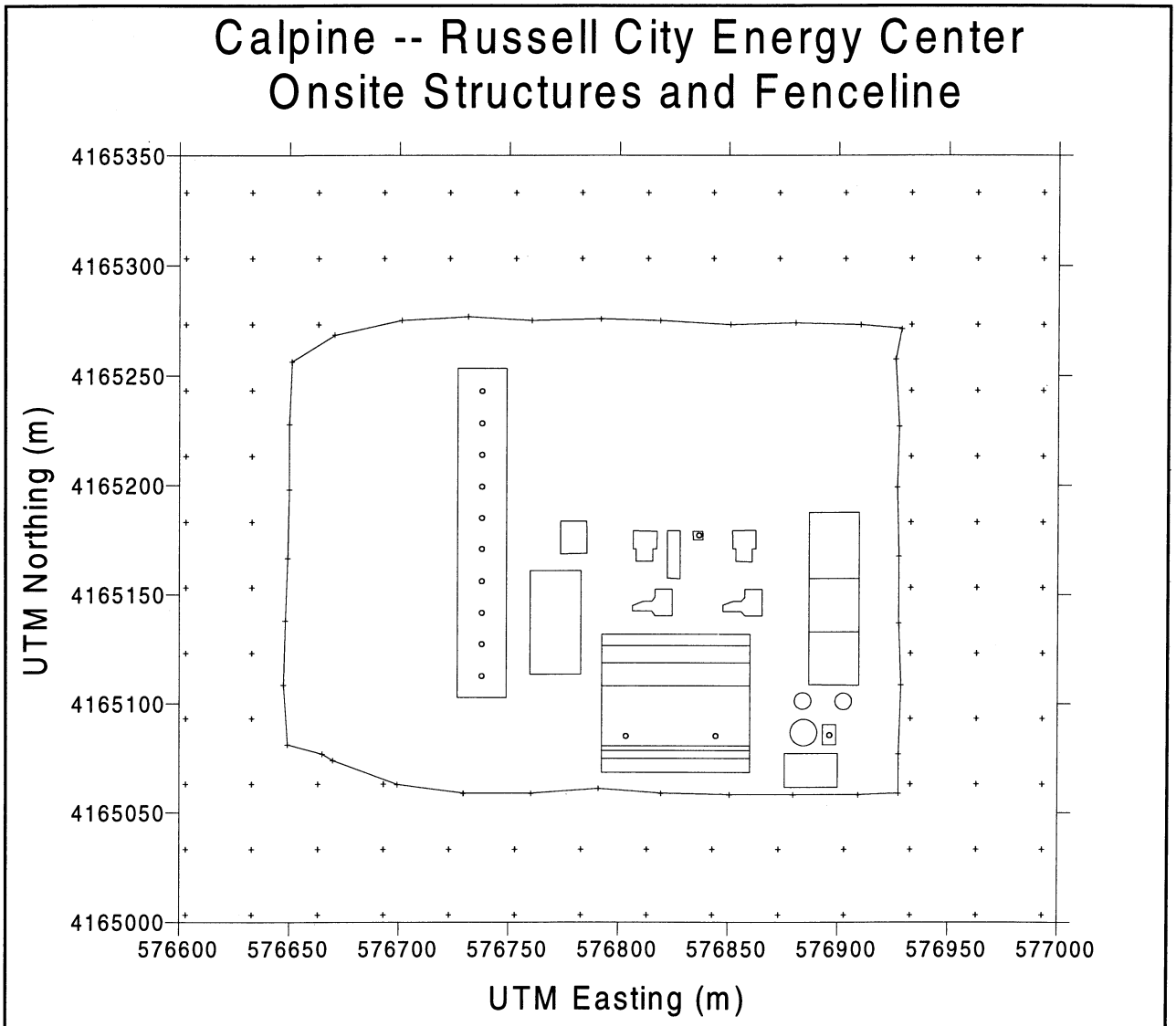


Figure 8.1B-1. Project dimensions as modeled.

Table 8.1B-2. RCEC emissions - screening analysis for worst-case source configuration.

GENERAL DATA:		Case 2	Case 3	Case 11	Case 12	Case 14	Case 16	Emer. Generator	Firepump
Manufacturer/Model		West 501F	West 501F	West 501F	West 501F	West 501F	West 501F	Caterpiller G3512 90 LE	Cummins 6CTA8.3-F3
Ambient Temperature, F		34	34	94	94	59	94		
Load, %		100.0	70.0	100.0	70.0	PWR AUG	PWR AUG		
Evaporative Cooler?		off	off	on	off	on	on		
Duct Burner?		off	off	off	off	on	on		
Modeling Stack Parameters									
Stack Height (m)		44.196	44.196	44.196	44.196	44.196	44.196	3.048	9.144
Stack Diameter (m)		5.4864	5.4864	5.4864	5.4864	5.4864	5.4864	0.2286	0.1016
Stack Exit Velocity (m/s)		21.0	17.3	19.6	15.9	21.4	20.7	48.4	83.5
Stack Temperature (K)		349.7	349.7	349.7	349.7	349.7	349.7	649.1	748.0
NOx (g/s/turbine)		2.405	1.810	2.209	1.591	2.696	2.601	0.223	4.914E-01
SO2 (g/s/turbine)		0.173	0.129	0.159	0.113	0.189	0.187	4.868E-04	1.336E-02
CO (g/s/turbine)		3.564	2.682	3.273	2.356	3.995	3.854	0.380	0.296
PM10 (g/s/turbine)		1.134	1.134	1.134	1.134	1.512	1.512	7.884E-05	0.01605
Maximum Unitized Impacts (ug/m3) at 1 g/s/turbine							Hrs/yr=	**200**	**30**
	1-hour	6.65850	9.99262	7.77954	11.85301	6.57389	6.87891	3238.32642	1504.05872
	3-hour	5.97715	7.47526	6.02534	8.70393	5.96665	5.98053	2026.96667	825.68140
	8-hour	2.32783	4.48348	3.07746	5.57665	2.31939	2.46504	760.11249	501.18179
	24-hour	1.13745	2.26713	1.49752	2.94345	1.05586	1.20234	370.91162	200.09004
	Annual	#N/A	#N/A	#N/A	#N/A	0.10138	#N/A	92.92491	48.75942
Maximum Pollutant Impacts (ug/m3)									
NOx (w/o OLM)	1-hour	16.01	18.09	17.19	***18.86***	17.72	17.89	722.15	***739.09***
	Annual					***0.273***		0.47	0.08
SO2	1-hour	1.15	1.29	1.24	***1.34***	1.24	1.29	1.58	***20.09***
	3-hour	1.03	0.96	0.96	0.98	***1.13***	1.12	0.33	***3.68***
	24-hour	0.20	0.29	0.24	***0.33***	0.20	0.22	0.008	***0.111***
	Annual					***0.019***		0.0010	0.0821
CO	1-hour	23.73	26.80	25.46	***27.93***	26.26	26.51	***1230.56***	445.20
	8-hour	8.30	12.02	10.07	***13.14***	9.27	9.50	36.11	***18.54***
PM10	24-hour	1.29	2.57	1.70	***3.34***	1.60	1.82	0.0012	***0.1338***
	Annual					***0.153***		0.00017	0.00268

Notes:

1. All values shown above are estimated, not guaranteed.
2. Stack velocity shown is based on a stack diameter of 18.0 feet.
3. SO2 and PM10 values are based on a fuel sulfur content of 4 ppmv.
4. Duct burner emissions are based on the following emission rates:
   NOX emission = 0.08 LB/MMBTU (HHV)
   CO emission = 0.10 LB/MMBTU (HHV)
   VOC emission = 0.02 LB/MMBTU (HHV)
   PM10 emission = 0.01 LB/MMBTU (HHV)
5. Firepump/Emerg.Gen emissions shown above are for one hour of operation. Since each source is only tested for one hour, at most, in any one day, 3-hour, 8-hour, and 24-hour emissions are 1-hour emissions divided by 3, 8, and 24, respectively.

Table 8.1B-2 (cont'd) Russell City Energy Center fine grid analysis for maximum turbine impacts.

		Case 12				Case 14				
GENERAL DATA:										
Manufacturer/Model		**West 501F**				**West 501F**				
Ambient Temperature, F		**94**				**59**				
Load, %		**70.0**				**PWR AUG**				
Evaporative Cooler?		**off**				**on**				
Duct Burner?		**off**				**on**				
Modeling Stack Parameters										
Stack Height (m)		44.196				44.196				
Stack Diameter (m)		5.4864				5.4864				
Stack Exit Velocity (m/s)		15.9				21.4				
Stack Temperature (K)		349.7				349.7				
Emission Rate by Avg.Time		**1-hour**	**3-hour**	**8-hour**	**24-hour**	**1-hour**	**3-hour**	**8-hour**	**24-hour**	**Annual**
NOx (g/s/turbine)		1.591				2.696				2.353
SO2 (g/s/turbine)		0.113	0.113		0.113	0.189	0.189			0.178
CO (g/s/turbine)		2.356		41.068		3.995				
PM10 (g/s/turbine)		1.134			1.134	1.512				1.200
Maximum Unitized Impacts (ug/m3) at 1 g/s/turbine										
	1-hour	11.85301				6.57389				
	3-hour	8.70393				6.05729				
	8-hour	5.57665				2.31939				
	24-hour	2.94345				1.05586				
	Annual					0.10770				
Maximum Pollutant Impacts (ug/m3)										
NOx (w/o OLM)	1-hour	***18.86***				17.72				
	Annual					0.290				***0.253***
SO2	1-hour	***1.34***				1.24				
	3-hour	0.98	0.98			1.14	***1.145***			
	24-hour	0.33			***0.3326***	0.20				
	Annual					0.020				***0.0192***
CO	1-hour	***27.93***				26.26				
	8-hour	13.14		***229.02***		9.27				
PM10	24-hour	3.34			***3.34***	1.60				
	Annual					0.163				***0.129***

Notes:

1. All values shown above are estimated, not guaranteed.
2. Stack velocity shown is based on a stack diameter of 18.0 feet.
3. SO2 and PM10 values are based on a fuel sulfur content of 4 ppmv.
4. Duct burner emissions are based on the following emission rates:
   NOX emission = 0.08 LB/MMBTU (HHV)
   CO emission = 0.10 LB/MMBTU (HHV)
   VOC emission = 0.02 LB/MMBTU (HHV)
   PM10 emission = 0.01 LB/MMBTU (HHV)

Table 8.1B-3. Emission rates and stack parameters for modeling.

	Emission Rates, g/s								Emission Rates, lb/hr							
	Stack Diam, m	Temp, deg K	Exhaust Flow, m3/s	Exhaust Velocity, m/s	NOx	SO2	CO	PM10	Stack Diam, ft	Exh Temp, Deg F	Exh Flow Rate, ft3/m	Exhaust Velocity, ft/s	NOx	SO2	CO	PM10
Averaging Period: One hour																
Turbine 1/HRSG	5.4864	349.7	376.14	15.9	1.591	0.113	2.356	n/a	18	170	797,000	52.20	12.626	0.9	18.7	n/a
Turbine 2/HRSG	5.4864	349.7	376.14	15.9	1.591	0.113	2.356	n/a	18	170	797,000	52.20	12.626	0.9	18.7	n/a
Em Generator	0.2286	649.1	1.99	48.4	(1)	(1)	0.380	n/a	0.75	709	4,210	158.82	(1)	(1)	3.015	n/a
Fire Pump	0.1016	748.0	0.68	83.5	4.914E-01	1.336E-02	(1)	n/a	0.33	887	1,435	274.06	3.9	0.106	(1)	n/a
Cooling Tower (each cell)	10.0584	294.1	674.08	8.5	n/a	n/a	n/a	n/a	33	69.9	1,428,300	27.83	n/a	n/a	n/a	n/a
Averaging Period: Three hours																
Turbine 1/HRSG	5.4864	349.7	505.83	21.4	n/a	0.189	n/a	n/a	18	170	1,071,800	70.20	n/a	1.5	n/a	n/a
Turbine 2/HRSG	5.4864	349.7	505.83	21.4	n/a	0.189	n/a	n/a	18	170	1,071,800	70.20	n/a	1.5	n/a	n/a
Em Generator	0.2286	649.1	1.99	48.4	n/a	(1)	n/a	n/a	0.75	709	4,210	158.82	n/a	(1)	n/a	n/a
Fire Pump	0.1016	748.0	0.68	83.5	n/a	4.452E-03	n/a	n/a	0.33	887	1,435	274.06	n/a	3.53E-02	n/a	n/a
Cooling Tower (each cell)	10.0584	294.1	674.08	8.5	n/a	n/a	n/a	n/a	33	69.9	1,428,300	27.83	n/a	n/a	n/a	n/a
Averaging Period: Eight hours																
Turbine 1/HRSG	5.4864	349.7	376.14	15.9	n/a	n/a	41.068	n/a	18	170	797,000	52.20	n/a	n/a	325.94	n/a
Turbine 2/HRSG	5.4864	349.7	376.14	15.9	n/a	n/a	41.068	n/a	18	170	797,000	52.20	n/a	n/a	325.94	n/a
Em Generator	0.2286	649.1	1.99	48.4	n/a	n/a	(1)	n/a	0.75	709	4,210	158.82	n/a	n/a	(1)	n/a
Fire Pump	0.1016	748.0	0.68	83.5	n/a	n/a	3.701E-02	n/a	0.33	887	1,435	274.06	n/a	n/a	0.294	n/a
Cooling Tower (each cell)	10.0584	294.1	674.08	8.5	n/a	n/a	n/a	n/a	33	69.9	1,428,300	27.83	n/a	n/a	n/a	n/a
Averaging Period: 24 hours																
Turbine 1/HRSG	5.4864	349.7	376.14	15.9	n/a	0.113	n/a	1.134	18	170	797,000	52.20	n/a	0.9	n/a	9
Turbine 2/HRSG	5.4864	349.7	376.14	15.9	n/a	0.113	n/a	1.134	18	170	797,000	52.20	n/a	0.9	n/a	9
Em Generator	0.2286	649.1	1.99	48.4	n/a	(1)	n/a	(1)	0.75	709	4,210	158.82	n/a	(1)	n/a	(1)
Fire Pump	0.1016	748.0	0.68	83.5	n/a	5.565E-04	n/a	6.694E-04	0.33	887	1,435	274.06	n/a	4.42E-03	n/a	0.0053125
Cooling Tower (each cell)	10.0584	294.1	674.08	8.5	n/a	n/a	n/a	8.631E-03	33	69.9	1,428,300	27.83	n/a	n/a	n/a	0.0685
Averaging Period: Annual																
Turbine 1/HRSG	5.4864	349.7	505.83	21.4	1.927	0.178	n/a	1.200	18	170	1,071,800	70.20	15.2968	1.416	n/a	9.521
Turbine 2/HRSG	5.4864	349.7	505.83	21.4	1.927	0.178	n/a	1.200	18	170	1,071,800	70.20	15.2968	1.416	n/a	9.521
Em Generator	0.2286	649.1	1.99	48.4	5.100E-03	1.112E-05	n/a	1.801E-06	0.75	709	4,210	158.82	4.05E-02	8.82E-05	n/a	1.43E-05
Fire Pump	0.1016	748.0	0.68	83.5	1.683E-03	4.574E-05	n/a	5.502E-05	0.33	887	1,435	274.06	1.34E-02	3.63E-04	n/a	4.37E-04
Cooling Tower (each cell)	10.0584	294.1	674.08	8.5	n/a	n/a	n/a	8.631E-03	33	69.9	1,428,300	27.83	n/a	n/a	n/a	0.0685

Note: 1. Emergency generator and fire pump will not operate during the same 24-hour period.

Higher concentration from screening assessement used for each pollutant and averaging period.

Table 8.1B-4. Russell City Project - SCREEN3 turbine fumigation impacts (maximum for A=2,3,4,5,6).

		Case 12				Case 14				
GENERAL DATA:										
Manufacturer/Model		West 501F				West 501F				
Ambient Temperature, F		94				59				
Load, %		70.0				PWR AUG				
Evaporative Cooler?		off				on				
Duct Burner?		off				on				
1-hour Emission Rates										
NOx (g/s/turbine)		1.591				2.696				
SO2 (g/s/turbine)		0.113				0.189				
CO (g/s/turbine)		2.356				3.995				
PM10 (g/s/turbine)		1.134				1.512				
		REFINED NORMAL	SCREENING NORMAL	INVERSION FUMIGATION	SHORELINE FUMIGATION	REFINED NORMAL	SCREENING NORMAL	INVERSION FUMIGATION	SHORELINE FUMIGATION	Fumigation Avg.Time
Maximum Impacts (ug/m3) at 1 g/s/turbine										
	1-hour	11.85301	6.396	1.608	4.421	6.57389	5.143	1.326	3.391	Ratios
	3-hour	8.70393	5.756	1.447	3.979	5.96665	4.629	1.193	3.052	0.9
	8-hour	5.57665	4.477	1.126	3.095	2.31939	3.600	0.928	2.374	0.7
	24-hour	2.94345	2.558	0.643	1.768	1.05586	2.057	0.530	1.356	0.4
Maximum Pollutant Impacts (ug/m3)		For 2 turbs	--- Multiplied by 2 for two turbines ---			For 2 turbs	--- Multiplied by 2 for two turbines ---			
NOx (w/o OLM)	1-hour	18.86	20.35	5.12	14.07	17.72	27.73	7.15	18.28	
SO2	1-hour	1.34	1.45	0.36	1.00	1.24	1.94	0.50	1.28	
	3-hour	0.98	1.30	0.33	0.90	1.13	1.75	0.45	1.15	
	24-hour	0.33	0.58	0.15	0.40	0.20	0.78	0.20	0.51	
CO	1-hour	27.93	30.14	7.58	20.83	26.26	41.09	10.59	27.09	
	8-hour	13.14	21.10	5.31	14.58	9.27	28.76	7.41	18.97	
PM10	1-hour	13.44	14.51	3.65	10.03	9.94	15.55	4.01	10.25	
	24-hour	3.34	5.80	1.46	4.01	1.60	6.22	1.60	4.10	
				13,298	4,425			15,329	5,540	meters

		--- EMER.GEN ---		--- FIREPUMP ---		--- EMER.GEN ---		--- FIREPUMP ---	
		INVERSION FUMIGATION	SHORELINE FUMIGATION	INVERSION FUMIGATION	SHORELINE FUMIGATION	INVERSION FUMIGATION	SHORELINE FUMIGATION	INVERSION FUMIGATION	SHORELINE FUMIGATION
Maximum Impacts (ug/m3) at/beyond Fumigation Distances for Auxiliary Sources									
	1-hour	14.37	41.34	14.24	40.78	12.36	33.63	12.26	33.21
	3-hour	12.93	37.21	12.82	36.70	11.12	30.27	11.03	29.89
	8-hour	10.06	28.94	9.97	28.55	8.65	23.54	8.58	23.25
	24-hour	5.75	16.54	5.70	16.31	4.94	13.45	4.90	13.28
Maximum Pollutant Emissions (g/s)									
NOx	1-hour	0.223		4.914E-01					
SO2	1-hour	4.868E-04		1.336E-02					
	3-hour	1.623E-04		4.453E-03					
	24-hour	2.028E-05		5.567E-04					
CO	1-hour	0.380		0.296					
	8-hour	0.048		0.037					
PM10	1-hour	7.884E-05		1.605E-02					
	24-hour	3.285E-06		6.688E-04					
Maximum Pollutant Impacts (ug/m3)									
NOx (w/o OLM)	1-hour	3.20	9.22	7.00	20.04	2.76	7.50	6.02	16.32
SO2	1-hour	7.00E-03	2.01E-02	1.90E-01	5.45E-01	6.02E-03	1.64E-02	1.64E-01	4.44E-01
	3-hour	2.10E-03	6.04E-03	5.71E-02	1.63E-01	1.80E-03	4.91E-03	4.91E-02	1.33E-01
	24-hour	1.17E-04	3.35E-04	3.17E-03	9.08E-03	1.00E-04	2.73E-04	2.73E-03	7.39E-03
CO	1-hour	5.46	15.71	4.22	12.07	4.70	12.78	3.63	9.83
	8-hour	0.48	1.37	0.37	1.06	0.41	1.12	0.32	0.86
PM10	1-hour	1.13E-03	3.26E-03	2.29E-01	6.55E-01	9.74E-04	2.65E-03	1.97E-01	5.33E-01
	24-hour	1.89E-05	5.43E-05	3.81E-03	1.09E-02	1.62E-05	4.42E-05	3.28E-03	8.88E-03

		INVERSION FUMIGATION	SHORELINE FUMIGATION	INVERSION FUMIGATION	SHORELINE FUMIGATION
Total (Turbine + Emer.Gen/Firepump) Pollutant Impacts (ug/m3)					
NOx (w/o OLM)	1-hour	12.11	34.11	13.17	**34.60**
SO2	1-hour	0.55	1.54	0.67	**1.73**
	3-hour	0.38	1.06	0.50	**1.29**
	24-hour	0.15	0.41	0.20	**0.52**
CO	1-hour	13.04	36.54	15.29	**39.87**
	8-hour	5.78	15.96	7.83	**20.09**
PM10	1-hour	3.88	10.68	4.21	**10.79**
	24-hour	1.46	4.02	1.61	**4.11**

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Appendix 8.1-C
Protocol for Increments Analysis

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APPENDIX 8.1-C PROTOCOL FOR INCREMENTS ANALYSIS

Overview of Requirements for Increments Analysis

The federal Prevention of Significant Deterioration (PSD) program is intended to ensure that economic growth in areas with good air quality occurs without causing the deterioration of that air quality to unhealthful levels. The PSD program contains a number of requirements that apply to new or modified sources of air pollution that are located in clean air areas. In the Bay Area, the Bay Area Air Quality Management District (BAAQMD) has been delegated authority by the USEPA to administer the PSD program for NO_2, SO_2 and PM_{10}, the pollutants for which federal ambient standards are currently being attained. These PSD program requirements, applied on a pollutant-specific basis, include conducting an increments analysis to demonstrate that no increments will be exceeded as a result of the proposed new or modified source.

Increments are the maximum increases in concentration that are allowed to occur above baseline concentrations for each pollutant for which an increment has been established. Currently, increments have been established for NO_2, SO_2 and PM_{10}. These allowable increments are shown in the table below.

Class II Increments	
Pollutant/Averaging Time	**Allowable Class Increments ($\mu g/m^3$)**
NO_2	
Annual	25
SO_2	
3-Hour	512
24-Hour	91
Annual	20
PM_{10}	
24-Hour	30
Annual	17

The baseline concentrations are defined for each pollutant and averaging time, and are the ambient concentrations of each pollutant existing at the time that the first complete PSD application affecting the area is submitted. Federal regulations establish the dates after which major and minor source impacts on increment consumption need to be considered in an increments analysis, as follows:

- Major source baseline date: The date after which actual emissions associated with modifications at a major stationary source affect the available increment.
- Trigger date: The date after which the minor source baseline date may be established.
- Minor source baseline date: The earliest date after the trigger date on which a complete PSD application is received by the reviewing agency. After this date, actual emission changes (including increases in throughput or production that do not require permit changes) from all sources (major and minor stationary sources, area sources and mobile sources) affect the available increment.

BAAQMD regulations require that before an Authority to Construct can be issued for a facility projecting significant increases in NO_2, SO_2 and PM_{10}, the applicant must perform an increments analysis to

demonstrate that the project will not cause an exceedance of the applicable increment. The ambient impacts from RCEC for NO_2, SO_2 and annual PM_{10} have been shown to be below significance levels for all averaging times; therefore, increments analyses are not required for these pollutants and averaging periods. Should further modeling indicate that a significance level is exceeded, the following procedures will be used to perform the increment analysis.

Methodology

Establishing the Impact Area - The first step in the increments analysis is the establishment of the impact area for each pollutant and averaging period. The impact area includes the area where the emissions from the new source will cause a significant ambient impact. The impact area is a circular area with a radius extending from the source to the most distant point where modeling indicates that the ambient impact will be significant.

As described in the air quality modeling analyses contained in Section 8.1 of the AFC, affected emissions from RCEC will be modeled using the appropriate short and/or long term emission rates, the ISCST3 model and the Union City meteorological data set. Based on these modeling analyses, a region surrounding the project site will be identified as the area in which RCEC could have a "significant" air quality impact on ambient levels.

Identifying Sources Affecting the Impact Area

Once the impact area is established, sources consuming increment within the impact area must be identified and emission inventories developed for those sources. The sources include not only those located within the impact area, but also those located outside the impact area whose emissions could contribute to ambient impacts there. These inventories must account for the change in emissions between the pollutant-specific baseline date and the date of the permit application for the new source or modification. Based on these inventories, the changes in emissions are modeled to determine the amount of increment consumed for each pollutant.

In order to ensure that other emission sources that might have significant impacts on the impact area in conjunction with RCEC are identified, we will request from District staff a list of facilities that meet the following criteria:

- Major Sources: All sources within 50 kilometers of the impact area (52 km of the project) that have had significant permitted increases in affected emissions (greater than 25 tons per year) since the applicable major source baseline date.
- Minor Sources: All sources within 20 kilometers of the identified impact area (22 km of the project) that have had any permitted increases in affected emissions since the applicable minor source baseline date.

Because the increments analysis is intended to evaluate changes in ambient impacts since the baseline date due to increment-consuming sources, the analysis should compare impacts from emissions during the appropriate baseline period (two years prior to the baseline date) and from current emissions. However, the District staff indicates that actual emissions data are not available from the District's inventory system for the appropriate baseline periods. Only the most current year of actual emissions data are available. Therefore, it will not be possible to determine the changes in actual emissions from the identified point sources. Based on consultations with District staff, it has been suggested that permitted changes in emissions from the identified point sources be modeled instead, if an increment analysis is required.

In addition to point sources, and based on recent draft USEPA guidelines, all area and mobile sources affecting increment are to be included in the increments analysis. We will also request a gridded inventory of mobile and area source emissions changes since the appropriate minor source baseline dates for use in modeling increment consumption from these sources. Emissions changes are allocated to pre-defined grid cell sizes in these inventories.

Data Used in the Increments Analysis

Stack Parameters for Sources

For the permitted changes in emissions, we anticipate that the computer printout will provide minimal stack data, especially when the emissions are fugitive in nature. The following default stack parameters will be used for sources identified as "fugitive" on the computer printout:

Release height:	1 meter
Temperature:	ambient (70 degF)
Stack cross-sectional area:	1 ft^2
Flow rate:	3000 ACFM

Modeling Area and Mobile Source Emissions

As discussed above, we expect to obtain from the District staff data on the change in affected emissions between the appropriate baseline date and the most recent available inventory for use in modeling increment consumption by area and mobile sources. These data will be provided for pre-defined grid cells for the project region. Gridded emission data for the grid cells that overlap the impact areas will be used in modeling increment consumption by these sources. The ISCST3 model and the Union City meteorological data will be used for modeling all increment-consuming sources.

The following exhaust temperatures and release heights will be used in modeling area and mobile source impacts:

Source Parameters for Area and Mobile Source Modeling	
Release height	2 meters
Exhaust temperature	298°K

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Appendix 8.1-D
Screening Health Risk Assessment

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APPENDIX 8.1D SCREENING HEALTH RISK ASSESSMENT

The screening health risk assessment was conducted in accordance with the procedures developed by the California Air Pollution Control Officers' Association (CAPCOA) in the *Air Toxics "Hot Spots" Program: Revised 1992 Risk Assessment Guidelines,* CAPCOA, 1993).

The screening health risk assessment was carried out in three steps. First, emissions of toxic air pollutants from the project were calculated. These calculations are described in Section 8.1.4.1.1 and Appendix 8.1A, Table 8.1A-4, and the emissions are summarized in Table 8.1-20. Emissions from the emergency generator and fire pump are given in Appendix 8.1A, Tables 8.1A-7 and 8.1A-8.

Next, the ISCST3 model was used to predict the maximum concentration at each receptor due to the facility. This was done first for the coarse grid of receptors, and the locations of maximum risk were determined. Fine grids were set up around the locations of maximum modeled risk and impacts were reevaluated using ISCST3. Finally, the ARB/OEHHA Health Risk Assessment (HRA) Program (September 1996, with 9-27-00 updated databases) was used to evaluate acute, chronic and cancer risks through inhalation and non-inhalation pathways based upon the maximum predicted concentration at each receptor.

Based upon the water quality data (front-end RO permeate) chromium (in any form) is not expected to be found in the cooling tower drift.

The other assumptions used in running the HRA program were as follows:

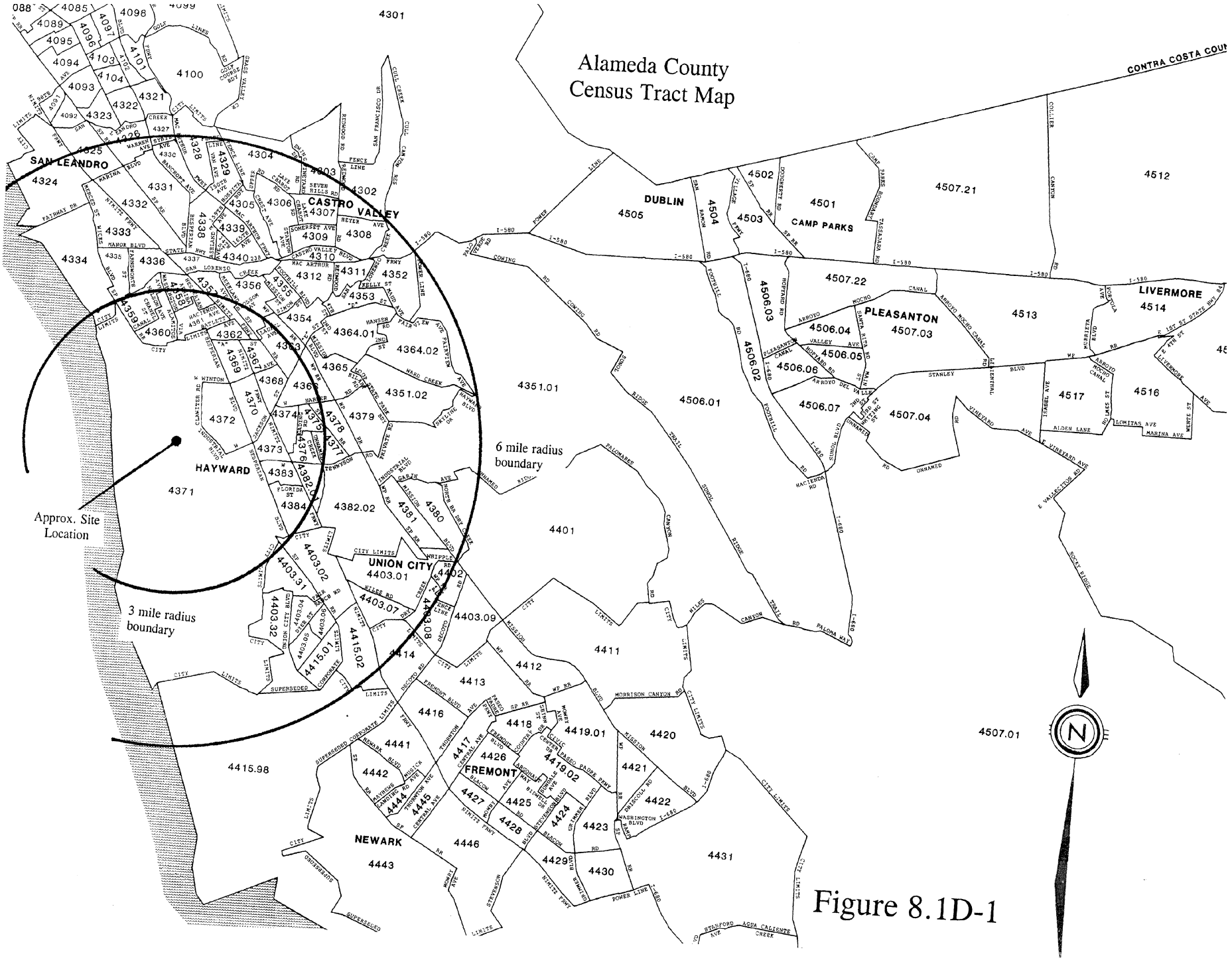
- Emission rates for non-criteria pollutants are taken from Table 8.1-20 of the AFC
- Number of residents affected is based upon the 1999 adjusted population data for those census tracts or portions of census tracts which lie within a 3 and 6 mile radius of the proposed facility.
- Number of workers affected is based upon the county average percentage of non-farm workers as compared to the total county population in 1999. This average was applied to all affected census tracts.
- Deposition velocity is taken to be 0.02 m/s, as recommended by ARB for controlled sources.
- Fraction of residents with gardens is taken to be 0.25, which is probably conservatively high for the urban area.
- Fraction of produce grown at home is taken to be 0.05, which is also believed to be conservatively high.

The HRA program is a single source model, using the emissions from a single source and the relationship between emissions and ambient concentration to calculate modeled concentration and then to determine modeled risk. The HRA input files use emission rates for each toxic pollutant, in grams per second, and a value of χ/Q, in $\mu g/m^3$ per gram per second. Since RCEC has multiple sources, the actual maximum modeled concentration of each toxic substance was used in place of the emission rate and χ/Q was taken as 1 to allow the model to evaluate total risk from all sources. While the modeled impacts of the cooling tower and the combustion sources were modeled separately (for ammonia only), the HRA program results were added together to determine total risk. The maximum modeled annual concentrations from all sources occurred at the same location.

The receptor grids used for these modeling analyses are similar to those used for the refined modeling, with the addition of discrete receptors located at schools, hospitals, day care centers, elder care facilities, retirement homes, and nursing homes. Residences nearest the proposed facility were also included as discrete receptors. A list of the discrete sensitive receptors is included in Table 8.1D-1 (Parts 1 and 2). Figure 8.1D-1 shows the boundary limits for the 3 and 6 mile radius areas. Table 8.1D-2 delineates the census tract population data, and Table 8.1D-3 and Attachment 8.1De delineates the census tract and population support data used in the SHRA.

The HRA program results for acute and chronic inhalation and chronic non-inhalation exposures, cancer burden and individual cancer risk (workplace and residential) for the cooling tower and the combustion sources are attached. Separate calculations are shown for each type of exposure and risk, and the results of the calculations are summarized below.

The modeling results show that the maximum modeled cancer risk from RCEC is expected to be 0.174 in one million. This risk is well below the one in one million level considered significant. The chronic and acute non-cancer hazard indices are <0.0216 and <0.246, respectively. Both are well below the significant impact level of 1. The total cancer burden was calculated to be 0.043, which is also well below 1.0. Detailed calculations and results for each significant receptor are included in the modeling results, which are being submitted electronically.


Alameda County
Census Tract Map
Approx. Site Location
3 mile radius boundary
6 mile radius boundary
SAN LEANDRO
CASTRO VALLEY
HAYWARD
UNION CITY
FREMONT
NEWARK
DUBLIN
CAMP PARKS
PLEASANTON
LIVERMORE
CONTRA COSTA COU
4301
4100
4321
4322
4323
4324
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4351.01
4351.02
4401
4402
4403.01
4403.02
4403.31
4403.32
4403.09
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4415.01
4415.02
4415.98
4411
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4418
4419.01
4419.02
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4506.02
4506.03
4506.04
4506.05
4506.06
4506.07
4507.01
4507.03
4507.04
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4507.22
4512
4513
4514
4516
4517
N

Figure 8.1D-1

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Table 8.1D-1, Part 1. Russell City sensitive receptor locational data.

Name	ADDRESS	CITY	ZIP CODE	Longitude	Latitude	Elevation	Elevation
A Kids Kingdom	18550 Redwood Rd	Castro Valley	94546	122.0728	37.7101	60-90ft	75
A Special Place	27305 Hintwood Ave	Hayward	94544	122.0681	37.6391	0-30ft	15
Abc Academy	670 Sunset Blvd	Hayward	94541	122.0926	37.6759	0-30ft	15
Abc pre-School & Day Care	20135 San Miguel Ave	Castro Valley	94546	122.0798	37.6985	30-60ft	45
Adventure Montessori Academy	4101 Pleiades Pl	Union City	94587	122.0654	37.5876	0-30ft	15
Adventure Time Lorenzo Manor	18250 Bengal Ave	Hayward	94541	122.1188	37.6748	0-30ft	15
Alameda County Medical Center	15400 Foothill Blvd	San Leandro	94578	122.1196	37.7080	0-30ft	15
All Saints School	22870 2nd Street	Hayward	94541	122.0802	37.6773	30-60ft	45
Alvarado Elementary School	31100 Fredi St	Union City	94587	122.0760	37.5951	0-30ft	15
Alzheimer's Services	561 A St	Hayward	94541	122.0879	37.6714	0-30ft	15
American Heritage Christian	425 Gresel St	Hayward	94544	122.0341	37.6181	0-30ft	15
Ardenwood Elementary School	33955 Emilia Ln	Fremont	94555	122.0510	37.5727	0-30ft	15
Avenue Pre-School	1521 159th Ave	San Leandro	94578	122.1170	37.7024	0-30ft	15
Barnard White Middle School	725 Wipple Rd	Union City	94587	122.0293	37.6058	0-30ft	15
Bay Point Healthcare Center	442 Sunset Blvd	Hayward	94579	122.0966	37.6742	0-30ft	15
Bay School	2001 Bockman Rd	San Lorenzo, CA	94580	122.1463	37.6717	0-30ft	15
Beth Sholom Pro-Shool	642 Dolores Ave	San Leandro	94578	122.1446	37.7249	0-30ft	15
Bethesda Christian Retirement	22427 Montgomery St	Hayward	94541	122.0867	37.6716	0-30ft	15
Bohannon Middle School	800 Bockman Rd	San Lorenzo, CA	94580	122.1247	37.6710	0-30ft	15
Bowman Elem	520 Jefferson St	Hayward	94544	122.0611	37.6417	0-30ft	15
Brenkwitz School	22100 Princeton St	Hayward	94545	122.0980	37.6721	0-30ft	15
Bret Harte Intermediate School	1047 E St	Hayward	94541	122.0251	37.5991	0-30ft	15
Broadmoor Parent Nursery	951 Dowling Blvd	San Leandro	94578	122.1457	37.7366	0-30ft	15
Burbank Elementary	353 B St	Hayward	94541	122.0934	37.6682	0-30ft	15
Burbank Pre School	15661 Washington Ave	San Lorenzo	94580	122.1369	37.6827	0-30ft	15
Camelot Schools	21753 Vallejo St	Hayward	94541	122.0936	37.6775	0-30ft	15
Castro Valley Elementary	20185 San Miguel Ave	Castro Valley	94546	122.0798	37.6981	30-60ft	45
Castro Valley Parent Nursery	3657 Christensen Ln	Castro Valley	94546	122.0836	37.7065	60-90ft	75
Cesar Chavez Middle School	2801 Hop Ranch Rd	Union City	94587	122.0462	37.5903	0-30ft	15
Chabot Elementary	19104 Lake Chabot Rd	Castro Valley	94546	122.0890	37.7071	60-90ft	75

Table 8.1D-1, Part 1. (continued)

Name	ADDRESS	CITY	ZIP CODE	Longitude	Latitude	Elevation	Elevation
Cherryland Elementary	585 Willow Ave	Hayward	94541	122.0970	37.6766	0-30ft	15
Cherubim's Children Center	30540 Mission Blvd	Hayward	94544	122.0302	37.6163	0-30ft	15
Child Family & Community Servic	20900 Corsair Blvd	Hayward	94545	122.1235	37.6554	0-30ft	15
Children's Choice	185 W Harder Rd	Hayward	94544	122.0853	37.6480	0-30ft	15
Circle Time Nursery	26555 Gading Rd	Hayward	94544	122.0802	37.6412	0-30ft	15
Colonial Acres Elementary	17115 Meekland Ave	Hayward	94580	122.1155	37.6840	0-30ft	15
Cornerstone Pentesostal Church	24150 Hesperian Blvd	Hayward	94545	122.1084	37.6521	0-30ft	15
Corvallis School	14790 Corvallis St	San Leandro	94579	122.1511	37.6966	0-30ft	15
Courtyard Care Center	1625 Denton Ave	Hayward	94545	122.1131	37.6467	0-30ft	15
Darwin Head Start	2560 Darwin St	Hayward	94545	122.1014	37.6315	0-30ft	15
Dayton Elementary School	1500 Dayton Ave	San Lorenzo	94579	122.1557	37.6888	0-30ft	15
Debbie's Daycare	2664 Hawthorne Ave	Hayward	94545	122.1052	37.6331	0-30ft	15
Diana's Care Home	27402 Manon Ave	Hayward	94580	122.0686	37.6365	0-30ft	15
Driftwood Healthcare Center	19700 Hesperian Blvd	Hayward	94542	122.1184	37.6679	0-30ft	15
Early Head Start Program	680 W Tennyson Rd	Hayward	94544	122.0676	37.6319	0-30ft	15
East Ave Elementary School	2424 East Ave	Hayward	94541	122.0562	37.6714	90-120ft	105
Eden Area Head Start	951 Palisade St	Hayward	94542	122.0726	37.6629	30-60ft	45
Eden Gardens Elementary	2184 Thayer Ave	Hayward	94545	122.1064	37.6375	0-30ft	15
Eden Villa	19960 Santa Maria Ave	Castro Valley, C	94546	122.0774	37.7007	30-60ft	45
Edendale Elementary School	16160 Ashland Ave	San Lorenzo, CA	94580	122.1178	37.6957	0-30ft	15
Eden-West Rehab & convalescent	1805 West St	Hayward	94541	122.1151	37.6450	0-30ft	15
Eldridge Elementary School	26825 Eldridge Ave	Hayward, CA	94544	122.0846	37.6370	0-30ft	15
Elmhurst Daycare & Preschool	380 Elmhurst St	Hayward	94544	122.0932	37.6559	0-30ft	15
Emerald Care Home	2729 Dowe Ave	Union City, CA	94587	122.0437	37.5897	0-30ft	15
Evergreen Residential Care	239 Blossom Way	Hayward, CA	94580	122.1060	37.6773	0-30ft	15
Evergreen Senior Center	985 Sueirro St	Hayward	94541	122.1146	37.6626	0-30ft	15
Fairview Elementary School	23515 Maud Ave	Hayward	94541	122.0511	37.6812	120-150ft	135
Fairview Hills Pre-School	2841 Romagnolo St	Hayward	94541	122.0522	37.6814	90-120ft	105
Fern Lodge Inc	18457 Madison Ave	Castro Valley, C	94546	122.0627	37.7088	90-120ft	105
Galicia's Tulip Care Home	1771 Tulip Ave	Hayward, CA	94542	122.0795	37.6242	0-30ft	15

Table 8.1D-1, Part 1. (continued)

Name	ADDRESS	CITY	ZIP CODE	Longitude	Latitude	Elevation	Elevation
Garfield Elementary School	13050 Aurora Dr	San Leandro	94577	122.1852	37.7044	0-30ft	15
Gerrylaide Manor	261 Medford Ave	Hayward, CA	94541	122.1078	37.6809	0-30ft	15
Glassbrook Elementary School	975 Schafer Rd	Hayward	94544	122.0798	37.6410	0-30ft	15
Grant School	879 Grant Ave	San Lorenzo, CA	94580	122.1335	37.6804	0-30ft	15
Growing Years Day Camp	20166 Wisteria St	Castro Valley	94546	122.0850	37.6988	30-60ft	45
Growing Years Preschool	20320 Anita Ave	Castro Valley	94546	122.0822	37.6974	30-60ft	45
Happiness Hill Pre-School	20600 John Dr	Castro Valley	94546	122.0912	37.6925	60-90ft	75
Hartnell Home Care	2041 Hartnell St	Union City, CA	94587	122.0283	37.5920	0-30ft	15
Hayward Convalescent Hospital	1832 B St	Hayward, CA	94541	122.0659	37.6822	30-60ft	45
Hayward Hills Health Care Ctr	1768 B St	Hayward, CA	94541	122.0679	37.6812	30-60ft	45
Hayward Parent Co-Op Nursery	2652 Vergil Ct	Castro Valley	94546	122.0684	37.6879	30-60ft	45
Head Start Program	25926 Carlos Bee Blvd	Hayward	94542	122.0608	37.6590	0-30ft	15
Head Start Program	975 Schafer Rd	Hayward	94544	122.0798	37.6410	120-150ft	135
Helen Turner Childrens Center	23640 Reed Way	Hayward	94541	122.1063	37.6563	0-30ft	15
Hesperian School	620 Drew St	San Lorenzo, CA	94580	122.1242	37.6939	0-30ft	15
Highland Elementary	2021 Highland Blvd	Hayward	94542	122.0579	37.6622	120-150ft	135
Hillside School	15980 Marcella St	San Leandro	94578	122.1154	37.7014	0-30ft	15
Hillview Crest School	31410 Wheelon Ave	Hayward	94544	122.0354	37.6148	0-30ft	15
His Growing From Infant Care	2490 Grove Way	Castro Valley	94546	122.0697	37.6858	30-60ft	45
James Madison	14751 Juniper Street	San Leandro	94579	122.1593	37.6959	0-30ft	15
Jefferson Elementary	14311 Lark St	San Leandro	94578	122.1341	37.7138	0-30ft	15
John Muir	24823 Soto Rd	Hayward	94544	122.0820	37.6566	0-30ft	15
Jones Rest Home	524 Callan Ave	San Leandro, CA	94579	122.1499	37.7275	0-30ft	15
Kids Klub Children's Center	2500 Oliver Dr	Hayward	94545	122.0946	37.6268	0-30ft	15
Laurel Grove hospital	19933 Lake Chabot	Castro Valley	94546	122.0867	37.7000	30-60ft	45
Learning Game	31600 Alvarado Blvd	Union City	94587	122.0799	37.5917	0-30ft	15
Lea's Christian School	26236 Adrian Ave	Hayward	94545	122.1018	37.6375	0-30ft	15
Lewelling School	562 Lewelling Blvd	San Leandro	94576	122.1345	37.6866	0-30ft	15
Lighthouse Kiddie Kingdom	16053 Ashland Ave	San Lorenzo	94580	122.1178	37.6975	0-30ft	15
Lil Angels Day Care Center	28924 Ruus Rd	Hayward	94544	122.0650	37.6259	0-30ft	15

Table 8.1D-1, Part 1. (continued)

Name	ADDRESS	CITY	ZIP CODE	Longitude	Latitude	Elevation	Elevation
Little Lambs Preschool	14871 Bancroft Ave	San Leandro	94578	122.1291	37.7078	0-30ft	15
Lollipop Lane Preschool	341 Paseo Grande	San Lorenzo	94580	122.1216	37.6823	0-30ft	15
Longwood Elementary School	850 Longwood Ave	Hayward	94541	122.1092	37.6593	0-30ft	15
Lorenzo Manor School	18250 Bengal Ave	Hayward	94541	122.1188	37.6748	0-30ft	15
Majestic Pines Care Ctr	1628 B St	Hayward, CA	94541	122.0709	37.6797	30-60ft	45
Markham Elementary School	1570 Ward St	Hayward	94541	122.0725	37.6766	30-60ft	45
Marshall School	20111 Marshall St	Castro Valley	94546	122.0646	37.6991	60-90ft	75
Masonic Home For Adults	34400 Mission Blvd	Union City, CA	94587	122.0063	37.5951	0-30ft	15
Monroe Elementary School	3750 Monterey Blvd	San Lorenzo	94578	122.1452	37.6983	30-60ft	45
Montessori Children's House	166 W Harder Rd	Hayward	94544	122.0861	37.6479	0-30ft	15
Montessori Children's House	26236 Adrian Ave	Hayward	94545	122.1018	37.6375	0-30ft	15
Montessori Children's School	1836 B St	Hayward	94541	122.0657	37.6823	30-60ft	45
Montessori School	1101 Walpert St	Hayward	94541	122.0738	37.6694	30-60ft	45
Montessori School	19234 Lake Chabot rd	Castro Valley	94546	122.0887	37.7062	60-90ft	75
Montessori School	16492 Foothill Blvd	San Leandro	94578	122.1047	37.6981	60-90ft	75
Moreau Catholic High School	27170 Mission Blvd	Hayward	94544	122.0364	37.6217	0-30ft	15
Morton Bakar Center	494 Blossom Way	Hayward	94542	122.1022	37.6787	0-30ft	15
Ochoa Intermediate School	2121 Depot Rd	Hayward	94545	122.1070	37.6389	0-30ft	15
Our Future Tots Learning Ctr	963 Manor Blvd	San Leandro	94578	122.1460	37.6911	0-30ft	15
Palma Ceia School	27679 Melborne Ave	Hayward	94545	122.0838	37.6273	0-30ft	15
Park Elementary School	411 Larchmont St	Hayward	94544	122.0926	37.6531	0-30ft	15
Pioneer Elementary School	32737 Bel Aire St	Union City	94587	122.0711	37.5724	0-30ft	15
Quail Ridge Health Care Center	1440 168th Ave	San Leandro	94579	122.1066	37.6920	0-30ft	15
Redwood Convalescent Hospital	22103 Redwood Rd	Castro Valley, C	94546	122.0727	37.6868	30-60ft	45
Redwood Forest Pre-School	19200 Redwood Rd	Castro Valley	94546	122.0729	37.7068	60-90ft	75
Refugio M Cabello Elementary	4500 Cabello St	Union City	94587	122.0714	37.5869	0-30ft	15
Right World Nursery School	20613 Stanton Ave	Castro Valley	94546	122.0887	37.6934	30-60ft	45
Rise'n Shine Preschool	20104 Center St	Castro Valley	94546	122.0606	37.6975	60-90ft	75
Rose Gate	1345 Clarke St	San Leandro, CA	94579	122.1572	37.7237	0-30ft	15
Ruus School	28027 Dickens Ave	Hayward	94544	122.0725	37.6277	0-30ft	15

Table 8.1D-1, Part 1. (continued)

Name	ADDRESS	CITY	ZIP CODE	Longitude	Latitude	Elevation	Elevation
Saint Anthony Care Center	553 Smalley Ave	Hayward	94578	122.0915	37.6713	0-30ft	15
Saint Bede's Ccd	26910 Patrick Ave	Hayward	94544	122.0784	37.6363	0-30ft	15
Saint Christopher Convalescent	22822 Myrtle St	Hayward	94542	122.0904	37.6659	0-30ft	15
Saint Clement's School	790 Calhoun St	Hayward	94544	122.0571	37.6426	0-30ft	15
Saint Felicitas School	1650 Manor Blvd	San Leandro	94579	122.1583	37.6912	0-30ft	15
Saint Francis Extended Care	718 Bartlett Ave	Hayward	94542	122.1174	37.6695	0-30ft	15
Saint Joachim's Ccd	21250 Hesperian Blvd	Hayward	94541	122.1151	37.6628	0-30ft	15
Saint Therese Convalescent Hosp	21863 Valleio St	Hayward	94542	122.0930	37.6769	0-30ft	15
Saint Therese Day Care	1507 Rieger Ave	Hayward	94544	122.0824	37.6332	0-30ft	15
San Leandro Childrens	14311 Lark St	San Leandro	94578	122.1341	37.7138	0-30ft	15
San Leandro Healthcare Ctr	368 Juana Ave	San Leandro, CA	94579	122.1506	37.7243	0-30ft	15
San Leandro Hospital	13855 E 14th St	San Leandro	94546	122.1394	37.7136	0-30ft	15
San Leandro Surgery Center	15035 E 14th St	San Leandro	94578	122.1272	37.7051	0-30ft	15
San Lorenzo Community Church	945 Paseo Grande	San Lorenzo	94580	122.1318	37.6772	0-30ft	15
San Lorenzo Parent Nursery	820 Bockman Rd	San Lorenzo	94580	122.1252	37.6709	0-30ft	15
Santo Domingo Residential Care	3327 San Marco Ct	Union City	94580	122.0689	37.5942	0-30ft	15
Schafer Park Elementary	26268 Flamingo Ave	Hayward	94544	122.0861	37.6430	0-30ft	15
Seaton Rehabilation Hospital	1652 Mono Ave	San Leandro, CA	94579	122.1186	37.7025	0-30ft	15
Seaton Rehabilitation Hospital	15705 Liberty St	San Leandro	94578	122.1173	37.7057	0-30ft	15
Semore School	4312 Dyer St	Union City	94587	122.0712	37.5869	0-30ft	15
Senior Friends	13847 E 14th St	San Leandro	94578	122.1395	37.7137	0-30ft	15
Shepard Elementary	27211 Tyrell Ave	Hayward	94544	122.0731	37.6362	0-30ft	15
Sir Love	27653 Pompano Ave	Hayward	94544	122.0763	37.6302	0-30ft	15
Southgate Elementary School	26601 Calaroga Ave	Hayward	94545	122.0933	37.6393	0-30ft	15
St Anthony Care Ctr	553 Smalley Ave	Hayward, CA	94541	122.0915	37.6713	0-30ft	15
St Anthony Residential Care	4491 Ariel Ave	Fremont, CA	94555	122.0547	37.5745	0-30ft	15
St Christopher Convalescent	22822 Myrtle St	Hayward, CA	94541	122.0904	37.6659	0-30ft	15
St Francis Extended Care	718 Bartlett Ave	Hayward, CA	94541	122.1174	37.6695	0-30ft	15
St Gregory Care Ctr	22424 Charlene Way	Castro Valley, C	94546	122.0723	37.6832	0-30ft	15
St John Kronstadt Convalescent	4432 James Ave	Castro Valley, C	94546	122.0684	37.7067	0-30ft	15

Table 8.1D-1, Part 1. (continued)

Name	ADDRESS	CITY	ZIP CODE	Longitude	Latitude	Elevation	Elevation
St John's School	270 E Lewelling Blvd	San Lorenzo, CA	94580	122.1164	37.6868	0-30ft	15
St Lukes Sub Acute Care	1652 Mono Ave	San Leandro	94578	122.1186	37.7025	0-30ft	15
St Therese Convalescent Hosp	21863 Vallejo St	Hayward, CA	94541	122.0930	37.6769	0-30ft	15
Stivers Academy	461 Bartlett Ave	Hayward	94541	122.1130	37.6711	0-30ft	15
Strobridge Elementary School	21400 Bedford Dr	Castro Valley	94546	122.0865	37.6860	30-60ft	45
Sunbridge Care & Rehab Center	26660 Patrick Ave	Hayward	94580	122.0792	37.6403	0-30ft	15
Sunbridge Care & Rehab Ctr	14766 Washington Ave	San Leandro, CA	94579	122.1381	37.6966	0-30ft	15
Sunset Parent Nursery School	22100 Princeton St	Hayward	94541	122.0980	37.6721	0-30ft	15
Supporting Future	22584 S Garden Ave	Hayward	94541	122.1076	37.6613	0-30ft	15
Tennyson High School	27035 Whitman St	Hayward, CA	94544	122.0649	37.6428	0-30ft	15
Tennyson Parent Nursery School	27552 E 11th St	Hayward	94544	122.0605	37.6415	0-30ft	15
Treeview Elementary	30565 Treeview St	Hayward	94544	122.0361	37.6246	0-30ft	15
Tri Cities Children's Ctrs Inco	625 Berry Ave	Hayward	94544	122.0727	37.6563	0-30ft	15
Tri Cities Children's Ctrs Inco	541 Blanche St	Hayward	94544	122.0280	37.6151	0-30ft	15
Tri Cities Children's Ctrs Inco	23640 Reed Way	Hayward	94541	122.1063	37.6563	0-30ft	15
Tyrell Elementary	27000 Tyrell Ave	Hayward	94544	122.0746	37.6375	0-30ft	15
Valley Pointe Rehab & Nursing	20090 Stanton Ave	Castro Valley, C	94546	122.0898	37.6974	30-60ft	45
Villa Fairmont Mental Health	15200 Foothill Blvd	San Leandro, CA	94579	122.1210	37.7095	0-30ft	15
Vintage Estates of Hayward	25919 Gading Rd	Hayward	94579	122.0802	37.6470	0-30ft	15
Washington Manor School	1170 Fargo Ave	San Leandro	94579	122.1481	37.6891	0-30ft	15
Whispering Pines Rest Haven	565 Schafer Rd	Hayward	94580	122.0746	37.6410	0-30ft	15
Wisteria Care Ctr	20524 Wisteria St	Castro Valley, C	94546	122.0840	37.6961	30-60ft	45
Woodroe Woods School	22502 Woodroe Ave	Hayward	94541	122.0541	37.6897	60-90ft	75
YMCA	951 Palisade St	Hayward	94542	122.0726	37.6629	30-60ft	45
Yours & Mine	2894 D St	Hayward	94541	122.0552	37.6799	90-120ft	105

Table 8.1D-1, Part 2. Russell City sensitive receptor locational data.

Name	ADDRESS	CITY	ZIP CODE	East(km) Zone 10	North(km) Zone 10	Elevation Feet	Dist(km) from Facility
A Kids Kingdom	18550 Redwood Rd	Castro Valley	94546	581.736	4173.861	75	9.934
A Special Place	27305 Hintwood Ave	Hayward	94544	582.231	4166.006	15	5.551
Abc Academy	670 Sunset Blvd	Hayward	94541	580.034	4170.053	15	5.805
Abc pre-School & Day Care	20135 San Miguel Ave	Castro Valley	94546	581.137	4172.592	45	8.537
Adventure Montessori Academy	4101 Pleiades Pl	Union City	94587	582.509	4160.276	15	7.648
Adventure Time Lorenzo Manor	18250 Bengal Ave	Hayward	94541	577.708	4169.908	15	4.729
Alameda County Medical Center	15400 Foothill Blvd	San Leandro	94578	577.600	4173.605	15	8.369
All Saints School	22870 2nd Street	Hayward	94541	581.111	4170.218	45	6.602
Alvarado Elementary School	31100 Fredi St	Union City	94587	581.592	4161.099	15	6.416
Alzheimer's Services	561 A St	Hayward	94541	580.456	4169.564	15	5.678
American Heritage Christian	425 Gresel St	Hayward	94544	585.245	4163.694	15	8.665
Ardenwood Elementary School	33955 Emilia Ln	Fremont	94555	583.800	4158.655	15	9.692
Avenue Pre-School	1521 159th Ave	San Leandro	94578	577.851	4172.991	15	7.791
Barnard White Middle School	725 Wipple Rd	Union City	94587	585.700	4162.343	15	9.442
Bay Point Healthcare Center	442 Sunset Blvd	Hayward	94579	579.669	4169.865	15	5.446
Bay School	2001 Bockman Rd	San Lorenzo, CA	94580	575.286	4169.546	15	4.501
Beth Sholom Pro-Shool	642 Dolores Ave	San Leandro	94578	575.403	4175.465	15	10.269
Bethesda Christian Retirement	22427 Montgomery St	Hayward	94541	580.553	4169.596	15	5.766
Bohannon Middle School	800 Bockman Rd	San Lorenzo, CA	94580	577.197	4169.502	15	4.246
Bowman Elem	520 Jefferson St	Hayward	94544	582.841	4166.290	15	6.197
Brenkwitz School	22100 Princeton St	Hayward	94545	579.548	4169.647	15	5.197
Bret Harte Intermediate School	1047 E St	Hayward	94541	586.076	4161.607	15	10.045
Broadmoor Parent Nursery	951 Dowling Blvd	San Leandro	94578	575.269	4176.759	15	11.569
Burbank Elementary	353 B St	Hayward	94541	579.969	4169.190	15	5.078
Burbank Pre School	15661 Washington Ave	San Lorenzo	94580	576.107	4170.787	15	5.540
Camelot Schools	21753 Vallejo St	Hayward	94541	579.934	4170.237	15	5.902

Table 8.1D-1, Part 2. (continued)

Name	ADDRESS	CITY	ZIP CODE	East(km) Zone 10	North(km) Zone 10	Elevation Feet	Dist(km) from Facility
Castro Valley Elementary	20185 San Miguel Ave	Castro Valley	94546	581.137	4172.530	45	8.484
Castro Valley Parent Nursery	3657 Christensen Ln	Castro Valley	94546	580.785	4173.451	75	9.121
Cesar Chavez Middle School	2801 Hop Ranch Rd	Union City	94587	584.222	4160.601	15	8.837
Chabot Elementary	19104 Lake Chabot Rd	Castro Valley	94546	580.319	4173.508	75	8.976
Cherryland Elementary	585 Willow Ave	Hayward	94541	579.641	4170.142	15	5.667
Cherubim's Children Center	30540 Mission Blvd	Hayward	94544	585.590	4163.513	15	9.038
Child Family & Community Servic	20900 Corsair Blvd	Hayward	94545	577.312	4167.777	15	2.563
Children's Choice	185 W Harder Rd	Hayward	94544	580.701	4166.977	15	4.320
Circle Time Nursery	26555 Gading Rd	Hayward	94544	581.150	4166.211	15	4.520
Colonial Acres Elementary	17115 Meekland Ave	Hayward	94580	577.992	4170.958	15	5.815
Cornerstone Pentesostal Church	24150 Hesperian Blvd	Hayward	94545	578.663	4167.420	15	2.884
Corvallis School	14790 Corvallis St	San Leandro	94579	574.845	4172.316	15	7.281
Courtyard Care Center	1625 Denton Ave	Hayward	94545	578.252	4166.800	15	2.152
Darwin Head Start	2560 Darwin St	Hayward	94545	579.298	4165.146	15	2.575
Dayton Elementary School	1500 Dayton Ave	San Lorenzo	94579	574.460	4171.450	15	6.571
Debbie's Daycare	2664 Hawthorne Ave	Hayward	94545	578.953	4165.296	15	2.226
Diana's Care Home	27402 Manon Ave	Hayward	94580	582.185	4165.698	15	5.474
Driftwood Healthcare Center	19700 Hesperian Blvd	Hayward	94542	577.765	4169.138	15	3.993
Early Head Start Program	680 W Tennyson Rd	Hayward	94544	582.288	4165.205	15	5.562
East Ave Elementary School	2424 East Ave	Hayward	94541	583.248	4169.592	105	7.817
Eden Area Head Start	951 Palisade St	Hayward	94542	581.812	4168.622	45	6.084
Eden Gardens Elementary	2184 Thayer Ave	Hayward	94545	578.850	4165.789	15	2.183
Eden Villa	19960 Santa Maria Ave	Castro Valley, C	94546	581.330	4172.840	45	8.849
Edendale Elementary School	16160 Ashland Ave	San Lorenzo, CA	94580	577.784	4172.251	15	7.049
Eden-West Rehab & convalescent	1805 West St	Hayward	94541	578.058	4166.613	15	1.882
Eldridge Elementary School	26825 Eldridge Ave	Hayward, CA	94544	580.762	4165.745	15	4.061
Elmhurst Daycare & Preschool	380 Elmhurst St	Hayward	94544	580.007	4167.834	15	4.156

Table 8.1D-1, Part 2. (continued)

Name	ADDRESS	CITY	ZIP CODE	East(km) Zone 10	North(km) Zone 10	Elevation Feet	Dist(km) from Facility
Emerald Care Home	2729 Dowe Ave	Union City, CA	94587	584.444	4160.542	15	9.056
Evergreen Residential Care	239 Blossom Way	Hayward, CA	94580	578.833	4170.196	15	5.346
Evergreen Senior Center	985 Sueirro St	Hayward	94541	578.113	4168.555	15	3.554
Fairview Elementary School	23515 Maud Ave	Hayward	94541	583.679	4170.675	135	8.799
Fairview Hills Pre-School	2841 Romagnolo St	Hayward	94541	583.580	4170.705	105	8.739
Fern Lodge Inc	18457 Madison Ave	Castro Valley, C	94546	582.619	4173.747	105	10.314
Galicia's Tulip Care Home	1771 Tulip Ave	Hayward, CA	94542	581.242	4164.333	15	4.614
Garfield Elementary School	13050 Aurora Dr	San Leandro	94577	571.824	4173.153	15	9.273
Gerrylaide Manor	261 Medford Ave	Hayward, CA	94541	578.681	4170.595	15	5.661
Glassbrook Elementary School	975 Schafer Rd	Hayward	94544	581.199	4166.211	15	4.567
Grant School	879 Grant Ave	San Lorenzo, CA	94580	576.404	4170.512	15	5.240
Growing Years Day Camp	20166 Wisteria St	Castro Valley	94546	580.671	4172.618	45	8.329
Growing Years Preschool	20320 Anita Ave	Castro Valley	94546	580.917	4172.466	45	8.317
Happiness Hill Pre-School	20600 John Dr	Castro Valley	94546	580.139	4171.904	75	7.449
Hartnell Home Care	2041 Hartnell St	Union City, CA	94587	585.790	4160.802	15	10.110
Hayward Convalescent Hospital	1832 B St	Hayward, CA	94541	582.379	4170.785	45	7.888
Hayward Hills Health Care Ctr	1768 B St	Hayward, CA	94541	582.209	4170.660	45	7.680
Hayward Parent Co-Op Nursery	2652 Vergil Ct	Castro Valley	94546	582.152	4171.430	45	8.199
Head Start Program	25926 Carlos Bee Blvd	Hayward	94542	582.845	4168.231	15	6.792
Head Start Program	975 Schafer Rd	Hayward	94544	581.199	4166.211	135	4.567
Helen Turner Childrens Center	23640 Reed Way	Hayward	94541	578.830	4167.884	15	3.346
Hesperian School	620 Drew St	San Lorenzo, CA	94580	577.223	4172.030	15	6.766
Highland Elementary	2021 Highland Blvd	Hayward	94542	583.112	4168.574	135	7.184
Hillside School	15980 Marcella St	San Leandro	94578	577.999	4172.870	15	7.694
Hillview Crest School	31410 Wheelon Ave	Hayward	94544	585.126	4163.323	15	8.624
His Growing From Infant Care	2490 Grove Way	Castro Valley	94546	582.032	4171.182	45	7.934
James Madison	14751 Juniper Street	San Leandro	94579	574.110	4172.218	15	7.413
Jefferson Elementary	14311 Lark St	San Leandro	94578	576.321	4174.241	15	8.968

Table 8.1D-1, Part 2. (continued)

Name	ADDRESS	CITY	ZIP CODE	East(km) Zone 10	North(km) Zone 10	Elevation Feet	Dist(km) from Facility
John Muir	24823 Soto Rd	Hayward	94544	580.986	4167.936	15	5.018
Jones Rest Home	524 Callan Ave	San Leandro, CA	94579	574.911	4175.738	15	10.613
Kids Klub Children's Center	2500 Oliver Dr	Hayward	94545	579.891	4164.596	15	3.238
Laurel Grove hospital	19933 Lake Chabot	Castro Valley	94546	580.522	4172.739	45	8.367
Learning Game	31600 Alvarado Blvd	Union City	94587	581.228	4160.726	15	6.404
Lea's Christian School	26236 Adrian Ave	Hayward	94545	579.242	4165.792	15	2.566
Lewelling School	562 Lewelling Blvd	San Leandro	94576	576.324	4171.221	15	5.953
Lighthouse Kiddie Kingdom	16053 Ashland Ave	San Lorenzo	94580	577.783	4172.436	15	7.232
Lil Angels Day Care Center	28924 Ruus Rd	Hayward	94544	582.515	4164.529	15	5.837
Little Lambs Preschool	14871 Bancroft Ave	San Leandro	94578	576.768	4173.567	15	8.285
Lollipop Lane Preschool	341 Paseo Grande	San Lorenzo	94580	577.456	4170.737	15	5.503
Longwood Elementary School	850 Longwood Ave	Hayward	94541	578.582	4168.190	15	3.449
Lorenzo Manor School	18250 Bengal Ave	Hayward	94541	577.708	4169.908	15	4.729
Majestic Pines Care Ctr	1628 B St	Hayward, CA	94541	581.941	4170.503	45	7.379
Markham Elementary School	1570 Ward St	Hayward	94541	581.797	4170.163	45	7.038
Marshall School	20111 Marshall St	Castro Valley	94546	582.458	4172.666	75	9.347
Masonic Home For Adults	34400 Mission Blvd	Union City, CA	94587	587.724	4161.162	15	11.743
Monroe Elementary School	3750 Monterey Blvd	San Lorenzo	94578	575.357	4172.506	45	7.353
Montessori Children's House	166 W Harder Rd	Hayward	94544	580.628	4166.946	15	4.241
Montessori Children's House	26236 Adrian Ave	Hayward	94545	579.242	4165.792	15	2.566
Montessori Children's School	1836 B St	Hayward	94541	582.379	4170.785	45	7.888
Montessori School	1101 Walpert St	Hayward	94541	581.683	4169.360	45	6.418
Montessori School	19234 Lake Chabot rd	Castro Valley	94546	580.345	4173.416	75	8.902
Montessori School	16492 Foothill Blvd	San Leandro	94578	578.933	4172.508	75	7.555
Moreau Catholic High School	27170 Mission Blvd	Hayward	94544	585.044	4164.093	15	8.402
Morton Bakar Center	494 Blossom Way	Hayward	94542	579.174	4170.353	15	5.631
Ochoa Intermediate School	2121 Depot Rd	Hayward	94545	578.800	4165.942	15	2.176
Our Future Tots Learning Ctr	963 Manor Blvd	San Leandro	94578	575.291	4171.704	15	6.581

Table 8.1D-1, Part 2. (continued)

Name	ADDRESS	CITY	ZIP CODE	East(km) Zone 10	North(km) Zone 10	Elevation Feet	Dist(km) from Facility
Palma Ceia School	27679 Melborne Ave	Hayward	94545	580.847	4164.667	15	4.166
Park Elementary School	411 Larchmont St	Hayward	94544	580.059	4167.526	15	4.017
Pioneer Elementary School	32737 Bel Aire St	Union City	94587	582.034	4158.606	15	8.528
Quail Ridge Health Care Center	1440 168th Ave	San Leandro	94579	578.768	4171.829	15	6.858
Redwood Convalescent Hospital	22103 Redwood Rd	Castro Valley, C	94546	581.762	4171.303	45	7.849
Redwood Forest Pre-School	19200 Redwood Rd	Castro Valley	94546	581.715	4173.522	75	9.632
Refugio M Cabello Elementary	4500 Cabello St	Union City	94587	581.994	4160.209	15	7.313
Right World Nursery School	20613 Stanton Ave	Castro Valley	94546	580.359	4171.998	45	7.635
Rise'n Shine Preschool	20104 Center St	Castro Valley	94546	582.828	4172.485	75	9.440
Rose Gate	1345 Clarke St	San Leandro, CA	94579	574.279	4175.301	15	10.314
Ruus School	28027 Dickens Ave	Hayward	94544	581.851	4164.739	15	5.153
Saint Anthony Care Center	553 Smalley Ave	Hayward	94578	580.137	4169.561	15	5.472
Saint Bede's Ccd	26910 Patrick Ave	Hayward	94544	581.327	4165.689	15	4.618
Saint Christopher Convalescent	22822 Myrtle St	Hayward	94542	580.217	4168.945	15	5.059
Saint Clement's School	790 Calhoun St	Hayward	94544	583.207	4166.417	15	6.579
Saint Felicitas School	1650 Manor Blvd	San Leandro	94579	574.213	4171.694	15	6.887
Saint Francis Extended Care	718 Bartlett Ave	Hayward	94542	577.836	4169.323	15	4.190
Saint Joachim's Ccd	21250 Hesperian Blvd	Hayward	94541	578.064	4168.585	15	3.563
Saint Therese Convalescent Hosp	21863 Valleio St	Hayward	94542	579.984	4170.176	15	5.879
Saint Therese Day Care	1507 Rieger Ave	Hayward	94544	580.963	4165.346	15	4.236
San Leandro Childrens	14311 Lark St	San Leandro	94578	576.321	4174.241	15	8.968
San Leandro Healthcare Ctr	368 Juana Ave	San Leandro, CA	94579	574.865	4175.368	15	10.256
San Leandro Hospital	13855 E 14th St	San Leandro	94546	575.856	4174.206	15	8.966
San Leandro Surgery Center	15035 E 14th St	San Leandro	94578	576.942	4173.261	15	7.982
San Lorenzo Community Church	945 Paseo Grande	San Lorenzo	94580	576.554	4170.175	15	4.896
San Lorenzo Parent Nursery	820 Bockman Rd	San Lorenzo	94580	577.149	4169.471	15	4.210
Santo Domingo Residential Care	3327 San Marco Ct	Union City	94580	582.207	4161.012	15	6.947
Schafer Park Elementary	26268 Flamingo Ave	Hayward	94544	580.633	4166.422	15	4.069

Table 8.1D-1, Part 2. (continued)

Name	ADDRESS	CITY	ZIP CODE	East(km) Zone 10	North(km) Zone 10	Elevation Feet	Dist(km) from Facility
Seaton Rehabilation Hospital	1652 Mono Ave	San Leandro, CA	94579	577.703	4172.990	15	7.770
Seaton Rehabilitation Hospital	15705 Liberty St	San Leandro	94578	577.823	4173.330	15	8.122
Semore School	4312 Dyer St	Union City	94587	582.018	4160.209	15	7.330
Senior Friends	13847 E 14th St	San Leandro	94578	575.856	4174.206	15	8.966
Shepard Elementary	27211 Tyrell Ave	Hayward	94544	581.792	4165.663	15	5.079
Sir Love	27653 Pompano Ave	Hayward	94544	581.505	4165.013	15	4.786
Southgate Elementary School	26601 Calaroga Ave	Hayward	94545	580.000	4165.984	15	3.347
St Anthony Care Ctr	553 Smalley Ave	Hayward, CA	94541	580.137	4169.561	15	5.472
St Anthony Residential Care	4491 Ariel Ave	Fremont, CA	94555	583.479	4158.837	15	9.334
St Christopher Convalescent	22822 Myrtle St	Hayward, CA	94541	580.217	4168.945	15	5.059
St Francis Extended Care	718 Bartlett Ave	Hayward, CA	94541	577.836	4169.323	15	4.190
St Gregory Care Ctr	22424 Charlene Way	Castro Valley, C	94546	581.815	4170.903	15	7.582
St John Kronstadt Convalescent	4432 James Ave	Castro Valley, C	94546	582.131	4173.495	15	9.831
St John's School	270 E Lewelling Blvd	San Lorenzo, CA	94580	577.916	4171.266	15	6.101
St Lukes Sub Acute Care	1652 Mono Ave	San Leandro	94578	577.703	4172.990	15	7.770
St Therese Convalescent Hosp	21863 Vallejo St	Hayward, CA	94541	579.984	4170.176	15	5.879
Stivers Academy	461 Bartlett Ave	Hayward	94541	578.227	4169.512	15	4.488
Strobridge Elementary School	21400 Bedford Dr	Castro Valley	94546	580.563	4171.168	45	7.026
Sunbridge Care & Rehab Center	26660 Patrick Ave	Hayward	94580	581.249	4166.120	15	4.599
Sunbridge Care & Rehab Ctr	14766 Washington Ave	San Leandro, CA	94579	575.996	4172.327	15	7.083
Sunset Parent Nursery School	22100 Princeton St	Hayward	94541	579.548	4169.647	15	5.197
Supporting Future	22584 S Garden Ave	Hayward	94541	578.727	4168.438	15	3.736
Tennyson High School	27035 Whitman St	Hayward, CA	94544	582.496	4166.410	15	5.878
Tennyson Parent Nursery School	27552 E 11th St	Hayward	94544	582.890	4166.291	15	6.245
Treeview Elementary	30565 Treeview St	Hayward	94544	585.066	4164.432	15	8.382
Tri Cities Children's Ctrs Inco	625 Berry Ave	Hayward	94544	581.795	4167.913	15	5.710
Tri Cities Children's Ctrs Inco	541 Blanche St	Hayward	94544	585.788	4163.361	15	9.262
Tri Cities Children's Ctrs Inco	23640 Reed Way	Hayward	94541	578.830	4167.884	15	3.346

Table 8.1D-1, Part 2. (continued)

Name	ADDRESS	CITY	ZIP CODE	East(km) Zone 10	North(km) Zone 10	Elevation Feet	Dist(km) from Facility
Tyrell Elementary	27000 Tyrell Ave	Hayward	94544	581.644	4165.815	15	4.946
Valley Pointe Rehab & Nursing	20090 Stanton Ave	Castro Valley, C	94546	580.256	4172.459	45	7.998
Villa Fairmont Mental Health	15200 Foothill Blvd	San Leandro, CA	94579	577.476	4173.759	15	8.510
Vintage Estates of Hayward	25919 Gading Rd	Hayward	94579	581.144	4166.858	15	4.690
Washington Manor School	1170 Fargo Ave	San Leandro	94579	575.121	4171.487	15	6.409
Whispering Pines Rest Haven	565 Schafer Rd	Hayward	94580	581.640	4166.216	15	5.001
Wisteria Care Ctr	20524 Wisteria St	Castro Valley, C	94546	580.747	4172.310	45	8.096
Woodroe Woods School	22502 Woodroe Ave	Hayward	94541	583.399	4171.627	75	9.207
YMCA	951 Palisade St	Hayward	94542	581.812	4168.622	45	6.084
Yours & Mine	2894 D St	Hayward	94541	583.313	4170.548	105	8.432

Table 8.1D-2. Affected census tracts and population data (3-mile radius).

Tract #	% Area Affected	Total 1990	Adjusted 1999	Population Data Worker 1999
4371	75	7833	8499	3592
4403.02	5	5928	6432	2718
4403.31	10	2451	2659	1124
4384	85	1948	2114	893
4383	100	3425	3716	1570
4382.01	95	3848	4175	1764
4373	100	2948	3199	1352
4376	100	2702	2932	1239
4377	50	7464	8098	3422
4375	100	3914	4247	1795
4374	100	2968	3220	1361
4378	30	3464	3758	1588
4366	80	8755	9499	4014
4372	100	5004	5429	2294
4370	100	2968	3220	1361
4368	100	2817	3056	1292
4363	80	3866	4195	1773
4369	100	5713	6199	2620
4362	100	2668	2895	1223
4357	60	2651	2876	1216
4356	45	7714	8370	3537
4361	100	4337	4706	1989
4358	25	4387	4760	2012
4360	100	4010	4351	1839
4359	90	4602	4993	2110
4334	10	3485	3781	1598
4335	10	3937	4272	1805
4336	5	5127	5563	2351
		Total=	**131,213**	**Total= 55,451**
6 Mile Radius Data:		**Total=**	**332,116**	**Total= 104,485**

Ref: U.S. Census Bureau, Population Estimates Program, Population Div., Washington, D.C. 3/9/01, Statistical Information Staff.
1990 U.S. Census, Census Tracts and Bolck Numbering Areas (Oakland, CA. PMSA) General Characteristics of Persons, Table 1.

Table 8.1D-3. Census tract centroid listing within 3-mile radius of site.

Receptor ID	UTM Coordinates N	E	Receptor Type	Elevation (m)
4371N	4167006	575923	Census Tract Centroid	3.1
4371S	4163170	577262	Census Tract Centroid	1.5
4403.02	4162397	580455	Census Tract Centroid	1,5
4403.31	4162191	580249	Census Tract Centroid	1.4
4384	4163607	580610	Census Tract Centroid	3.1
4383	4164560	580146	Census Tract Centroid	3.1
4382.01	4164560	581125	Census Tract Centroid	4.6
4373	4165436	579760	Census Tract Centroid	7.6
4376	4165333	580919	Census Tract Centroid	7.6
4377	4165616	581331	Census Tract Centroid	13.7
4375	4166260	580970	Census Tract Centroid	13.7
4374	4166054	580249	Census Tract Centroid	15.2
4378	4166672	581176	Census Tract Centroid	9.1
4366	4167238	580507	Census Tract Centroid	18.3
4372	4166234	578138	Census Tract Centroid	9.1
4370	4166594	579065	Census Tract Centroid	15.2
4368	4167238	579631	Census Tract Centroid	22.8
4363	4168526	579786	Census Tract Centroid	36.6
4369	4168036	578344	Census Tract Centroid	12.2
4362	4168938	578138	Census Tract Centroid	13.7
4357	4169607	578140	Census Tract Centroid	18.3
4356	4169350	578859	Census Tract Centroid	28.9
4361	4169221	577159	Census Tract Centroid	10.7
4358	4169917	576799	Census Tract Centroid	9.1
4360	4168886	576052	Census Tract Centroid	4.6
4359	4169427	575357	Census Tract Centroid	4.6
4334	4169144	574172	Census Tract Centroid	1.5
4335	4169659	574662	Census Tract Centroid	3.1
4336	4169865	575074	Census Tract Centroid	4.6

Table 8.1D-4. Sensitive receptor impacts, 1-hour case 12.

Sensitive Receptor Impacts

Name	Emissions (g/s/turbine)	Nearest Residence	Child Family & Community Service	Cornerstone Pentecostal Church	Courtyard Care Center	Darwin Head Start	Debbie's Daycare	Eden Gardens Elementary	Eden-West Rehab & Convalescent	Lea's Christian School	Montessori Children's House	Ochoa Intermediate School
UTM X - Easting (m)		578064	577312	578663	578252	579298	578953	578850	578058	579242	579242	578800
UTM Y - Northing (m)		4165904	4167777	4167420	4166800	4165146	4165296	4165789	4166613	4165792	4165792	4165942
Dist(km) from Facility		1.49	2.74	2.97	2.23	2.47	2.14	2.14	1.96	2.52	2.52	2.15
Normalized Impacts for Emissions of 1 g/s/turbine												
1-Hr Case 12		2.40956	1.68758	1.35405	1.65919	1.90848	1.80425	1.90426	1.83213	1.63286	1.63286	1.79638
Acetaldehyde	1.88E-02	4.52E-02	3.16E-02	2.54E-02	3.11E-02	3.58E-02	3.38E-02	3.57E-02	3.44E-02	3.06E-02	3.06E-02	3.37E-02
Acrolein	1.76E-03	4.24E-03	2.97E-03	2.38E-03	2.92E-03	3.35E-03	3.17E-03	3.35E-03	3.22E-03	2.87E-03	2.87E-03	3.16E-03
Benzene	3.72E-03	8.96E-03	6.27E-03	5.03E-03	6.17E-03	7.09E-03	6.71E-03	7.08E-03	6.81E-03	6.07E-03	6.07E-03	6.68E-03
1,3-Butadiene	3.47E-05	8.37E-05	5.86E-05	4.70E-05	5.76E-05	6.63E-05	6.26E-05	6.61E-05	6.36E-05	5.67E-05	5.67E-05	6.24E-05
Ethylbenzene	4.89E-03	1.18E-02	8.26E-03	6.63E-03	8.12E-03	9.34E-03	8.83E-03	9.32E-03	8.96E-03	7.99E-03	7.99E-03	8.79E-03
Formaldehyde	3.01E-02	7.25E-02	5.07E-02	4.07E-02	4.99E-02	5.74E-02	5.43E-02	5.73E-02	5.51E-02	4.91E-02	4.91E-02	5.40E-02
Hexane	7.08E-02	1.71E-01	1.19E-01	9.59E-02	1.17E-01	1.35E-01	1.28E-01	1.35E-01	1.30E-01	1.16E-01	1.16E-01	1.27E-01
Naphthalene	4.54E-04	1.09E-03	7.66E-04	6.14E-04	7.53E-04	8.66E-04	8.19E-04	8.64E-04	8.31E-04	7.41E-04	7.41E-04	8.15E-04
PAHs (5)	1.80E-04	4.35E-04	3.04E-04	2.44E-04	2.99E-04	3.44E-04	3.26E-04	3.44E-04	3.31E-04	2.95E-04	2.95E-04	3.24E-04
Propylene	2.10E-01	5.07E-01	3.55E-01	2.85E-01	3.49E-01	4.02E-01	3.80E-01	4.01E-01	3.86E-01	3.44E-01	3.44E-01	3.78E-01
Propylene oxide	1.31E-02	3.15E-02	2.21E-02	1.77E-02	2.17E-02	2.49E-02	2.36E-02	2.49E-02	2.39E-02	2.13E-02	2.13E-02	2.35E-02
Toluene	1.94E-02	4.68E-02	3.28E-02	2.63E-02	3.22E-02	3.70E-02	3.50E-02	3.70E-02	3.56E-02	3.17E-02	3.17E-02	3.49E-02
Xylene	7.13E-03	1.72E-02	1.20E-02	9.66E-03	1.18E-02	1.36E-02	1.29E-02	1.36E-02	1.31E-02	1.16E-02	1.16E-02	1.28E-02
Ammonia	2.00E+00	4.82E+00	3.38E+00	2.71E+00	3.32E+00	3.82E+00	3.61E+00	3.81E+00	3.66E+00	3.27E+00	3.27E+00	3.59E+00

Table 8.1D-5. Sensitive receptor impacts, annual case 14.

Sensitive Receptor Impacts

Name	Emissions (g/s/turbine)	Nearest Residence	Child Family & Community Service	Cornerstone Pentecostal Church	Courtyard Care Center	Darwin Head Start	Debbie's Daycare	Eden Gardens Elementary	Eden-West Rehab & Convalescent	Lea's Christian School	Montessori Children's House	Ochoa Intermediate School
Normalized Impacts for Emissions of 1 g/s/turbine												
Annual Case 14		0.00655	0.00483	0.00436	0.00465	0.04611	0.03202	0.01389	0.00429	0.01722	0.01722	0.01079
Acetaldehyde	1.69E-02	1.11E-04	8.16E-05	7.36E-05	7.85E-05	7.79E-04	5.41E-04	2.35E-04	7.24E-05	2.91E-04	2.91E-04	1.82E-04
Acrolein	1.58E-03	1.04E-05	7.64E-06	6.90E-06	7.36E-06	7.30E-05	5.07E-05	2.20E-05	6.79E-06	2.73E-05	2.73E-05	1.71E-05
Benzene	3.35E-03	2.19E-05	1.62E-05	1.46E-05	1.56E-05	1.54E-04	1.07E-04	4.65E-05	1.44E-05	5.76E-05	5.76E-05	3.61E-05
1,3-Butadiene	3.13E-05	2.05E-07	1.51E-07	1.36E-07	1.45E-07	1.44E-06	1.00E-06	4.34E-07	1.34E-07	5.38E-07	5.38E-07	3.37E-07
Ethylbenzene	4.41E-03	2.89E-05	2.13E-05	1.92E-05	2.05E-05	2.03E-04	1.41E-04	6.12E-05	1.89E-05	7.59E-05	7.59E-05	4.75E-05
Formaldehyde	2.71E-02	1.77E-04	1.31E-04	1.18E-04	1.26E-04	1.25E-03	8.67E-04	3.76E-04	1.16E-04	4.66E-04	4.66E-04	2.92E-04
Hexane	6.38E-02	4.18E-04	3.08E-04	2.78E-04	2.96E-04	2.94E-03	2.04E-03	8.85E-04	2.73E-04	1.10E-03	1.10E-03	6.88E-04
Naphthalene	4.09E-04	2.68E-06	1.97E-06	1.78E-06	1.90E-06	1.88E-05	1.31E-05	5.68E-06	1.75E-06	7.04E-06	7.04E-06	4.41E-06
PAHs (5)	1.62E-04	1.06E-06	7.85E-07	7.08E-07	7.55E-07	7.49E-06	5.20E-06	2.26E-06	6.97E-07	2.80E-06	2.80E-06	1.75E-06
Propylene	1.90E-01	1.24E-03	9.15E-04	8.26E-04	8.81E-04	8.74E-03	6.07E-03	2.63E-03	8.13E-04	3.26E-03	3.26E-03	2.05E-03
Propylene oxide	1.18E-02	7.71E-05	5.68E-05	5.13E-05	5.47E-05	5.43E-04	3.77E-04	1.63E-04	5.05E-05	2.03E-04	2.03E-04	1.27E-04
Toluene	1.75E-02	1.14E-04	8.44E-05	7.62E-05	8.13E-05	8.06E-04	5.60E-04	2.43E-04	7.50E-05	3.01E-04	3.01E-04	1.89E-04
Xylene	6.42E-03	4.21E-05	3.10E-05	2.80E-05	2.99E-05	2.96E-04	2.06E-04	8.92E-05	2.76E-05	1.11E-04	1.11E-04	6.93E-05
Ammonia	1.88E+00	1.23E-02	9.07E-03	8.21E-03	8.74E-03	8.67E-02	6.02E-02	2.61E-02	8.06E-03	3.24E-02	3.24E-02	2.03E-02
Ammonia-Turbines Only												
1-hour		4.81E+00	3.37E+00	2.70E+00	3.31E+00	3.81E+00	3.60E+00	3.80E+00	3.66E+00	3.26E+00	3.26E+00	3.59E+00
Annual		1.23E-02	9.09E-03	8.20E-03	8.75E-03	8.67E-02	6.02E-02	2.61E-02	8.07E-03	3.24E-02	3.24E-02	2.03E-02

Table 8.1D-6, Summary of screening HRA results.

Turbines and Cooling Tower at the Maximum Impact Receptor

Acute Inhalation Hazard Index:

Pollutant	Resp	CV/BL	CNS	Eye	Repro	Kidn	GI/LV	Immun
Acrolein	0.1095			0.1095				
Ammonia	0.0074			0.0074				
Benzene		0.0001			0.0001			0.0001
Formaldehyde	0.0038			0.0038				0.0038
Propylene Oxide	0.0001			0.0001	0.0001			
Toluene	0.0001		0.0001	0.0001	0.0001			
Xylenes	0.0001			0.0001				
Total Acute	0.121	0.0001	0.0001	0.121	0.0003	0	0	0.0039

Chronic Inhalation Hazard Index:

Pollutant	Resp	CV/BL	CNS	Skin	Repro	Kidn	GI/LV	Immun
Acetaldehyde	0.0002							
Acrolein	0.0085			0.0085				
Ammonia	0.001							
Benzene					0.0001			
Ethyl Benzene		0.0001	0.0001		0.0001	0.0001	0.0001	
Formaldehyde	0.001			0.001				
Naphthalene	0.0001							
Propylene	0.0001							
Propylene Oxide	0.0001							
Toluene	0.0001		0.0001		0.0001			
Xylenes	0.0001		0.0001					
Total Chronic	0.0112	0.0001	0.0003	0.0095	0.0003	0.0001	0.0001	0

Chronic Non-Inhalation Exposure:

Pollutant	Avg Dose mg/kg-d	REL mg/kg-d	Avg Dose/REL
PAH: BaP	9.75E-09	NV	NV
Naphthalene	3.35E-08	NV	NV

NV=no value

MIR Individual Lifetime Cancer Risk:

44 Year Worker	0.158	per million
70 Year Residential	0.174	per million

MIR Total Population Cancer Burden

		Impact/Burden Area Radius:	3 miles
		Total Population:	332116
Total Burden	0.043	Worker Population:	104485

Attachment 8.1Da

California Air Resources Board

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Office of Environmental Health Hazard Assessment

Health Risk Assessment Program

Version 2.0e

ACUTE INHALATION EXPOSURE REPORT

Run Made By

R.B.Booth

RTP Environmental Assoc.

Project : RCEC

May. 16, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

MAX. 1-HR EMISSION RATE INFORMATION

File: TURB.M96

Pollutant Name	Emission Rate (g/s)
ACROLEIN	2.080E-02
AMMONIA	2.370E+01
BENZENE	4.410E-02
FORMALDEHYDE	3.560E-01
PROPYLENE OXIDE	1.550E-01
TOLUENE	2.300E-01
XYLENES	8.460E-02

ACUTE INHALATION HAZARD INDEX

Pollutant	Resp	CV/BL	CNS	Eye	Repro	Kidn	GI/LV	Immun
ACROLEIN	0.1095	--	--	0.1095	--	--	--	--
AMMONIA	0.0074	--	--	0.0074	--	--	--	--
BENZENE	--	<.0001	--	--	<.0001	--	--	<.0001
FORMALDEHYDE	0.0038	--	--	0.0038	--	--	--	0.0038
PROPYLENE OXIDE	<.0001	--	--	<.0001	<.0001	--	--	--
TOLUENE	<.0001	--	<.0001	<.0001	<.0001	--	--	--
XYLENES	<.0001	--	--	<.0001	--	--	--	--
Total Acute	0.1207	<.0001	<.0001	0.1207	<.0001	--	--	0.0038

A Zero Background Concentration file was used to perform this analysis, therefore, there is no contribution from background pollutants.

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CHRONIC INHALATION EXPOSURE REPORT

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May. 16, 2001

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DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: TURB.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	3.370E-06
ACETALDEHYDE	1.820E-03
ACROLEIN	1.700E-04
AMMONIA	2.020E-01
BENZENE	3.610E-04
ETHYL BENZENE	4.750E-04
FORMALDEHYDE	2.920E-03
NAPHTHALENE	4.400E-05
PAH:BENZO(A)PYRENE	1.750E-05
PROPYLENE (PROPENE)	2.040E-02
PROPYLENE OXIDE	1.270E-03
TOLUENE	1.880E-03
XYLENES	6.920E-04

CHRONIC INHALATION HAZARD INDEX

Pollutant	Resp	CV/BL	CNS	Skin	Repro	Kidn	GI/LV	Immun
ACETALDEHYDE	0.0002	--	--	--	--	--	--	--
ACROLEIN	0.0085	--	--	0.0085	--	--	--	--
AMMONIA	0.0010	--	--	--	--	--	--	--
BENZENE	--	<.0001	<.0001	--	<.0001	--	--	--
ETHYL BENZENE	--	--	--	--	<.0001	<.0001	<.0001	--
FORMALDEHYDE	0.0010	--	--	0.0010	--	--	--	--
NAPHTHALENE	<.0001	--	--	--	--	--	--	--
PROPYLENE (PROP	<.0001	--	--	--	--	--	--	--
PROPYLENE OXIDE	<.0001	--	--	--	--	--	--	--
TOLUENE	<.0001	--	<.0001	--	<.0001	--	--	--
XYLENES	<.0001	--	<.0001	--	--	--	--	--
Total Chronic	0.0107	<.0001	<.0001	0.0095	<.0001	<.0001	<.0001	--

A Zero Background Concentration file was used to perform this analysis, therefore, there is no contribution from background pollutants.

California Air Resources Board

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Office of Environmental Health Hazard Assessment

Health Risk Assessment Program

Version 2.0e

CHRONIC NONINHALATION EXPOSURE REPORT

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Project : RCEC

May. 16, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: TURB.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	3.370E-06
ACETALDEHYDE	1.820E-03
ACROLEIN	1.700E-04
AMMONIA	2.020E-01
BENZENE	3.610E-04
ETHYL BENZENE	4.750E-04
FORMALDEHYDE	2.920E-03
NAPHTHALENE	4.400E-05
PAH:BENZO(A)PYRENE	1.750E-05
PROPYLENE (PROPENE)	2.040E-02
PROPYLENE OXIDE	1.270E-03
TOLUENE	1.880E-03
XYLENES	6.920E-04

EXPOSURE ROUTE INFORMATION

File: TURB.I96

Deposition Velocity (m/s) .....: 0.020

Fraction of Homegrown Produce .: 0.050

Dilution Factor for Farm/Ranch X/Q (ug/m3)/(g/s) ....: 0.0000
Fraction of Animals' Diet From Grazing .....: 0.0000
Fraction of Animals' Diet From Impacted Feed .....: 0.0000

Fraction of Animals' Water Impacted by Deposition ...: 0.0000

Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume Changes .....: 0.000E+00

Fraction of Meat in Diet Impacted ..: 0.0000

Beef .....: 0.0000
Pork .....: 0.0000
Lamb/Goat .....: 0.0000
Chicken .....: 0.0000

Fraction of Milk in Diet Impacted ..: 0.0000

Goat Milk Fraction ..: 0.0000

Fraction of Eggs in Diet Impacted ..: 0.0000

Fraction of Impacted Drinking Water : 0.0000

X/Q at water source ..: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

Fraction of Fish from Impacted Water: 0.0000

X/Q at Fish Source ...: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

CHRONIC NONINHALATION EXPOSURE

Pollutant	Avg. Dose (mg/kg-d)	REL (mg/kg-d)	Avg Dose/REL
1,3-BUTADIENE	---	---	---
ACETALDEHYDE	---	---	---
ACROLEIN	---	---	---
AMMONIA	---	---	---
BENZENE	---	---	---
ETHYL BENZENE	---	---	---
FORMALDEHYDE	---	---	---
NAPHTHALENE	3.35E-08	---	---
PAH:BENZO(A)PYRENE	9.75E-09	---	---
PROPYLENE (PROPENE)	---	---	---
PROPYLENE OXIDE	---	---	---
TOLUENE	---	---	---
XYLENES	---	---	---

California Air Resources Board

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Health Risk Assessment Program

Version 2.0e

INDIVIDUAL CANCER RISK REPORT

Run Made By

R.B.Booth

RTP Environmental Assoc.

Project : RCEC

May. 16, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: TURB.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	3.370E-06
ACETALDEHYDE	1.820E-03
ACROLEIN	1.700E-04
AMMONIA	2.020E-01
BENZENE	3.610E-04
ETHYL BENZENE	4.750E-04
FORMALDEHYDE	2.920E-03
NAPHTHALENE	4.400E-05
PAH:BENZO(A)PYRENE	1.750E-05
PROPYLENE (PROPENE)	2.040E-02
PROPYLENE OXIDE	1.270E-03
TOLUENE	1.880E-03
XYLENES	6.920E-04

EXPOSURE ROUTE INFORMATION

File: TURB.I96

Deposition Velocity (m/s) .....: 0.020

Fraction of Homegrown Produce .: 0.050

Dilution Factor for Farm/Ranch X/Q (ug/m3)/(g/s) ....: 0.0000
Fraction of Animals' Diet From Grazing .....: 0.0000
Fraction of Animals' Diet From Impacted Feed .....: 0.0000

Fraction of Animals' Water Impacted by Deposition ...: 0.0000

Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume Changes .....: 0.000E+00

Fraction of Meat in Diet Impacted ..: 0.0000

Beef .....: 0.0000
Pork .....: 0.0000
Lamb/Goat .....: 0.0000
Chicken .....: 0.0000

Fraction of Milk in Diet Impacted ..: 0.0000

Goat Milk Fraction ..: 0.0000

Fraction of Eggs in Diet Impacted ..: 0.0000

Fraction of Impacted Drinking Water : 0.0000

X/Q at water source ..: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

Fraction of Fish from Impacted Water: 0.0000

X/Q at Fish Source ...: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

---

44 YEAR
INDIVIDUAL CANCER RISK BY POLLUTANT AND ROUTE

Pollutant	Air	Soil	Skin	Garden	MMilk	Other
1,3-BUTADIENE	3.60E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ACETALDEHYDE	3.09E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BENZENE	6.58E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FORMALDEHYDE	1.10E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PAH:BENZO(A)PYR	1.21E-08	1.86E-08	1.18E-08	4.39E-08	4.77E-08	0.00E+00
PROPYLENE OXIDE	2.95E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Route Total	3.61E-08	1.86E-08	1.18E-08	4.39E-08	4.77E-08	0.00E+00

TOTAL RISK: 1.58E-07

70 YEAR
INDIVIDUAL CANCER RISK BY POLLUTANT AND ROUTE

Pollutant	Air	Soil	Skin	Garden	MMilk	Other
1,3-BUTADIENE	5.73E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ACETALDEHYDE	4.91E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BENZENE	1.05E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FORMALDEHYDE	1.75E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PAH:BENZO(A)PYR	1.92E-08	2.88E-08	1.83E-08	6.99E-08	0.00E+00	0.00E+00
PROPYLENE OXIDE	4.70E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Route Total	5.74E-08	2.88E-08	1.83E-08	6.99E-08	0.00E+00	0.00E+00

TOTAL RISK: 1.74E-07

California Air Resources Board

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Health Risk Assessment Program

Version 2.0e

CANCER BURDEN REPORT

Run Made By

R.B.Booth

RTP Environmental Assoc.

Project : RCEC

May. 16, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: TURB.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	3.370E-06
ACETALDEHYDE	1.820E-03
ACROLEIN	1.700E-04
AMMONIA	2.020E-01
BENZENE	3.610E-04
ETHYL BENZENE	4.750E-04
FORMALDEHYDE	2.920E-03
NAPHTHALENE	4.400E-05
PAH:BENZO(A)PYRENE	1.750E-05
PROPYLENE (PROPENE)	2.040E-02
PROPYLENE OXIDE	1.270E-03
TOLUENE	1.880E-03
XYLENES	6.920E-04

FACTORS USED IN CANCER BURDEN CALCULATIONS

Deposition Velocity (m/s) . . . . . :	0.02
Fraction of Produce Grown At Home . :	0.05
Fraction of Residents with Gardens :	0.25

RECEPTOR INFORMATION

File: TURB.R96

Receptor ID	X/Q	Residents	Workers
MIR	1.0E+00	332116	104485

EXPOSED POPULATION AND CANCER BURDEN BY RECEPTOR AND ROUTE

Rec ID	Residents	Workers	Air	Soil	Dermal	Garden
MIR	332116	104485	2.06E-02	1.01E-02	6.56E-03	5.80E-03
Total	332116	104485	2.06E-02	1.01E-02	6.56E-03	5.80E-03

TOTAL BURDEN: 4.30E-02

EXPOSED POPULATION AND CANCER BURDEN BY RECEPTOR AND ROUTE
For 2588 Screening Purposes Only

Rec ID	Residents	Workers	Air	Soil	Dermal	Garden
MIR	332116	104485	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	332116	104485	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL BURDEN: 0.00E+00

Attachment 8.1Db

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Version 2.0e

ACUTE INHALATION EXPOSURE REPORT

Run Made By

R.B.Booth

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Project : RCEC

May. 15, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

MAX. 1-HR EMISSION RATE INFORMATION

File: REMAKE.M96

Pollutant Name	Emission Rate (g/s)
BENZENE	5.610E-01
FORMALDEHYDE	1.210E+01
TOLUENE	6.150E-01
XYLENES	1.660E+00

ACUTE INHALATION HAZARD INDEX

Pollutant	Resp	CV/BL	CNS	Eye	Repro	Kidn	GI/LV	Immun
BENZENE	--	0.0004	--	--	0.0004	--	--	0.0004
FORMALDEHYDE	0.1287	--	--	0.1287	--	--	--	0.1287
TOLUENE	<.0001	--	<.0001	<.0001	<.0001	--	--	--
XYLENES	<.0001	--	--	<.0001	--	--	--	--
Total Acute	0.1288	0.0004	<.0001	0.1288	0.0004	--	--	0.1292

A Zero Background Concentration file was used to perform this analysis, therefore, there is no contribution from background pollutants.

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CHRONIC INHALATION EXPOSURE REPORT

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DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: REMAKE.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	6.190E-04
ACETALDEHYDE	8.920E-04
ACROLEIN	9.950E-05
BENZENE	3.680E-04
ETHYL BENZENE	1.200E-04
FORMALDEHYDE	7.940E-03
NAPHTHALENE	4.230E-05
PAH:BENZ(A)ANTHRACENE	9.910E-08
PAH:BENZO(A)PYRENE	4.550E-09
PAH:BENZO(K)FLUORANTHENE	1.320E-08
PAH:CHRYSENE	2.410E-08
PAH:DIBENZ(A,H)ANTHRACENE	4.550E-09
PAH:INDENO(1,2,3-C,D)PYRENE	1.210E-08
PROPYLENE (PROPENE)	9.070E-03
TOLUENE	4.030E-04
XYLENES	1.090E-03

CHRONIC INHALATION HAZARD INDEX

Pollutant	Resp	CV/BL	CNS	Skin	Repro	Kidn	GI/LV	Immun
ACETALDEHYDE	<.0001	--	--	--	--	--	--	--
ACROLEIN	0.0050	--	--	0.0050	--	--	--	--
BENZENE	--	<.0001	<.0001	--	<.0001	--	--	--
ETHYL BENZENE	--	--	--	--	<.0001	<.0001	<.0001	--
FORMALDEHYDE	0.0026	--	--	0.0026	--	--	--	--
NAPHTHALENE	<.0001	--	--	--	--	--	--	--
PROPYLENE (PROP	<.0001	--	--	--	--	--	--	--
TOLUENE	<.0001	--	<.0001	--	<.0001	--	--	--
XYLENES	<.0001	--	<.0001	--	--	--	--	--
Total Chronic	0.0077	<.0001	<.0001	0.0076	<.0001	<.0001	<.0001	--

A Zero Background Concentration file was used to perform this analysis, therefore, there is no contribution from background pollutants.

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Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

CHRONIC NONINHALATION EXPOSURE

Pollutant	Avg. Dose (mg/kg-d)	REL (mg/kg-d)	Avg Dose/REL
1,3-BUTADIENE	---	---	---
ACETALDEHYDE	---	---	---
ACROLEIN	---	---	---
BENZENE	---	---	---
ETHYL BENZENE	---	---	---
FORMALDEHYDE	---	---	---
NAPHTHALENE	3.22E-08	---	---
PAH:BENZ(A)ANTHRACENE	5.52E-11	---	---
PAH:BENZO(A)PYRENE	2.53E-12	---	---
PAH:BENZO(K)FLUORANTHENE	7.35E-12	---	---
PAH:CHRYSENE	1.34E-11	---	---
PAH:DIBENZ(A,H)ANTHRACEN	2.53E-12	---	---
PAH:INDENO(1,2,3-C,D)PYR	6.74E-12	---	---
PROPYLENE (PROPENE)	---	---	---
TOLUENE	---	---	---
XYLENES	---	---	---

EXPOSURE ROUTE INFORMATION

File: REMAKE.I96

Deposition Velocity (m/s) .....: 0.020

Fraction of Homegrown Produce .: 0.050

Dilution Factor for Farm/Ranch X/Q (ug/m3)/(g/s) ....: 0.0000
Fraction of Animals' Diet From Grazing .....: 0.0000
Fraction of Animals' Diet From Impacted Feed .....: 0.0000

Fraction of Animals' Water Impacted by Deposition ...: 0.0000

Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume Changes .....: 0.000E+00

Fraction of Meat in Diet Impacted ..: 0.0000

Beef .....: 0.0000
Pork .....: 0.0000
Lamb/Goat .....: 0.0000
Chicken .....: 0.0000

Fraction of Milk in Diet Impacted ..: 0.0000

Goat Milk Fraction ..: 0.0000

Fraction of Eggs in Diet Impacted ..: 0.0000

Fraction of Impacted Drinking Water : 0.0000

X/Q at water source ..: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

Fraction of Fish from Impacted Water: 0.0000

X/Q at Fish Source ...: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

CHRONIC NONINHALATION EXPOSURE

Pollutant	Avg. Dose (mg/kg-d)	REL (mg/kg-d)	Avg Dose/REL
1,3-BUTADIENE	---	---	---
ACETALDEHYDE	---	---	---
ACROLEIN	---	---	---
BENZENE	---	---	---
ETHYL BENZENE	---	---	---
FORMALDEHYDE	---	---	---
NAPHTHALENE	3.22E-08	---	---
PAH:BENZ(A)ANTHRACENE	5.52E-11	---	---
PAH:BENZO(A)PYRENE	2.53E-12	---	---
PAH:BENZO(K)FLUORANTHENE	7.35E-12	---	---
PAH:CHRYSENE	1.34E-11	---	---
PAH:DIBENZ(A,H)ANTHRACEN	2.53E-12	---	---
PAH:INDENO(1,2,3-C,D)PYR	6.74E-12	---	---
PROPYLENE (PROPENE)	---	---	---
TOLUENE	---	---	---
XYLENES	---	---	---

California Air Resources Board

And

Office of Environmental Health Hazard Assessment

Health Risk Assessment Program

Version 2.0e

INDIVIDUAL CANCER RISK REPORT

Run Made By

R.B.Booth

RTP Environmental Assoc.

Project : RCEC

May. 15, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: REMAKE.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	6.190E-04
ACETALDEHYDE	8.920E-04
ACROLEIN	9.950E-05
BENZENE	3.680E-04
ETHYL BENZENE	1.200E-04
FORMALDEHYDE	7.940E-03
NAPHTHALENE	4.230E-05
PAH:BENZ(A)ANTHRACENE	9.910E-08
PAH:BENZO(A)PYRENE	4.550E-09
PAH:BENZO(K)FLUORANTHENE	1.320E-08
PAH:CHRYSENE	2.410E-08
PAH:DIBENZ(A,H)ANTHRACENE	4.550E-09
PAH:INDENO(1,2,3-C,D)PYRENE	1.210E-08
PROPYLENE (PROPENE)	9.070E-03
TOLUENE	4.030E-04
XYLENES	1.090E-03

EXPOSURE ROUTE INFORMATION

File: REMAKE.I96

Deposition Velocity (m/s) .....: 0.020

Fraction of Homegrown Produce .: 0.050

Dilution Factor for Farm/Ranch X/Q (ug/m3)/(g/s) ....: 0.0000
Fraction of Animals' Diet From Grazing .....: 0.0000
Fraction of Animals' Diet From Impacted Feed .....: 0.0000

Fraction of Animals' Water Impacted by Deposition ...: 0.0000

Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume Changes .....: 0.000E+00

Fraction of Meat in Diet Impacted ..: 0.0000

Beef .....: 0.0000
Pork .....: 0.0000
Lamb/Goat .....: 0.0000
Chicken .....: 0.0000

Fraction of Milk in Diet Impacted ..: 0.0000

Goat Milk Fraction ..: 0.0000

Fraction of Eggs in Diet Impacted ..: 0.0000

Fraction of Impacted Drinking Water : 0.0000

X/Q at water source ..: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

Fraction of Fish from Impacted Water: 0.0000

X/Q at Fish Source ...: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

---

44 YEAR
INDIVIDUAL CANCER RISK BY POLLUTANT AND ROUTE

Pollutant	Air	Soil	Skin	Garden	MMilk	Other
1,3-BUTADIENE	6.61E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ACETALDEHYDE	1.51E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BENZENE	6.71E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FORMALDEHYDE	2.99E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PAH:BENZ(A)ANTH	6.85E-12	1.05E-11	6.70E-12	2.49E-11	2.70E-11	0.00E+00
PAH:BENZO(A)PYR	3.15E-12	4.84E-12	3.07E-12	1.14E-11	1.24E-11	0.00E+00
PAH:BENZO(K)FLU	9.13E-13	1.40E-12	8.92E-13	3.31E-12	3.60E-12	0.00E+00
PAH:CHRYSENE	1.67E-13	2.56E-13	1.63E-13	6.05E-13	6.57E-13	0.00E+00
PAH:DIBENZ(A,H)	3.43E-12	1.65E-12	1.05E-12	3.90E-12	4.24E-12	0.00E+00
PAH:INDENO(1,2,	8.37E-13	1.29E-12	8.18E-13	3.04E-12	3.30E-12	0.00E+00
Route Total	1.04E-07	2.00E-11	1.27E-11	4.71E-11	5.12E-11	0.00E+00

TOTAL RISK: 1.04E-07

70 YEAR
INDIVIDUAL CANCER RISK BY POLLUTANT AND ROUTE

Pollutant	Air	Soil	Skin	Garden	MMilk	Other
1,3-BUTADIENE	1.05E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ACETALDEHYDE	2.41E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BENZENE	1.07E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FORMALDEHYDE	4.76E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PAH:BENZ(A)ANTH	1.09E-11	1.63E-11	1.04E-11	3.96E-11	0.00E+00	0.00E+00
PAH:BENZO(A)PYR	5.00E-12	7.50E-12	4.76E-12	1.82E-11	0.00E+00	0.00E+00
PAH:BENZO(K)FLU	1.45E-12	2.17E-12	1.38E-12	5.27E-12	0.00E+00	0.00E+00
PAH:CHRYSENE	2.65E-13	3.97E-13	2.52E-13	9.62E-13	0.00E+00	0.00E+00
PAH:DIBENZ(A,H)	5.46E-12	2.56E-12	1.63E-12	6.21E-12	0.00E+00	0.00E+00
PAH:INDENO(1,2,	1.33E-12	1.99E-12	1.27E-12	4.83E-12	0.00E+00	0.00E+00
Route Total	1.66E-07	3.09E-11	1.96E-11	7.50E-11	0.00E+00	0.00E+00

TOTAL RISK: 1.66E-07

California Air Resources Board

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Office of Environmental Health Hazard Assessment

Health Risk Assessment Program

Version 2.0e

CANCER BURDEN REPORT

Run Made By

R.B.Booth

RTP Environmental Assoc.

Project : RCEC

May. 15, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: REMAKE.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	6.190E-04
ACETALDEHYDE	8.920E-04
ACROLEIN	9.950E-05
BENZENE	3.680E-04
ETHYL BENZENE	1.200E-04
FORMALDEHYDE	7.940E-03
NAPHTHALENE	4.230E-05
PAH:BENZ(A)ANTHRACENE	9.910E-08
PAH:BENZO(A)PYRENE	4.550E-09
PAH:BENZO(K)FLUORANTHENE	1.320E-08
PAH:CHRYSENE	2.410E-08
PAH:DIBENZ(A,H)ANTHRACENE	4.550E-09
PAH:INDENO(1,2,3-C,D)PYRENE	1.210E-08
PROPYLENE (PROPENE)	9.070E-03
TOLUENE	4.030E-04
XYLENES	1.090E-03

FACTORS USED IN CANCER BURDEN CALCULATIONS

Deposition Velocity (m/s) . . . . . :	0.02
Fraction of Produce Grown At Home . :	0.05
Fraction of Residents with Gardens :	0.25

RECEPTOR INFORMATION

File: REMAKE.R96

Receptor ID	X/Q	Residents	Workers
MIR	1.0E+00	131213	55451

EXPOSED POPULATION AND CANCER BURDEN BY RECEPTOR AND ROUTE

Rec ID	Residents	Workers	Air	Soil	Dermal	Garden
MIR	131213	55451	2.41E-02	4.35E-06	2.85E-06	2.46E-06
Total	131213	55451	2.41E-02	4.35E-06	2.85E-06	2.46E-06

TOTAL BURDEN: 2.41E-02

EXPOSED POPULATION AND CANCER BURDEN BY RECEPTOR AND ROUTE
For 2588 Screening Purposes Only

Rec ID	Residents	Workers	Air	Soil	Dermal	Garden
MIR	131213	55451	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	131213	55451	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL BURDEN: 0.00E+00

Attachment 8.1Dc

California Air Resources Board

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Health Risk Assessment Program

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ACUTE INHALATION EXPOSURE REPORT

Run Made By

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Project : RCEC

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Database Reference..... : CAPCOA Risk Assessment Guidelines

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

MAX. 1-HR EMISSION RATE INFORMATION

File: FPUMP.M96

Pollutant Name	Emission Rate (g/s)
ARSENIC AND COMPOUNDS (INOR	4.670E-03
BENZENE	5.290E-01
COPPER AND COMPOUNDS	1.200E-02
FORMALDEHYDE	1.490E-01
MERCURY AND COMPOUNDS (INOR	5.840E-03
NICKEL AND COMPOUNDS	1.140E-02
TOLUENE	1.780E-01
XYLENES	6.100E-02

ACUTE INHALATION HAZARD INDEX

Pollutant	Resp	CV/BL	CNS	Eye	Repro	Kidn	GI/LV	Immun
ARSENIC AND COM	--	--	--	--	0.0246	--	--	--
BENZENE	--	0.0004	--	--	0.0004	--	--	0.0004
COPPER AND COMP	0.0001	--	--	--	--	--	--	--
FORMALDEHYDE	0.0016	--	--	0.0016	--	--	--	0.0016
MERCURY AND COM	--	--	--	--	0.0032	--	--	--
NICKEL AND COMP	0.0019	--	--	--	--	--	--	0.0019
TOLUENE	<.0001	--	<.0001	<.0001	<.0001	--	--	--
XYLENES	<.0001	--	--	<.0001	--	--	--	--
Total Acute	0.0036	0.0004	<.0001	0.0016	0.0282	--	--	0.0039

A Zero Background Concentration file was used to perform this analysis, therefore, there is no contribution from background pollutants.

California Air Resources Board

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CHRONIC INHALATION EXPOSURE REPORT

Run Made By

R.B.Booth

RTP Environmental Assoc.

Project : RCEC

May. 15, 2001

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Database Reference..... : CAPCOA Risk Assessment Guidelines

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: FPUMP.E96

Pollutant Name	Emission Rate (g/s)
ACETALDEHYDE	1.130E-06
ACROLEIN	3.470E-07
ARSENIC AND COMPOUNDS (INOR	5.190E-07
BENZENE	5.870E-05
CADMIUM AND COMPOUNDS	4.860E-07
CHROMIUM 6+	3.240E-08
COPPER AND COMPOUNDS	1.330E-06
ETHYL BENZENE	2.190E-06
FORMALDEHYDE	1.650E-05
LEAD AND COMPOUNDS	2.690E-06
MANGANESE AND COMPOUNDS	1.010E-06
MERCURY AND COMPOUNDS (INOR	6.490E-07
NAPHTHALENE	5.190E-06
NICKEL AND COMPOUNDS	1.260E-06
PAH:BENZ(A)ANTHRACENE	3.110E-08
PAH:BENZO(A)PYRENE	2.560E-08
PAH:BENZO(K)FLUORANTHENE	2.540E-08
PAH:CHRYSENE	4.220E-08
PAH:DIBENZ(A,H)ANTHRACENE	2.660E-08
PAH:INDENO(1,2,3-C,D)PYRENE	2.740E-08
PARTICULATE EMISSIONS FROM	2.690E-03
PROPYLENE (PROPENE)	1.110E-04
SELENIUM AND COMPOUNDS	7.130E-07
TOLUENE	1.980E-05
XYLENES	6.810E-06
ZINC COMPOUNDS	7.260E-06

CHRONIC INHALATION HAZARD INDEX

Pollutant	Resp	CV/BL	CNS	Skin	Repro	Kidn	GI/LV	Immun
ACETALDEHYDE	<.0001	--	--	--	--	--	--	--
ACROLEIN	<.0001	--	--	<.0001	--	--	--	--
ARSENIC AND COM	<.0001	--	<.0001	<.0001	--	--	--	--
BENZENE	--	<.0001	<.0001	--	<.0001	--	--	--
CADMIUM AND COM	<.0001	--	--	--	--	<.0001	--	--
CHROMIUM 6+	<.0001	--	--	--	--	<.0001	<.0001	--
COPPER AND COMP	<.0001	--	--	--	--	--	--	--
ETHYL BENZENE	--	--	--	--	<.0001	<.0001	<.0001	--
FORMALDEHYDE	<.0001	--	--	<.0001	--	--	--	--
MANGANESE AND C	--	--	<.0001	--	--	--	--	--
MERCURY AND COM	--	--	<.0001	--	--	--	--	--
NAPHTHALENE	<.0001	--	--	--	--	--	--	--
NICKEL AND COMP	<.0001	<.0001	--	--	--	--	--	--
PARTICULATE EMI	0.0005	--	--	--	--	--	--	--
PROPYLENE (PROP	<.0001	--	--	--	--	--	--	--
SELENIUM AND CO	<.0001	--	--	--	--	--	--	--
TOLUENE	<.0001	--	<.0001	--	<.0001	--	--	--
XYLENES	<.0001	--	<.0001	--	--	--	--	--
ZINC COMPOUNDS	<.0001	<.0001	--	--	--	--	--	--
Total Chronic	0.0006	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	--

A Zero Background Concentration file was used to perform this analysis, therefore, there is no contribution from background pollutants.

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CHRONIC NONINHALATION EXPOSURE REPORT

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DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: FPUMP.E96

Pollutant Name	Emission Rate (g/s)
ACETALDEHYDE	1.130E-06
ACROLEIN	3.470E-07
ARSENIC AND COMPOUNDS (INOR	5.190E-07
BENZENE	5.870E-05
CADMIUM AND COMPOUNDS	4.860E-07
CHROMIUM 6+	3.240E-08
COPPER AND COMPOUNDS	1.330E-06
ETHYL BENZENE	2.190E-06
FORMALDEHYDE	1.650E-05
LEAD AND COMPOUNDS	2.690E-06
MANGANESE AND COMPOUNDS	1.010E-06
MERCURY AND COMPOUNDS (INOR	6.490E-07
NAPHTHALENE	5.190E-06
NICKEL AND COMPOUNDS	1.260E-06
PAH:BENZ(A)ANTHRACENE	3.110E-08
PAH:BENZO(A)PYRENE	2.560E-08
PAH:BENZO(K)FLUORANTHENE	2.540E-08
PAH:CHRYSENE	4.220E-08
PAH:DIBENZ(A,H)ANTHRACENE	2.660E-08
PAH:INDENO(1,2,3-C,D)PYRENE	2.740E-08
PARTICULATE EMISSIONS FROM	2.690E-03
PROPYLENE (PROPENE)	1.110E-04
SELENIUM AND COMPOUNDS	7.130E-07
TOLUENE	1.980E-05
XYLENES	6.810E-06
ZINC COMPOUNDS	7.260E-06

EXPOSURE ROUTE INFORMATION

File: FPUMP.I96

Deposition Velocity (m/s) .....: 0.020

Fraction of Homegrown Produce .: 0.050

Dilution Factor for Farm/Ranch X/Q (ug/m3)/(g/s) ....: 0.0000
Fraction of Animals' Diet From Grazing .....: 0.0000
Fraction of Animals' Diet From Impacted Feed .....: 0.0000

Fraction of Animals' Water Impacted by Deposition ...: 0.0000

Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume Changes .....: 0.000E+00

Fraction of Meat in Diet Impacted ..: 0.0000

Beef .....: 0.0000
Pork .....: 0.0000
Lamb/Goat .....: 0.0000
Chicken .....: 0.0000

Fraction of Milk in Diet Impacted ..: 0.0000

Goat Milk Fraction ..: 0.0000

Fraction of Eggs in Diet Impacted ..: 0.0000

Fraction of Impacted Drinking Water : 0.0000

X/Q at water source ..: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

Fraction of Fish from Impacted Water: 0.0000

X/Q at Fish Source ...: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

CHRONIC NONINHALATION EXPOSURE

Pollutant	Avg. Dose (mg/kg-d)	REL (mg/kg-d)	Avg Dose/REL
ACETALDEHYDE	---	---	---
ACROLEIN	---	---	---
ARSENIC AND COMPOUNDS (I	1.57E-09	3.00E-04	5.22E-06
BENZENE	---	---	---
CADMIUM AND COMPOUNDS	1.77E-09	1.00E-03	1.77E-06
CHROMIUM 6+	1.13E-10	5.00E-03	2.27E-08
COPPER AND COMPOUNDS	---	---	---
ETHYL BENZENE	---	---	---
FORMALDEHYDE	---	---	---
LEAD AND COMPOUNDS	8.13E-09	---	---
MANGANESE AND COMPOUNDS	---	---	---
MERCURY AND COMPOUNDS (I	2.74E-09	3.00E-04	9.14E-06
NAPHTHALENE	3.95E-09	---	---
NICKEL AND COMPOUNDS	---	5.00E-02	---
PAH:BENZ(A)ANTHRACENE	1.73E-11	---	---
PAH:BENZO(A)PYRENE	1.43E-11	---	---
PAH:BENZO(K)FLUORANTHENE	1.42E-11	---	---
PAH:CHRYSENE	2.35E-11	---	---
PAH:DIBENZ(A,H)ANTHRACEN	1.48E-11	---	---
PAH:INDENO(1,2,3-C,D)PYR	1.53E-11	---	---
PARTICULATE EMISSIONS FR	---	---	---
PROPYLENE (PROPENE)	---	---	---
SELENIUM AND COMPOUNDS	---	---	---
TOLUENE	---	---	---
XYLENES	---	---	---
ZINC COMPOUNDS	---	---	---

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DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: FPUMP.E96

Pollutant Name	Emission Rate (g/s)
ACETALDEHYDE	1.130E-06
ACROLEIN	3.470E-07
ARSENIC AND COMPOUNDS (INOR	5.190E-07
BENZENE	5.870E-05
CADMIUM AND COMPOUNDS	4.860E-07
CHROMIUM 6+	3.240E-08
COPPER AND COMPOUNDS	1.330E-06
ETHYL BENZENE	2.190E-06
FORMALDEHYDE	1.650E-05
LEAD AND COMPOUNDS	2.690E-06
MANGANESE AND COMPOUNDS	1.010E-06
MERCURY AND COMPOUNDS (INOR	6.490E-07
NAPHTHALENE	5.190E-06
NICKEL AND COMPOUNDS	1.260E-06
PAH:BENZ(A)ANTHRACENE	3.110E-08
PAH:BENZO(A)PYRENE	2.560E-08
PAH:BENZO(K)FLUORANTHENE	2.540E-08
PAH:CHRYSENE	4.220E-08
PAH:DIBENZ(A,H)ANTHRACENE	2.660E-08
PAH:INDENO(1,2,3-C,D)PYRENE	2.740E-08
PARTICULATE EMISSIONS FROM	2.690E-03
PROPYLENE (PROPENE)	1.110E-04
SELENIUM AND COMPOUNDS	7.130E-07
TOLUENE	1.980E-05
XYLENES	6.810E-06
ZINC COMPOUNDS	7.260E-06

EXPOSURE ROUTE INFORMATION

File: FPUMP.I96

Deposition Velocity (m/s) .....: 0.020

Fraction of Homegrown Produce .: 0.050

Dilution Factor for Farm/Ranch X/Q (ug/m3)/(g/s) ....: 0.0000
Fraction of Animals' Diet From Grazing .....: 0.0000
Fraction of Animals' Diet From Impacted Feed .....: 0.0000

Fraction of Animals' Water Impacted by Deposition ...: 0.0000

Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume Changes .....: 0.000E+00

Fraction of Meat in Diet Impacted ..: 0.0000

Beef .....: 0.0000
Pork .....: 0.0000
Lamb/Goat .....: 0.0000
Chicken .....: 0.0000

Fraction of Milk in Diet Impacted ..: 0.0000

Goat Milk Fraction ..: 0.0000

Fraction of Eggs in Diet Impacted ..: 0.0000

Fraction of Impacted Drinking Water : 0.0000

X/Q at water source ..: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

Fraction of Fish from Impacted Water: 0.0000

X/Q at Fish Source ...: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

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44 YEAR
INDIVIDUAL CANCER RISK BY POLLUTANT AND ROUTE

Pollutant	Air	Soil	Skin	Garden	MMilk	Other
ACETALDEHYDE	1.92E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ARSENIC AND COM	1.08E-09	1.75E-09	3.70E-11	1.82E-10	0.00E+00	0.00E+00
BENZENE	1.07E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CADMIUM AND COM	1.28E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHROMIUM 6+	3.05E-09	3.05E-11	6.46E-12	3.04E-12	0.00E+00	0.00E+00
FORMALDEHYDE	6.22E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
LEAD AND COMPOU	2.03E-11	5.13E-11	1.09E-12	5.40E-12	0.00E+00	0.00E+00
NICKEL AND COMP	2.06E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PAH:BENZ(A)ANTH	2.15E-12	3.31E-12	2.10E-12	7.80E-12	8.48E-12	0.00E+00
PAH:BENZO(A)PYR	1.77E-11	2.72E-11	1.73E-11	6.42E-11	6.98E-11	0.00E+00
PAH:BENZO(K)FLU	1.76E-12	2.70E-12	1.72E-12	6.37E-12	6.92E-12	0.00E+00
PAH:CHRYSENE	2.92E-13	4.49E-13	2.85E-13	1.06E-12	1.15E-12	0.00E+00
PAH:DIBENZ(A,H)	2.01E-11	9.67E-12	6.14E-12	2.28E-11	2.48E-11	0.00E+00
PAH:INDENO(1,2,	1.89E-12	2.92E-12	1.85E-12	6.88E-12	7.47E-12	0.00E+00
PARTICULATE EMI	5.07E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Route Total	5.14E-07	1.87E-09	7.39E-11	3.00E-10	1.19E-10	0.00E+00

TOTAL RISK: 5.16E-07

70 YEAR
INDIVIDUAL CANCER RISK BY POLLUTANT AND ROUTE

Pollutant	Air	Soil	Skin	Garden	MMilk	Other
ACETALDEHYDE	3.05E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ARSENIC AND COM	1.71E-09	2.03E-09	4.29E-11	2.81E-10	0.00E+00	0.00E+00
BENZENE	1.70E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CADMIUM AND COM	2.04E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHROMIUM 6+	4.86E-09	3.54E-11	7.49E-12	4.75E-12	0.00E+00	0.00E+00
FORMALDEHYDE	9.90E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
LEAD AND COMPOU	3.23E-11	5.95E-11	1.26E-12	8.33E-12	0.00E+00	0.00E+00
NICKEL AND COMP	3.28E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PAH:BENZ(A)ANTH	3.42E-12	5.12E-12	3.25E-12	1.24E-11	0.00E+00	0.00E+00
PAH:BENZO(A)PYR	2.82E-11	4.22E-11	2.68E-11	1.02E-10	0.00E+00	0.00E+00
PAH:BENZO(K)FLU	2.79E-12	4.18E-12	2.66E-12	1.01E-11	0.00E+00	0.00E+00
PAH:CHRYSENE	4.64E-13	6.95E-13	4.41E-13	1.68E-12	0.00E+00	0.00E+00
PAH:DIBENZ(A,H)	3.19E-11	1.50E-11	9.51E-12	3.63E-11	0.00E+00	0.00E+00
PAH:INDENO(1,2,	3.01E-12	4.51E-12	2.87E-12	1.09E-11	0.00E+00	0.00E+00
PARTICULATE EMI	8.07E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Route Total	8.18E-07	2.19E-09	9.71E-11	4.68E-10	0.00E+00	0.00E+00

TOTAL RISK: 8.21E-07

California Air Resources Board

And

Office of Environmental Health Hazard Assessment

Health Risk Assessment Program

Version 2.0e

CANCER BURDEN REPORT

Run Made By

R.B.Booth

RTP Environmental Assoc.

Project : RCEC

May. 15, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: FPUMP.E96

Pollutant Name	Emission Rate (g/s)
ACETALDEHYDE	1.130E-06
ACROLEIN	3.470E-07
ARSENIC AND COMPOUNDS (INOR	5.190E-07
BENZENE	5.870E-05
CADMIUM AND COMPOUNDS	4.860E-07
CHROMIUM 6+	3.240E-08
COPPER AND COMPOUNDS	1.330E-06
ETHYL BENZENE	2.190E-06
FORMALDEHYDE	1.650E-05
LEAD AND COMPOUNDS	2.690E-06
MANGANESE AND COMPOUNDS	1.010E-06
MERCURY AND COMPOUNDS (INOR	6.490E-07
NAPHTHALENE	5.190E-06
NICKEL AND COMPOUNDS	1.260E-06
PAH:BENZ(A)ANTHRACENE	3.110E-08
PAH:BENZO(A)PYRENE	2.560E-08
PAH:BENZO(K)FLUORANTHENE	2.540E-08
PAH:CHRYSENE	4.220E-08
PAH:DIBENZ(A,H)ANTHRACENE	2.660E-08
PAH:INDENO(1,2,3-C,D)PYRENE	2.740E-08
PARTICULATE EMISSIONS FROM	2.690E-03
PROPYLENE (PROPENE)	1.110E-04
SELENIUM AND COMPOUNDS	7.130E-07
TOLUENE	1.980E-05
XYLENES	6.810E-06
ZINC COMPOUNDS	7.260E-06

FACTORS USED IN CANCER BURDEN CALCULATIONS

Deposition Velocity (m/s) . . . . . :	0.02
Fraction of Produce Grown At Home . :	0.05
Fraction of Residents with Gardens :	0.25

RECEPTOR INFORMATION

File: FPUMP.R96

Receptor ID	X/Q	Residents	Workers
MIR	1.0E+00	131213	55451

EXPOSED POPULATION AND CANCER BURDEN BY RECEPTOR AND ROUTE

Rec ID	Residents	Workers	Air	Soil	Dermal	Garden
MIR	131213	55451	1.19E-01	3.08E-04	1.41E-05	1.54E-05
Total	131213	55451	1.19E-01	3.08E-04	1.41E-05	1.54E-05

TOTAL BURDEN: 1.19E-01

EXPOSED POPULATION AND CANCER BURDEN BY RECEPTOR AND ROUTE
For 2588 Screening Purposes Only

Rec ID	Residents	Workers	Air	Soil	Dermal	Garden
MIR	131213	55451	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	131213	55451	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL BURDEN: 0.00E+00

Attachment 8.1Dd

California Air Resources Board

And

Office of Environmental Health Hazard Assessment

Health Risk Assessment Program

Version 2.0e

ACUTE INHALATION EXPOSURE REPORT

Run Made By

R.B.Booth

RTP Environmental Assoc.

Project : RCEC

May. 16, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

MAX. 1-HR EMISSION RATE INFORMATION

File: RESMIR.M96

Pollutant Name	Emission Rate (g/s)
ACROLEIN	4.240E-03
AMMONIA	4.820E+00
BENZENE	8.960E-03
FORMALDEHYDE	7.250E-02
PROPYLENE OXIDE	3.150E-02
TOLUENE	4.680E-02
XYLENES	1.720E-02

ACUTE INHALATION HAZARD INDEX

Pollutant	Resp	CV/BL	CNS	Eye	Repro	Kidn	GI/LV	Immun
ACROLEIN	0.0223	--	--	0.0223	--	--	--	--
AMMONIA	0.0015	--	--	0.0015	--	--	--	--
BENZENE	--	<.0001	--	--	<.0001	--	--	<.0001
FORMALDEHYDE	0.0008	--	--	0.0008	--	--	--	0.0008
PROPYLENE OXIDE	<.0001	--	--	<.0001	<.0001	--	--	--
TOLUENE	<.0001	--	<.0001	<.0001	<.0001	--	--	--
XYLENES	<.0001	--	--	<.0001	--	--	--	--
Total Acute	0.0246	<.0001	<.0001	0.0246	<.0001	--	--	0.0008

A Zero Background Concentration file was used to perform this analysis, therefore, there is no contribution from background pollutants.

California Air Resources Board

And

Office of Environmental Health Hazard Assessment

Health Risk Assessment Program

Version 2.0e

CHRONIC INHALATION EXPOSURE REPORT

Run Made By

R.B.Booth

RTP Environmental Assoc.

Project : RCEC

May. 16, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: RESMIR.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	2.050E-07
ACETALDEHYDE	1.110E-04
ACROLEIN	1.040E-05
AMMONIA	1.230E-02
BENZENE	2.190E-05
ETHYL BENZENE	2.890E-05
FORMALDEHYDE	1.770E-04
NAPHTHALENE	2.680E-06
PAH:BENZO(A)PYRENE	1.060E-06
PROPYLENE OXIDE	7.710E-05
TOLUENE	1.140E-04
XYLENES	4.210E-05

CHRONIC INHALATION HAZARD INDEX

Pollutant	Resp	CV/BL	CNS	Skin	Repro	Kidn	GI/LV	Immun
ACETALDEHYDE	<.0001	--	--	--	--	--	--	--
ACROLEIN	0.0005	--	--	0.0005	--	--	--	--
AMMONIA	<.0001	--	--	--	--	--	--	--
BENZENE	--	<.0001	<.0001	--	<.0001	--	--	--
ETHYL BENZENE	--	--	--	--	<.0001	<.0001	<.0001	--
FORMALDEHYDE	<.0001	--	--	<.0001	--	--	--	--
NAPHTHALENE	<.0001	--	--	--	--	--	--	--
PROPYLENE OXIDE	<.0001	--	--	--	--	--	--	--
TOLUENE	<.0001	--	<.0001	--	<.0001	--	--	--
XYLENES	<.0001	--	<.0001	--	--	--	--	--
Total Chronic	0.0007	<.0001	<.0001	0.0006	<.0001	<.0001	<.0001	--

A Zero Background Concentration file was used to perform this analysis, therefore, there is no contribution from background pollutants.

California Air Resources Board

And

Office of Environmental Health Hazard Assessment

Health Risk Assessment Program

Version 2.0e

CHRONIC NONINHALATION EXPOSURE REPORT

Run Made By

R.B.Booth

RTP Environmental Assoc.

Project : RCEC

May. 16, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: RESMIR.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	2.050E-07
ACETALDEHYDE	1.110E-04
ACROLEIN	1.040E-05
AMMONIA	1.230E-02
BENZENE	2.190E-05
ETHYL BENZENE	2.890E-05
FORMALDEHYDE	1.770E-04
NAPHTHALENE	2.680E-06
PAH:BENZO(A)PYRENE	1.060E-06
PROPYLENE OXIDE	7.710E-05
TOLUENE	1.140E-04
XYLENES	4.210E-05

EXPOSURE ROUTE INFORMATION

File: RESMIR.I96

Deposition Velocity (m/s) .....: 0.020

Fraction of Homegrown Produce .: 0.050

Dilution Factor for Farm/Ranch X/Q (ug/m3)/(g/s) ....: 0.0000
Fraction of Animals' Diet From Grazing .....: 0.0000
Fraction of Animals' Diet From Impacted Feed .....: 0.0000

Fraction of Animals' Water Impacted by Deposition ...: 0.0000

Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume Changes .....: 0.000E+00

Fraction of Meat in Diet Impacted ..: 0.0000

Beef .....: 0.0000
Pork .....: 0.0000
Lamb/Goat .....: 0.0000
Chicken .....: 0.0000

Fraction of Milk in Diet Impacted ..: 0.0000

Goat Milk Fraction ..: 0.0000

Fraction of Eggs in Diet Impacted ..: 0.0000

Fraction of Impacted Drinking Water : 0.0000

X/Q at water source ..: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

Fraction of Fish from Impacted Water: 0.0000

X/Q at Fish Source ...: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

CHRONIC NONINHALATION EXPOSURE

Pollutant	Avg. Dose (mg/kg-d)	REL (mg/kg-d)	Avg Dose/REL
1,3-BUTADIENE	---	---	---
ACETALDEHYDE	---	---	---
ACROLEIN	---	---	---
AMMONIA	---	---	---
BENZENE	---	---	---
ETHYL BENZENE	---	---	---
FORMALDEHYDE	---	---	---
NAPHTHALENE	2.04E-09	---	---
PAH:BENZO(A)PYRENE	5.91E-10	---	---
PROPYLENE OXIDE	---	---	---
TOLUENE	---	---	---
XYLENES	---	---	---

California Air Resources Board

And

Office of Environmental Health Hazard Assessment

Health Risk Assessment Program

Version 2.0e

INDIVIDUAL CANCER RISK REPORT

Run Made By

R.B.Booth

RTP Environmental Assoc.

Project : RCEC

May. 16, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: RESMIR.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	2.050E-07
ACETALDEHYDE	1.110E-04
ACROLEIN	1.040E-05
AMMONIA	1.230E-02
BENZENE	2.190E-05
ETHYL BENZENE	2.890E-05
FORMALDEHYDE	1.770E-04
NAPHTHALENE	2.680E-06
PAH:BENZO(A)PYRENE	1.060E-06
PROPYLENE OXIDE	7.710E-05
TOLUENE	1.140E-04
XYLENES	4.210E-05

EXPOSURE ROUTE INFORMATION

File: RESMIR.I96

Deposition Velocity (m/s) .....: 0.020

Fraction of Homegrown Produce .: 0.050

Dilution Factor for Farm/Ranch X/Q (ug/m3)/(g/s) ....: 0.0000
Fraction of Animals' Diet From Grazing .....: 0.0000
Fraction of Animals' Diet From Impacted Feed .....: 0.0000

Fraction of Animals' Water Impacted by Deposition ...: 0.0000

Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume Changes .....: 0.000E+00

Fraction of Meat in Diet Impacted ..: 0.0000

Beef .....: 0.0000
Pork .....: 0.0000
Lamb/Goat .....: 0.0000
Chicken .....: 0.0000

Fraction of Milk in Diet Impacted ..: 0.0000

Goat Milk Fraction ..: 0.0000

Fraction of Eggs in Diet Impacted ..: 0.0000

Fraction of Impacted Drinking Water : 0.0000

X/Q at water source ..: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

Fraction of Fish from Impacted Water: 0.0000

X/Q at Fish Source ...: 0.0000
Surface Area (m2) ....: 0.000E+00
Volume (liters) .....: 0.000E+00
Volume changes .....: 0.000E+00

---

44 YEAR
INDIVIDUAL CANCER RISK BY POLLUTANT AND ROUTE

Pollutant	Air	Soil	Skin	Garden	MMilk	Other
1,3-BUTADIENE	2.19E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ACETALDEHYDE	1.88E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BENZENE	3.99E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FORMALDEHYDE	6.68E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PAH:BENZO(A)PYR	7.33E-10	1.13E-09	7.16E-10	2.66E-09	2.89E-09	0.00E+00
PROPYLENE OXIDE	1.79E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Route Total	2.19E-09	1.13E-09	7.16E-10	2.66E-09	2.89E-09	0.00E+00

TOTAL RISK: 9.58E-09

70 YEAR
INDIVIDUAL CANCER RISK BY POLLUTANT AND ROUTE

Pollutant	Air	Soil	Skin	Garden	MMilk	Other
1,3-BUTADIENE	3.49E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ACETALDEHYDE	3.00E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BENZENE	6.35E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FORMALDEHYDE	1.06E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PAH:BENZO(A)PYR	1.17E-09	1.75E-09	1.11E-09	4.23E-09	0.00E+00	0.00E+00
PROPYLENE OXIDE	2.85E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Route Total	3.48E-09	1.75E-09	1.11E-09	4.23E-09	0.00E+00	0.00E+00

TOTAL RISK: 1.06E-08

California Air Resources Board

And

Office of Environmental Health Hazard Assessment

Health Risk Assessment Program

Version 2.0e

CANCER BURDEN REPORT

Run Made By

R.B.Booth

RTP Environmental Assoc.

Project : RCEC

May. 16, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: RESMIR.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	2.050E-07
ACETALDEHYDE	1.110E-04
ACROLEIN	1.040E-05
AMMONIA	1.230E-02
BENZENE	2.190E-05
ETHYL BENZENE	2.890E-05
FORMALDEHYDE	1.770E-04
NAPHTHALENE	2.680E-06
PAH:BENZO(A)PYRENE	1.060E-06
PROPYLENE OXIDE	7.710E-05
TOLUENE	1.140E-04
XYLENES	4.210E-05

FACTORS USED IN CANCER BURDEN CALCULATIONS

Deposition Velocity (m/s) . . . . . :	0.02
Fraction of Produce Grown At Home . :	0.05
Fraction of Residents with Gardens :	0.25

RECEPTOR INFORMATION

File: RESMIR.R96

Receptor ID	X/Q	Residents	Workers
Residential MIR	1.0E+00	131213	55451

EXPOSED POPULATION AND CANCER BURDEN BY RECEPTOR AND ROUTE

Rec ID	Residents	Workers	Air	Soil	Dermal	Garden
Residentia	131213	55451	5.05E-04	2.45E-04	1.61E-04	1.39E-04
Total	131213	55451	5.05E-04	2.45E-04	1.61E-04	1.39E-04

TOTAL BURDEN: 1.05E-03

EXPOSED POPULATION AND CANCER BURDEN BY RECEPTOR AND ROUTE
For 2588 Screening Purposes Only

Rec ID	Residents	Workers	Air	Soil	Dermal	Garden
Residentia	131213	55451	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	131213	55451	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL BURDEN: 0.00E+00

(CO-99-2) County Population Estimates for July 1, 1999 and Population Change for April 1, 1990 to July 1, 1999
(includes revised April 1, 1990 Population Estimates Base)

Source: Population Estimates Program, Population Division, U.S. Census Bureau, Washington, DC 20233
Contact: Statistical Information Staff, Population Division, U.S. Census Bureau (301-457-2422)

Internet Release Date: March 9, 2000

FIPS State/County Code and Area Name	7/1/99 Estimate	4/1/90 Population Estimates Base	Numeric Population Change 1990-99	Percent Population Change 1990-99
06 California	33,145,121	29,811,427	3,333,694	11.2
06001 Alameda County, CA	1,415,582	1,304,347	111,235	8.5
06003 Alpine County, CA	1,161	1,113	48	4.3
06005 Amador County, CA	34,153	30,039	4,114	13.7
06007 Butte County, CA	195,220	182,120	13,100	7.2
06009 Calaveras County, CA	40,051	31,998	8,053	25.2
06011 Colusa County, CA	18,844	16,275	2,569	15.8
06013 Contra Costa County, CA	933,141	803,731	129,410	16.1
06015 Del Norte County, CA	26,477	23,460	3,017	12.9
06017 El Dorado County, CA	161,358	125,995	35,363	28.1
06019 Fresno County, CA	763,069	667,479	95,590	14.3
06021 Glenn County, CA	26,328	24,798	1,530	6.2
06023 Humboldt County, CA	121,358	119,118	2,240	1.9
06025 Imperial County, CA	145,287	109,303	35,984	32.9
06027 Inyo County, CA	17,958	18,281	-323	-1.8
06029 Kern County, CA	642,495	544,981	97,514	17.9
06031 Kings County, CA	123,241	101,469	21,772	21.5
06033 Lake County, CA	55,405	50,631	4,774	9.4

California

StCou	County Name	Census Tract/ BNA	1990 Population	Land Area (Square Miles)	Persons In Poverty	Percent Below Poverty Level
06001	Alameda	4001	2754	2.69	79	2.9
06001	Alameda	4002	2001	0.25	174	8.8
06001	Alameda	4003	5008	0.41	641	12.9
06001	Alameda	4004	3857	0.27	690	18.0
06001	Alameda	4005	3365	0.22	781	23.4
06001	Alameda	4006	1665	0.12	415	24.8
06001	Alameda	4007	4212	0.33	973	23.3
06001	Alameda	4008	3169	0.28	790	25.1
06001	Alameda	4009	2414	0.17	490	20.6
06001	Alameda	4010	5496	0.45	1583	28.9
06001	Alameda	4011	3922	0.34	696	17.5
06001	Alameda	4012	2474	0.26	431	17.8
06001	Alameda	4013	2472	0.33	548	26.6
06001	Alameda	4014	4182	0.29	1404	33.7
06001	Alameda	4015	1908	0.18	678	36.0
06001	Alameda	4016	1845	0.24	921	49.3
06001	Alameda	4017	1930	2.28	380	20.6
06001	Alameda	4018	1857	0.12	720	40.4
06001	Alameda	4019	775	1.71	110	14.4
06001	Alameda	4020	34	0.46	10	20.8
06001	Alameda	4021	1744	0.09	1065	58.7
06001	Alameda	4022	1576	0.12	793	51.7
06001	Alameda	4023	351	0.16	46	14.6
06001	Alameda	4024	2064	0.13	626	31.5
06001	Alameda	4025	2251	0.14	1404	58.8
06001	Alameda	4026	1333	0.11	228	18.6
06001	Alameda	4027	1547	0.14	409	26.0
06001	Alameda	4028	1184	0.15	320	28.6
06001	Alameda	4029	1035	0.15	164	15.8
06001	Alameda	4030	2043	0.13	507	23.8
06001	Alameda	4031	1300	0.13	258	37.2
06001	Alameda	4032	13	0.21	0	0.0
06001	Alameda	4033	2046	0.35	450	22.0
06001	Alameda	4034	3732	0.22	489	13.1
06001	Alameda	4035	6171	0.33	905	14.7
06001	Alameda	4036	4746	0.14	461	9.7
06001	Alameda	4037	4094	0.16	416	10.7
06001	Alameda	4038	3513	0.27	207	5.9
06001	Alameda	4039	3720	0.20	388	10.1
06001	Alameda	4040	2844	0.14	311	12.0
06001	Alameda	4041	5553	0.35	488	9.1
06001	Alameda	4042	2862	1.02	83	2.9
06001	Alameda	4043	3237	0.71	139	4.3
06001	Alameda	4044	4420	1.51	130	2.9
06001	Alameda	4045.01	1547	0.42	16	1.0
06001	Alameda	4045.02	5285	1.19	162	3.1
06001	Alameda	4046	4112	1.89	74	1.8
06001	Alameda	4047	1897	0.51	50	2.7
06001	Alameda	4048	2704	0.27	264	9.7
06001	Alameda	4049	4152	0.38	242	6.0

California

StCou	County Name	Census Tract/ BNA	1990 Population	Land Area (Square Miles)	Persons In Poverty	Percent Below Poverty Level
06001	Alameda	4050	3189	0.33	158	5.0
06001	Alameda	4051	4347	0.48	101	2.3
06001	Alameda	4052	4896	0.38	517	10.6
06001	Alameda	4053	5471	0.18	1074	19.8
06001	Alameda	4054	7829	0.26	2327	30.4
06001	Alameda	4055	4068	0.16	1016	25.0
06001	Alameda	4056	3580	0.16	815	22.8
06001	Alameda	4057	3430	0.21	742	21.9
06001	Alameda	4058	4367	0.21	1210	27.8
06001	Alameda	4059	7302	0.35	2427	33.4
06001	Alameda	4060	3114	0.84	741	23.9
06001	Alameda	4061	3407	0.72	699	21.9
06001	Alameda	4062	9192	0.31	3552	40.0
06001	Alameda	4063	3565	0.18	704	19.8
06001	Alameda	4064	2266	0.21	296	15.1
06001	Alameda	4065	5615	0.29	1272	22.9
06001	Alameda	4066	6788	0.45	969	14.3
06001	Alameda	4067	5014	0.64	225	4.6
06001	Alameda	4068	3566	0.38	147	4.1
06001	Alameda	4069	3480	0.34	303	8.7
06001	Alameda	4070	6040	0.33	790	13.5
06001	Alameda	4071	7522	0.40	1510	20.2
06001	Alameda	4072	6350	0.27	1410	22.9
06001	Alameda	4073	1980	0.86	395	20.7
06001	Alameda	4074	3571	0.20	986	27.3
06001	Alameda	4075	3812	0.19	920	25.1
06001	Alameda	4076	6201	0.41	1038	17.1
06001	Alameda	4077	4731	0.36	480	10.1
06001	Alameda	4078	2556	0.46	199	10.1
06001	Alameda	4079	2806	0.48	181	6.4
06001	Alameda	4080	2123	0.72	30	1.7
06001	Alameda	4081	5908	3.73	277	4.7
06001	Alameda	4082	4153	0.35	456	11.1
06001	Alameda	4083	4517	0.59	474	10.5
06001	Alameda	4084	3399	0.20	990	29.3
06001	Alameda	4085	4573	0.33	968	21.4
06001	Alameda	4086	4653	0.42	1102	23.9
06001	Alameda	4087	6602	0.44	1501	23.0
06001	Alameda	4088	4752	0.50	1835	38.7
06001	Alameda	4089	2809	0.31	732	25.5
06001	Alameda	4090	3116	6.39	754	25.1
06001	Alameda	4091	1938	0.19	214	11.1
06001	Alameda	4092	2734	0.27	721	26.6
06001	Alameda	4093	4605	0.42	1004	21.8
06001	Alameda	4094	3662	0.49	963	26.4
06001	Alameda	4095	2691	0.33	650	24.4
06001	Alameda	4096	4432	0.29	1389	31.4
06001	Alameda	4097	4499	0.31	1326	29.8
06001	Alameda	4098	3082	0.68	537	17.5
06001	Alameda	4099	4201	1.84	96	2.5

California

StCou	County Name	Census Tract/ BNA	1990 Population	Land Area (Square Miles)	Persons In Poverty	Percent Below Poverty Level
06001	Alameda	4100	2849	2.61	67	2.5
06001	Alameda	4101	2673	0.33	367	13.3
06001	Alameda	4102	3001	0.24	501	16.1
06001	Alameda	4103	3054	0.22	735	24.7
06001	Alameda	4104	2944	0.27	271	9.4
06001	Alameda	4201	2137	0.20	143	7.0
06001	Alameda	4202	2438	0.17	325	12.9
06001	Alameda	4203	4109	0.47	368	9.1
06001	Alameda	4204	2598	0.39	409	16.1
06001	Alameda	4205	2023	0.15	160	7.9
06001	Alameda	4206	3042	0.31	153	5.0
06001	Alameda	4211	2055	0.29	52	2.6
06001	Alameda	4212	3635	0.50	82	2.2
06001	Alameda	4213	3873	0.42	263	6.8
06001	Alameda	4214	1639	0.18	145	8.5
06001	Alameda	4215	3526	0.58	92	2.7
06001	Alameda	4216	3735	0.60	229	6.1
06001	Alameda	4217	2898	0.23	337	11.7
06001	Alameda	4218	2045	0.21	131	6.5
06001	Alameda	4219	3619	0.33	363	10.1
06001	Alameda	4220	1872	1.69	640	34.6
06001	Alameda	4221	2528	0.21	413	16.3
06001	Alameda	4222	3169	0.26	628	19.9
06001	Alameda	4223	2962	0.21	320	11.0
06001	Alameda	4224	3333	0.18	856	25.4
06001	Alameda	4225	3744	0.17	727	25.1
06001	Alameda	4226	1194	0.69	25	45.5
06001	Alameda	4227	4466	0.15	850	37.6
06001	Alameda	4228	6407	0.16	1280	42.2
06001	Alameda	4229	2104	0.21	586	27.8
06001	Alameda	4230	3983	0.27	576	15.0
06001	Alameda	4231	3785	0.29	614	16.3
06001	Alameda	4232	2491	0.18	543	21.9
06001	Alameda	4233	3324	0.28	425	12.9
06001	Alameda	4234	4517	0.29	789	17.7
06001	Alameda	4235	2938	0.24	469	16.7
06001	Alameda	4236	7483	0.35	2302	31.8
06001	Alameda	4237	3767	0.31	680	23.6
06001	Alameda	4238	3199	0.41	181	5.7
06001	Alameda	4239	3308	0.28	463	14.3
06001	Alameda	4240	5105	0.32	1309	26.0
06001	Alameda	4251	5753	1.22	857	14.9
06001	Alameda	4261	5971	1.14	90	1.5
06001	Alameda	4262	4631	0.55	101	2.2
06001	Alameda	4271	3313	0.38	130	4.0
06001	Alameda	4272	4155	0.52	406	10.2
06001	Alameda	4273	4067	0.78	372	9.2
06001	Alameda	4274	3668	0.71	317	8.7
06001	Alameda	4275	2068	2.56	113	9.1
06001	Alameda	4276	4562	0.23	711	15.6

California

StCou	County Name	Census Tract/ BNA	1990 Population	Land Area (Square Miles)	Persons In Poverty	Percent Below Poverty Level
06001	Alameda	4277	4744	0.38	281	5.9
06001	Alameda	4278	4668	0.33	311	6.7
06001	Alameda	4279	4419	0.34	229	5.2
06001	Alameda	4280	2671	0.21	269	10.1
06001	Alameda	4281	4141	0.38	180	4.3
06001	Alameda	4282	5894	0.53	345	5.9
06001	Alameda	4283	11254	2.41	361	3.2
06001	Alameda	4284	4313	0.32	318	8.1
06001	Alameda	4285	2974	0.26	144	4.9
06001	Alameda	4286	3273	0.35	175	5.5
06001	Alameda	4301	5795	39.26	209	3.6
06001	Alameda	4302	6608	1.87	189	2.9
06001	Alameda	4303	3428	0.92	85	2.5
06001	Alameda	4304	2000	1.15	10	0.5
06001	Alameda	4305	4807	0.62	241	5.0
06001	Alameda	4306	5070	0.89	96	1.9
06001	Alameda	4307	3721	0.51	47	1.3
06001	Alameda	4308	4865	0.71	338	7.0
06001	Alameda	4309	3884	0.43	261	6.9
06001	Alameda	4310	2106	0.36	132	6.2
06001	Alameda	4311	3019	0.37	133	4.5
06001	Alameda	4312	4869	0.77	255	5.3
06001	Alameda	4321	3307	0.40	201	6.1
06001	Alameda	4322	3429	0.39	187	5.5
06001	Alameda	4323	2738	0.40	162	5.9
06001	Alameda	4324	4768	2.36	185	3.9
06001	Alameda	4325	7152	0.83	408	5.7
06001	Alameda	4326	5010	0.65	237	4.9
06001	Alameda	4327	2403	0.32	94	3.8
06001	Alameda	4328	3585	0.89	280	7.8
06001	Alameda	4329	796	0.63	0	0.0
06001	Alameda	4330	3234	0.50	187	5.8
06001	Alameda	4331	9145	1.12	407	4.5
06001	Alameda	4332	5882	1.13	488	8.4
06001	Alameda	4333	6179	0.98	174	2.8
06001	Alameda	4334	3485	2.05	97	2.8
06001	Alameda	4335	3937	0.48	123	3.1
06001	Alameda	4336	5127	0.61	293	5.8
06001	Alameda	4337	2511	0.61	286	11.5
06001	Alameda	4338	5321	0.73	231	4.4
06001	Alameda	4339	4999	0.32	1029	20.6
06001	Alameda	4340	3857	0.45	403	11.0
06001	Alameda	4351.01	4592	21.91	434	9.5
06001	Alameda	4351.02	4901	1.63	192	4.1
06001	Alameda	4352	3986	0.95	243	6.4
06001	Alameda	4353	3778	0.50	440	12.0
06001	Alameda	4354	3287	0.52	455	14.4
06001	Alameda	4355	3057	0.39	253	8.4
06001	Alameda	4356	7714	0.79	1016	13.7
06001	Alameda	4357	3758	0.50	332	8.8

California

StCou	County Name	Census Tract/ BNA	1990 Population	Land Area (Square Miles)	Persons In Poverty	Percent Below Poverty Level
06001	Alameda	4358	4387	0.52	226	5.2
06001	Alameda	4359	4602	0.59	113	2.5
06001	Alameda	4360	4010	0.50	153	3.8
06001	Alameda	4361	4337	0.49	191	4.4
06001	Alameda	4362	2668	0.25	291	11.7
06001	Alameda	4363	4781	0.69	637	13.8
06001	Alameda	4364.01	6490	1.25	506	7.7
06001	Alameda	4364.02	2976	1.76	61	2.1
06001	Alameda	4365	3716	0.66	298	8.1
06001	Alameda	4366	8755	0.76	1467	16.8
06001	Alameda	4367	2499	0.31	206	8.7
06001	Alameda	4368	2817	0.39	258	9.0
06001	Alameda	4369	5713	0.45	693	12.2
06001	Alameda	4370	2968	0.63	57	1.9
06001	Alameda	4371	7873	19.27	547	7.0
06001	Alameda	4372	5004	1.00	336	6.8
06001	Alameda	4373	2948	0.41	181	6.1
06001	Alameda	4374	2968	0.36	172	5.8
06001	Alameda	4375	3914	0.24	516	13.4
06001	Alameda	4376	2702	0.29	291	11.9
06001	Alameda	4377	7464	0.34	2091	28.6
06001	Alameda	4378	3464	0.49	181	5.3
06001	Alameda	4379	2477	0.86	342	14.3
06001	Alameda	4380	2776	0.96	119	4.2
06001	Alameda	4381	5198	0.74	170	3.3
06001	Alameda	4382.01	3848	0.38	317	8.3
06001	Alameda	4382.02	6345	2.66	393	6.2
06001	Alameda	4383	3425	0.33	132	4.0
06001	Alameda	4384	1948	0.66	75	3.6
06001	Alameda	4401	2329	10.66	201	10.2
06001	Alameda	4402	5493	0.46	681	12.4
06001	Alameda	4403.01	4753	1.65	165	3.5
06001	Alameda	4403.02	5928	1.40	100	1.7
06001	Alameda	4403.04	4704	0.37	454	9.7
06001	Alameda	4403.05	4153	0.31	96	2.3
06001	Alameda	4403.06	4029	0.22	470	11.7
06001	Alameda	4403.07	4279	0.55	213	5.0
06001	Alameda	4403.08	4873	0.69	390	8.1
06001	Alameda	4403.09	4862	1.21	377	7.6
06001	Alameda	4403.31	2451	0.69	167	7.1
06001	Alameda	4403.32	9	1.34	0	0.0
06001	Alameda	4411	3944	5.79	179	4.6
06001	Alameda	4412	5426	1.24	273	5.0
06001	Alameda	4413	8117	2.07	461	5.7
06001	Alameda	4414	11448	1.33	647	5.7
06001	Alameda	4415.01	5014	0.62	80	1.6
06001	Alameda	4415.02	10656	1.13	397	3.7
06001	Alameda	4415.98	7853	32.41	122	1.6
06001	Alameda	4416	10662	1.14	421	4.0
06001	Alameda	4417	5048	0.83	491	9.8

California

StCou	County Name	Census Tract/ BNA	1990 Population	Land Area (Square Miles)	Persons In Poverty	Percent Below Poverty Level
06001	Alameda	4418	5929	0.80	315	5.3
06001	Alameda	4419.01	6171	1.96	312	5.1
06001	Alameda	4419.02	12101	1.30	1024	8.8
06001	Alameda	4420	2365	3.01	17	0.7
06001	Alameda	4421	4552	0.71	40	0.9
06001	Alameda	4422	5959	1.15	182	3.1
06001	Alameda	4423	6806	0.93	498	7.4
06001	Alameda	4424	5580	0.63	86	1.6
06001	Alameda	4425	6872	0.77	313	4.7
06001	Alameda	4426	7431	0.96	449	6.1
06001	Alameda	4427	2869	0.48	31	1.1
06001	Alameda	4428	2831	0.48	52	1.8
06001	Alameda	4429	5977	0.86	115	1.9
06001	Alameda	4430	8288	0.91	280	3.4
06001	Alameda	4431	15058	9.24	380	2.5
06001	Alameda	4432	2035	5.16	34	1.7
06001	Alameda	4433	9353	1.36	197	2.1
06001	Alameda	4441	7362	1.14	196	2.7
06001	Alameda	4442	6210	0.81	298	4.8
06001	Alameda	4443	6831	7.69	452	6.6
06001	Alameda	4444	4648	0.38	201	4.4
06001	Alameda	4445	5025	0.77	590	11.8
06001	Alameda	4446	7785	3.25	156	2.0
06001	Alameda	4501	3786	4.28	0	0.0
06001	Alameda	4502	3557	0.63	323	11.0
06001	Alameda	4503	4340	1.23	129	3.0
06001	Alameda	4504	5676	1.24	193	3.4
06001	Alameda	4505	5870	4.79	149	2.5
06001	Alameda	4506.01	1647	19.46	65	4.1
06001	Alameda	4506.02	6217	2.39	126	2.0
06001	Alameda	4506.03	4852	1.51	71	1.5
06001	Alameda	4506.04	4917	0.82	62	1.3
06001	Alameda	4506.05	3661	0.69	36	1.0
06001	Alameda	4506.06	5685	0.80	93	1.6
06001	Alameda	4506.07	2577	1.89	152	5.9
06001	Alameda	4507.01	2968	101.79	26	0.9
06001	Alameda	4507.03	4586	3.52	130	2.9
06001	Alameda	4507.04	8922	5.57	361	4.1
06001	Alameda	4507.21	157	11.49	0	0.0
06001	Alameda	4507.22	7038	2.63	176	2.5
06001	Alameda	4511	3569	213.92	93	2.7
06001	Alameda	4512	8697	19.26	473	5.5
06001	Alameda	4513	5512	4.95	139	2.5
06001	Alameda	4514	10726	2.61	890	8.4
06001	Alameda	4515	12599	5.12	759	6.0
06001	Alameda	4516	7938	2.69	387	5.0
06001	Alameda	4517	10338	1.93	311	3.0
06001	Alameda	4518.98	0	0.03	0	0.0
06001	Alameda	4519.98	0	0.00	0	0.0
06001	Alameda	4520.95	0	0.00	0	0.0

California

StCou	County Name	Census Tract/ BNA	1990 Population	Land Area (Square Miles)	Persons In Poverty	Percent Below Poverty Level
06001	Alameda	4520.96	0	0.00	0	0.0
06001	Alameda	4520.97	0	0.00	0	0.0
06001	Alameda	4520.98	0	0.00	0	0.0
06001	Alameda	4521.93	0	0.01	0	0.0
06001	Alameda	4521.94	0	0.00	0	0.0
06001	Alameda	4521.95	0	0.00	0	0.0
06001	Alameda	4521.96	0	0.00	0	0.0
06001	Alameda	4521.97	0	0.00	0	0.0
06001	Alameda	4521.98	0	0.00	0	0.0

Population Data:

3 mile radius adjusted 1999 population:		131,213
	worker:	55451
6 mile radius adjusted 1999 population:		332,116
	worker:	104,485

U.S. Census Bureau

State and County *QuickFacts*

Alameda County, California

More data for this area ▶

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County Selection Map
Locate a county by place name

Follow the ? link for definition and source information.

People QuickFacts	Alameda County	California
Population, 1999 estimate	1,415,582	33,145,121
Population percent change, 1990-1999 estimate	8.5%	11.2%
Male population, 1999 estimate	698,354	16,579,707
Female population, 1999 estimate	717,228	16,565,414
Percent population under 18 years old, 1999 estimate	24.4%	26.9%
Percent population 65 years old and over, 1999 estimate	10.5%	11.0%
Percent white population, 1999 estimate	60.6%	79.4%
Percent Black population, 1999 estimate	19.0%	7.5%
Percent American Indian, Eskimo, or Aleut pop, 1999 estimate	0.8%	0.9%
Percent Asian or Pacific Islander population, 1999 estimate	19.6%	12.2%
Percent Hispanic population, 1999 estimate	18.6%	31.6%
Percent White non-Hispanic population, 1999 estimate	44.5%	49.9%
High school graduates, persons 25 years and over, 1990	682,698	14,244,971
College graduates, persons 25 years and over, 1990	241,487	4,366,674
Homeownership rate, 1990	53.3%	55.6%
Single family homes, number 1990	299,639	6,930,949
Households, 1990	480,079	10,399,700
Persons per household, 1990	2.59	2.79
Family households, 1990	311,888	7,218,877
Median household money income, 1997 model-based estimate	$46,795	$39,595
Persons below poverty, percent, 1997 model-based estimate	11.8%	16.0%
Children below poverty, percent, 1997 model-based estimate	17.6%	24.6%

Business QuickFacts	Alameda County	California
Private nonfarm establishments, 1998	35,137	773,925
Private nonfarm employment, 1998	598,220	12,026,989
Private nonfarm employment, percent change 1990-1998	18.3%	6.3%
Manufacturers shipments, 1997 ($1000)	22,337,780	379,612,443
Retail sales, 1997 ($1000)	12,404,947	263,118,346

Retail sales per capita 1997	$9,040	$8,167
Minority-owned firms, 1992	27,157	541,414
Women-owned firms, 1992	36,500	801,487
Housing units authorized by building permits, 1999	6,397	138,039
Federal funds and grants, 1999 ($1000)	8,052,789	166,049,702
Local government employment - full-time equivalent, 1997	59,236	1,194,169

Geography QuickFacts	Alameda County	California
Land area, 1990 (square miles)	738	155,973
Persons per square mile, 1999	1,919.4	212.5
Metropolitan Area	Oakland, CA PMSA	

FN: Footnote on this item for this area in place of data
NA: Not available
D: Suppressed to avoid disclosure of confidential information
X: Not applicable
S: Suppressed; does not meet publication standards
Z: Value greater than zero but less than half unit of measure shown

Percent worker population by census tract calculation:

(non-farm employment 1998) ÷ (county population 1999) = multiplier

Where: Non-farm employment for Alameda County 1998 = 598,200
County population for Alameda County 1999 = 1,415,582

(598,220) ÷ (1,415,582) = 0.4226

= 42.26%

Therefore, the worker population for each census tract evaluated in the HRA will be estimated by multiplying the 1990 census tract population (as adjusted per the 1999 data, i.e., 8.5% increase) by the above multiplier:

(1990 tract population) X (8.5% increase) X (.4226) = 1999 tract worker population

Russell City Energy Center

Appendix 8.1-E
Construction Emissions and Impact Analysis

May 2001

Russell City Energy Center AFC

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APPENDIX 8.1E CONSTRUCTION EMISSIONS AND IMPACT ANALYSIS

8.1E.1 Construction Phases

Construction of RCEC is expected to last approximately 21 months during the 2 year construction period. The construction will occur in the following four main phases:

- Site preparation;
- Foundation work;
- Installation of major equipment; and
- Construction/installation of major structures.

Site preparation includes clearing, grading, excavation of footings and foundations, and backfilling operations. After site preparation is finished, the construction of the foundations and structures is expected to begin. Once the foundations and structures are finished, installation and assembly of the mechanical and electrical equipment are scheduled to commence.

Fugitive dust emissions from the construction of RCEC will result from:

- Dust entrained during site preparation and grading/excavation at the construction site;
- Dust entrained during onsite travel on paved and unpaved surfaces;
- Dust entrained during aggregate and soil loading and unloading operations; and
- Wind erosion of areas disturbed during construction activities.

Combustion emissions during construction will result from:

- Exhaust from the Diesel construction equipment used for site preparation, grading, excavation, and construction of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;
- Exhaust from Diesel-powered welding machines, electric generators, air compressors, and water pumps;
- Exhaust from pickup trucks and Diesel trucks used to transport workers and materials around the construction site;
- Exhaust from Diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site;
- Exhaust from locomotives used to deliver mechanical equipment to the project area; and
- Exhaust from automobiles used by workers to commute to the construction site.

To determine the potential worst-case daily construction impacts, exhaust and dust emission rates have been evaluated for each source of emissions. Worst-case daily dust emissions are expected to occur during the first one to two months of construction when site preparation occurs (i.e., 5 months after notice to proceed). The worst-case daily exhaust emissions are expected to occur during the middle of the construction schedule during the installation of the major mechanical equipment (i.e., 15 months after notice to proceed). Annual emissions are based on the average equipment mix during the 21-month construction period.

8.1E.2 Available Mitigation Measures

The following mitigation measures are proposed to control exhaust emissions from the Diesel heavy equipment used during construction of RCEC:

- Operational measures, such as limiting time spent with the engine idling by shutting down equipment when not in use;
- Regular preventive maintenance to prevent emission increases due to engine problems;
- Use of low sulfur and low aromatic fuel meeting California standards for motor vehicle Diesel fuel; and
- Use of low-emitting Diesel engines meeting federal emissions standards for construction equipment.

The following mitigation measures are proposed to control fugitive dust emissions during construction of the project:

- Use either water application or chemical dust suppressant application to control dust emissions from unpaved road travel and unpaved parking areas;
- Use vacuum sweeping and/or water flushing of paved road surface to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard;
- Limit traffic speeds on unpaved roads to 15 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to roadways;
- Replant vegetation in disturbed areas as quickly as possible;
- Use wheel washers or wash off tires of all trucks exiting construction site; and
- Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water or chemical dust suppressant.

8.1E.3 Estimation of Emissions with Mitigation Measures

Tables 8.1E-1 through 8.1E-3 show the estimated maximum daily and annual heavy equipment exhaust and fugitive dust emissions with recommended mitigation measures. Detailed emission calculations are included in Tables 8.1E-5 through 8.1E-12.

Table 8.1E-1. Maximum Daily Emissions During Construction (Month 5; maximum dust emissions), pounds per day.

	NO_x	CO	POC	SO_x	PM_{10}
Onsite					
Construction Equipment, Fugitive Dust	310.93	93.31	25.1	8.72	43.25
Offsite					
Worker Travel, Truck/Rail Deliveries	40.28	291.08	23.91	0.71	1.42
Total =	**351.21**	**384.39**	**49.01**	**9.43**	**44.67**

Table 8.1E-2. Maximum Daily Emissions During Construction (Month 15; maximum exhaust emissions), pounds per day.

	NO_x	CO	POC	SO_x	PM_{10}
Onsite					
Construction Equipment, Fugitive Dust	230.06	76.71	20.08	6.45	23.63
Offsite					
Worker Travel, Truck/Rail Deliveries	152.66	736.76	62.01	5.07	4.84
Total =	**382.72**	**813.47**	**82.09**	**11.52**	**28.47**

Table 8.1E-3. Annual Emissions During Construction, tons per year.

	NO_x	CO	POC	SO_x	PM_{10}
Onsite					
Construction Equipment, Fugitive Dust	15.25	4.95	1.28	0.44	2.87
Offsite					
Worker Travel, Truck/Rail Deliveries	7.70	58.87	4.81	0.14	0.23
Total =	**22.95**	**63.82**	**6.09**	**0.58**	**3.10**

8.1E.4 Analysis of Ambient Impacts from Facility Construction

Ambient air quality impacts from emissions during the construction of RCEC were estimated using an air quality dispersion modeling analysis. The modeling analysis considers the construction site location, the surrounding topography, and the sources of emissions during construction, including vehicle and equipment exhaust emissions and fugitive dust.

8.1E.4.1 Existing Ambient Levels

As with the modeling analysis of project operating impacts (Section 8.1.4.1.2), monitoring stations delineated in Section 8.1.3 were used to establish the ambient background levels for the construction impact modeling analysis. Table 8.1-26 showed the maximum concentrations of NO_x, SO_2, CO and PM_{10} recorded for 1997 through 2000 at those monitoring stations.

8.1E.4.2 Dispersion Model

As in the analysis of project operating impacts, the USEPA-approved Industrial Source Complex Short Term (ISCST3) model was used to estimate ambient impacts from construction activities. A detailed discussion of the ISCST3 dispersion model is included in Section 8.1.5.1.2.

The emission sources for the construction site were grouped into two categories: exhaust emissions and dust emissions. An effective emission plume height of 2.0 meters was used for all exhaust emissions. For construction dust emissions, an effective plume height of 0.5 meters was used in the modeling analysis. The exhaust and dust emissions were modeled as a single area source that covered

the total area of the construction site. The construction impacts modeling analysis used the same receptor locations as used for the project operating impact analysis. A detailed discussion of the receptor locations is included in Section 8.1.5.1.2.

To determine the construction impacts on short-term ambient standards (24 hours and less), the worst-case daily onsite construction emission levels shown in Tables 8.1E-1 and 8.1E-2 were used. For pollutants with annual average ambient standards, the annual onsite emission levels shown in Table 8.1E-3 were used. As with the project operating impact analysis, the meteorological data set used for the construction emission impacts analysis is data collected from the Union City met station for 1990-1994.

8.1E.4.3 Modeling Results

Based on the emission rates of NO_x, SO_2, CO, and PM_{10} and the meteorological data, the ISCST3 model calculates hourly and annual ambient impacts for each pollutant. As mentioned above, the modeled 1-hour, 3-hour 8-hour, and 24-hour ambient impacts are based on the worst-case daily emission rates of NO_x, SO_2, CO, and PM_{10}. The annual impacts are based on the annual emission rates of these pollutants.

The one-hour and annual average concentrations of NO_2 were computed following the revised USEPA guidance for computing these concentrations (August 9, 1995 Federal Register, 60 FR 40465). The one-hour average was adjusted using the Ozone Limiting Method. The annual average was calculated using the ambient ratio method (ARM) with the national default value of 0.75 for the annual average NO_2/NO_x ratio.

The modeling analysis results are shown in Table 8.1E-4. Also included in the table are the maximum background levels that have occurred in the last three years and the resulting total ambient impacts. As shown in Table 8.1E-4, with the exception of 1-hour NO_2 impacts, construction impacts for all modeled pollutants are expected to be below the most stringent state and national standards. However, the state 24-hour average PM_{10} standard is exceeded in the absence of the construction emissions for RCEC.

The ISCST3 model over predicts construction emission impacts due to the cold plume (i.e., ambient temperature) effect of dust emissions. Most of the plume dispersion characteristics in the ISCST3 model are derived from observations of hot plumes associated with typical smoke stacks. The ISCST3 model does compensate for plume temperature; however, for ambient temperature plumes the model assumes negligible buoyancy and dispersion. Consequently, the ambient concentrations in cold plumes remain high even at significant distances from a source. RCEC construction site impacts are not unusual in comparison to most construction sites; construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards. The input and output modeling files are being provided electronically.

Table 8.1E-4. Modeled Maximum Construction Impacts

Pollutant	Averaging Time	Maximum Construction Impacts ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2[a]	1-hour	340.96[d]	206.8	549.8	470	-
	Annual	61.25	41.5	102.7	-	100
SO_2	1-hour	82.12[d]	104.8	186.9	650	-
	3-hour	50.05	52	102	-	1300
	24-hour	14.18[d]	18.4	32.6	109	365
	Annual	2.335	5.3	7.64	-	80
CO	1-hour	977[d]	6440	7417	23,000	40,000
	8-hour	506.23[d]	3617	4123.2	10,000	10,000
PM_{10}	24-hour	119.1[e]	88	207	50	150
	Annual[b]	19.74	24.3	44	30	-
	Annual[c]	19.74	21.9	41.6	-	50

Notes:
[a]Ozone limiting method applied for 1-hour average, using maximum background O_3 and NO_2 level during the period from 1995 to 1997. ARM applied for annual average, using national default 0.75 ratio.
[b]Annual Arithmetic Mean.
[c]Annual Geometric Mean.
[d]Based on maximum daily emissions during Month 15.
[e]Based on maximum daily emissions during Month 5.

Table 8.1E-5. Notes on fugitive dust emission calculations and assumptions- Russell City Energy Center.

(1) Paved Road Travel - Delivery Trucks and Workers - Source: AP-42, Section 13.2.1, 10/97

E = k(sL/2)^0.65*(W/3)^1.5

k = particle size constant =	0.016	lb/VMT - PM10
sL = silt loading =	0.015	g/m2 (AP-42, page 13.2.1-5, limited access roads)
W = auto/pickup truck avg. vehicle weight =	2.4	tons (CARB Area Source Manual, 9/97)
W = delivery truck avg. vehicle weight =	27.50	tons (for heavy duty Diesel trucks)
E = auto/pick truck emission factor =	0.0005	lb/VMT - PM10
E = delivery truck emission factor =	0.0185	lb/VMT - PM10

(2) Wind erosion of active construction area - 'Source: South Coast AQMD CEQA Manual, Table A-9-9-F.

E = ([0.45*({[G]^1.5}/{[H]^1.4})]*I)*J = 3.68 lbs/day = E

E = Pm10 lbs/day 612763 site area, sq.ft.

G = Silt content of soil (overburden value, 7.5%)

H = Soil moisture condition (overburden-moist, 15%)

I = 2.2046 (conversion factor kg/hr to lbs/hr)

J = hours/day (value used, 8) EF 0.000006 lbs/sqft/day

(3) Finish Grading - Source: AP-42, Table 11.9-2, 1/95

E = (0.60)(0.051)(S^2.0)

S = mean vehicle speed =	3.0	mph (estimated)
E = emission factor =	0.2754	lb/VMT

(4) Bulldozer Operation and Scraper Excavation - Source: AP-42, Table 11.9.2, 1/95

E = (0.75)(s^1.5)/(M^1.4)

s = silt content =	7.5%	SCAQMD CEQA Manual, Table A-9-9-F
M = moisture content =	15.0%	SCAQMD CEQA Manual, Table A-9-9-F
E = emission factor =	0.35	lb/hr

(5) Scraper Travel

W = mean vehicle weight =	73.4	tons empty (651E scraper, Caterpillar Performance Handbook, 10/89)
=	125.4	tons loaded (651E scraper, Caterpillar Performance Handbook, 10/89)
=	99.4	tons mean weight
Daily Scraper Haul Tonnage =	4,992	ton/day (estimated)
Scraper Load =	52.0	ton (651E scraper, Caterpillar Performance Handbook, 10/89)
Daily Scraper Loads =	96.00	loads/day
Daily Scraper Hauling Distance =	0.08	miles/load (estimated)
Daily Scraper Travel =	14.81	miles/day

(6) Material Unloading - Source: AP-42, p. 13.2.4-3, 1/95

E = (k)(0.0032)[(U/5)^1.3]/[(M/2)^1.4]

k = particle size constant =	0.35	for PM10
U = average wind speed =	2.94	m/sec (based on onsite wind data)
=	6.58	mph
M = moisture content =	15.0%	SCAQMD CEQA Manual, Table A9-9-F
E = emission factor =	0.0001	lb/ton

(7) Loader Unpaved Road Travel - Source: AP-42, Section 13.2.2, 1/95

E = (k)[(s/12)^0.8][(W/3)^0.4]/[(M/0.2)^0.3]

k = particle size constant =	2.6	
s = surface silt content =	7.5%	SCAQMD CEQA Manual, Table A9-9-F

Notes - Fugitive Dust Emission Calculations (cont.)

M = surface moisture content =	15.0%	SCAQMD CEQA Manual, Table A9-9-F
W = avg. vehicle weight =	18.50	tons (avg. of loaded and unloaded weights, 966E loader, Caterpillar Performance Handbook, 10/89)
E = emission factor =	0.10	lb PM10/VMT
Soil Density =	1.05	ton/yd3 (Caterpillar Performance Handbook, 10/89)
Loader Bucket Capacity =	4.75	yd3 (966E loader, Caterpillar Performance Handbook, 10/89)
=	4.99	ton/load
Daily Soil Transfer Rate =	480	ton/day (estimated)
Daily Loader Trips =	96	loading trips/day
Loading Travel Distance =	203.7	ft/load (estimated)
Daily Loader Travel Distance =	19,555	ft/day
=	3.7	mi/day

(8) Backhoe Trenching - Source: AP-42, Table 11.9-2 (dragline operations), 1/95

E = (0.75)(0.0021)(d^0.7)/(M^0.3)

d = drop height =	3	ft (estimated)
M = moisture content =	15.0%	SCAQMD CEQA Manual, Table A9-9-F
E = emission factor =	0.0015	lb/yd3
Backhoe Excavating Rate =	49.8	yd3/hr (E70B backhoe, Caterpillar Performance Handbook, 10/89)
=	398	yd3/day for 1 backhoe @ 8 hr/day

(9) Excavator Trenching - Source: AP-42, Table 11.9-2 (dragline operations), 1/95

E = (0.75)(0.0021)(d^0.7)/(M^0.3)

d = drop height =	3	ft (estimated)
M = moisture content =	15.0%	SCAQMD CEQA Manual, Table A9-9-F
E = emission factor =	0.0015	lb/yd3
Excavator Excavating Rate =	427.2	yd3/hr (225D excavator, Caterpillar Performance Handbook, 10/89)
=	3,418	yd3/day for 1 excavator @ 8 hr/day

(10) Unpaved Road Travel - Source: AP-42, Section 13.2.2, 9/98.

E = (k)[(s/12)^0.8][(W/3)^0.4]/[(M/0.2)^0.3]

k = particle size constant =	2.6	
s = silt fraction =	7.5%	SCAQMD CEQA Manual, Table A9-9-F
M = surface moisture content =	15.0%	SCAQMD CEQA Manual, Table A9-9-F
W = water truck avg. veh. weight =	10.0	tons empty (estimated)
=	39.4	tons loaded (estimated with 8,000 gallon water capacity)
=	24.7	tons average
W = fuel truck avg. veh. weight =	8.0	tons empty (estimated)
=	18.2	tons loaded (estimated with 3,000 gallons Diesel fuel capacity)
=	13.1	tons average
W = service truck avg. veh. weight =	5.0	tons (estimated)
W = dump truck avg. veh. weight =	15.0	tons (for heavy duty Diesel trucks)
=	40.0	tons (for heavy duty Diesel trucks)
=	27.5	tons (for heavy duty Diesel trucks)
W = concrete pumper truck avg. veh. wt. =	15.0	tons (for heavy duty Diesel trucks)
=	40.0	tons (for heavy duty Diesel trucks)
=	27.5	tons (for heavy duty Diesel trucks)
W = forklift avg. veh. weight =	8.0	tons empty (estimated)
W = auto/pickup avg. vehicle weight =	2.4	tons (CARB Area Source Manual, 9/97)
W = delivery truck avg. veh. wt. =	27.5	tons (for heavy duty Diesel trucks)
W = scraper avg. veh. wt. =	73.4	tons empty (651E scraper, Caterpillar

Notes - Fugitive Dust Emission Calculations (cont.)

	Performance Handbook, 10/89)
	125.4 tons loaded (651E scraper, Caterpillar
	Performance Handbook, 10/89)
	99.4 tons mean weight

E = water truck emission factor =	0.11 lb PM10/VMT
E = fuel truck emission factor =	0.09 lb PM10/VMT
E = service truck emission factor =	0.06 lb PM10/VMT
E = dump truck emission factor =	0.12 lb PM10/VMT
E = concrete pumper truck emiss. factor =	0.12 lb PM10/VMT
E = forklift emiss. factor =	0.07 lb PM10/VMT
E = 5th wheel truck emiss. factor =	0.07 lb PM10/VMT
E = auto/pickup emiss. factor =	0.04 lb PM10/VMT
E = delivery truck emiss. factor =	0.12 lb PM10/VMT
E = scraper emiss. factor =	0.20 lb PM10/VMT

(11) Unpaved Road Travel and Active Excavation Area Control - Source: Control of Open Fugitive Dust Sources, U.S EPA, 9/88

$C = 100 - (0.8)(p)(d)(t)/(i)$

p = potential average hourly daytime evaporation rate =	0.4225 mm/hr (EPA document, Figure 3-2, summer)
d = average hourly daytime traffic rate =	291.6 vehicles/hr (estimated)
t = time between watering applications =	0.25 hr/application (estimated)
i = application intensity =	0.7 L/m2 (typical level in EPA document, page 3-23)
C = average watering control efficiency =	66.2%

(3) Wind Errosion of Storage Piles - Source: EPA's "Control of Open Fugitive Dust Sources", 9/88, Chapter 4.

Max. Hourly Ave. WS @ 10m(1) (m/s)	Fastest(2) Mile @ 10m (m/s)	Threshold Friction Velocity(3) (m/s)	Roughness Height(3) (m)	Threshold Fastest Mile @ 10m (m/s)	TSP Emission Factor(4) (g/m^2)	PM10 Factor(5)	PM10 Emission Factor (g/m^2)	PM10 Emission Factor (lbs/ft^2)
8.90	10.18	0.53	0.0003	13.79	0.000	0.50	0.000	0.000000

Notes:
1- maximum hourly average wind speed based on onsite wind data.
2 - calculated based on fastest mile conversion factor.
3 - from Table 4-4 of EPA document (construction site).
4- from equation 4-4 of EPA document.
5 - from equation 4-3 of EPA document.

Notes - Fugitive Dust Emission Calculations

(1) Paved road travel emission factors for delivery trucks and worker automobiles are based on AP-42, Section 13.2.1, 10/97.
(2) Wind erosion emission factor for active construction area is based on "Improvement of Specific Emission Factors (BACM Project No. 1), Final Report", prepared for South Coast AQMD by Midwest Research Institute, March 1996.
(3) Finish grading emission factor is based on AP-42, Table 11.9-2, 1/95.
(4) Bulldozer and scraper excavation emission factors are based AP-42, Table 11.9.2, 1/95.
(5) Material unloading emission factors are based on AP-42, p. 13.2.4-3, 1/95.
(6) Loader unpaved road travel emission factor is based on AP-42, Section 13.2.2, 1/95.
(7) Backhoe trenching emission factor is based on AP-42, Table 11.9-2 (dragline operations), 1/95.
(8) Unpaved road travel emission factors for water trucks, fuel trucks, service trucks, dump trucks, scrapers, forklifts, pickup trucks, delivery trucks, 5th wheel tractor trucks, and concrete trucks are based on AP-42, Section 13.2.2, 9/98.
(9) Dust control efficiency for unpaved road travel and active excavation area is based on "Control of Open Fugitive Dust Sources", U.S. EPA, 9/88.

Table 8.1E-6. Construction equipment emission factors

Construction Equipment

	Emission Factors (1)				
	NOx (lbs/1000 gals)	CO (lbs/1000 gals)	POC (lbs/1000 gals)	SOx (lbs/1000 gals)	PM10 (lbs/1000 gals)
Crawler Crane- Greater than 300 ton	270.01	39.13	15.65	7.10	15.65
Crawler Crane- Greater than200 ton	270.01	39.13	15.65	7.10	15.65
Crane-Mobile 65 ton	270.01	39.13	15.65	7.10	15.65
Cranes -Mobile 45 ton	270.01	39.13	15.65	7.10	15.65
Cranes - Mobile 35 ton	270.01	39.13	15.65	7.10	15.65
Bulldozer D6H	270.01	39.13	15.65	7.10	15.65
Bulldozer D4C	270.01	39.13	15.65	7.10	15.65
Excavator- Trencher	270.01	39.13	15.65	7.10	15.65
Excavator- Earth Scraper	270.01	39.13	15.65	7.10	15.65
Excavator-Motor Grader	270.01	39.13	15.65	7.10	15.65
Excavator- Backhoe/loader	270.01	39.13	15.65	7.10	15.65
Excavator - loader	270.01	39.13	15.65	7.10	15.65
Vibratory Roller	270.01	39.13	15.65	7.10	15.65
Portable Compaction roller	270.01	39.13	15.65	7.10	15.65
Truck- Water	170.68	106.79	15.33	7.10	9.59
Loader/Forklift	270.01	39.13	15.65	7.10	15.65
10/12 cubic yd Dump Truck	170.68	106.79	15.33	7.10	9.59
Service Truck- 1 ton	74.40	59.47	5.57	7.10	4.83
Truck- Fuel/Lube	170.68	106.79	15.33	7.10	9.59
Concrete Pumper Truck	170.68	106.79	15.33	7.10	9.59
Tractor Truck 5th Wheel	270.01	39.13	15.65	7.10	15.65
Trucks- Pickup 3/4 ton	74.40	59.47	5.57	7.10	4.83
Trucks- 3 ton	74.40	59.47	5.57	7.10	4.83
Diesel Powered Welder	313.05	195.66	46.96	7.10	39.13
Light Plants	313.05	195.66	46.96	7.10	39.13
Portable Compaction- Vibratory Plate	313.05	195.66	46.96	7.10	39.13
Portable Compaction- Vibratory Ram	313.05	195.66	46.96	7.10	39.13
Articulating Boom Platforms	313.05	195.66	46.96	7.10	39.13
Pumps	313.05	195.66	46.96	7.10	39.13
Air Compressor 185 CFM	313.05	195.66	46.96	7.10	39.13
Air Compressor 750 CFM	313.05	195.66	46.96	7.10	39.13
Concrete Vibrators	313.05	195.66	46.96	7.10	39.13
Concrete Trowel Machine	313.05	195.66	46.96	7.10	39.13
Fusion Welder	313.05	195.66	46.96	7.10	39.13
Portable Power Generators	313.05	195.66	46.96	7.10	39.13

Notes:

(1) For heavy Diesel construciton equipment, emission factors based on equipment meeting EPA 1996 off-road Diesel standards and uses CARB low-sulfur fue
For trucks, depending on size of truck, emissions factors based on MVE17G version 1.0c for heavy-heavy duty or medium duty Diesel trucks, fleet average for calendar year 2000, San Francisco Air Basin.
For portable equipment, emission factors based on EPA's "Non-road Engine and Vehicle Emission Study Report", 11/91, Table 2-07, for generator sets, welders, pumps, air compressors, etc., less than 50 bhp.

	NOx	CO	POC	SO2	PM10	
Large Equipment(1)	6.90	1.00	0.40	0.18	0.40	
Small Equipment(2)	8.00	5.00	1.20	0.18	1.00	
	(lb/1000 gal @ 0.4 lb/HP-hr & 7.1 lb/gal)					

	NOx	CO	HC	SO2	PM	
Large Equipment(1)	270.01	39.13	15.65	7.10	15.65	
Small Equipment(2)	313.05	195.66	46.96	7.10	39.13	

Notes:

(1) Equipment meeting EPA 1996 off-road Diesel standards and uses CARB low-sulfur fuel.

(2) From EPA's "Non-road Engine and Vehicle Emission Study Report", 11/91, Table 2-07, for generator sets, welders, pumps, and air compressors less than 5

	Emission Factors (1)				
	NOx	CO	POC	SOx	PM10
Truck Hauling (lbs/vmt)	0.02802	0.01753	0.00252	0.00116	0.00157
Truck Hauling (lbs/1000 gals)	170.68	106.79	15.33	7.06	9.59

Notes:

(1) From MVE17G version 1.0c, heavy-heavy duty Diesel trucks, fleet average for calendar year 2000, San Francisco Air Basin.

Table 8.1E-6. (continued).

	Emission Factors NOx (lbs/vmt)	CO (lbs/vmt)	POC (lbs/vmt)	SOx (lbs/vmt)	PM10 (lbs/vmt)
Worker Travel (lbs/vmt)(1)	0.00287	0.03434	0.00274	0.00000	0.00006
Medium Duty Trucks (lbs/1000 gals)(2)	74.40	59.47	5.57	7.03	4.83

Notes:
(1) From MVE17G version 1.0c, average of light duty automobiles and light duty trucks, fleet average for calendar year 2000, San Franciso Air Basin.
(2) From MVE17G version 1.0c, medium duty trucks (Diesel), fleet average for calendar year 2000, San Franciso Air Basin.

	Emission Factors (1) NOx (lbs/1000 gals)	CO (lbs/1000 gals)	POC (lbs/1000 gals)	SOx (lbs/1000 gals)	PM10 (lbs/1000 gals)
Rail Hauling	595	59	22	38	15

Notes:
(1) NOx, CO, POC, and PM10 emission factors from EPA's "Technical Highlights - Emissions Factors for Locomotives", December 1997.
SOx emission factor from Booz-Allen & Hamilton "Locomotive Emission Study", prepared for CARB, January 1991.

Notes - Combustion Emission Calculations

(1) For Construction Equipment
For heavy Diesel construction equipment, emission factors based on equipment meeting EPA 1996 off-road Diesel standards and use of CARB low-sulfur fu
For trucks, depending on size of truck, emissions factors based on MVE17G version 1.0c for heavy-heavy duty or medium duty Diesel trucks, fleet average
calendar year 2000, San Francisco Air Basin.

(2) For Delivery Trucks
From MVE17G version 1.0c, heavy-heavy duty Diesel trucks, fleet average for calendar year 2000, San Francisco Air Basin.

(3) For Worker Travel
From MVE17G version 1.0c, average of light duty automobiles and light duty trucks, fleet average for calendar year 2000, San Francisco Air Basin.

(4) For Rail Deliveries
NOx, CO, POC, and PM10 emission factors from EPA's "Technical Highlights - Emissions Factors for Locomotives", December 1997.
SOx emission factor from Booz-Allen & Hamilton "Locomotive Emission Study", prepared for CARB, January 1991.

Table 8.1E-7
CONSTRUCTION EQUIPMENT USEAGE- RUSSELL CITY ENERGY CENTER

Construction Equipment	Use %	hrs / mo /mach.	Months After Notice to Proceed																				Annual Average Number of Units
			5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Crawler Crane- Greater than 300 ton	80	139	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.25
Crawler Crane- Greater than200 ton	75	130	0	0	0	0	0	0	1	2	3	3	3	3	3	2	2	2	1	0	0	0	1.25
Crane-Mobile 65 ton	70	121	0	0	0	0	0	1	1	1	2	2	2	2	2	2	1	1	1	1	1	0	1
Cranes -Mobile 45 ton	75	130	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6
Cranes - Mobile 35 ton	75	130	2	1	0	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1.25
Bulldozer D6H	70	121	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Bulldozer D4C	70	121	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Excavator- Trencher	80	139	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Excavator- Earth Scraper	80	139	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Excavator-Motor Grader	70	121	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.45
Excavator- Backhoe/loader	75	130	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.8
Excavator - loader	70	121	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Vibratory Roller	70	121	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5
Portable Compaction roller	70	121	2	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.55
Truck- Water	65	113	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1
Loader/Forklift	65	113	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1.8
10/12 cubic yd Dump Truck	75	130	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4
Service Truck- 1 ton	65	113	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	0	0	1.35
Truck- Fuel/Lube	65	113	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	0	1.8
Concrete Pumper Truck	85	147	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.45
Tractor Truck 5th Wheel	70	121	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1.9
Trucks- Pickup 3/4 ton	75	130	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	4	2	1	4
Trucks- 3 ton	70	121	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1.65
Welders	85	147	1	1	2	2	2	2	4	5	9	11	13	13	13	9	9	9	4	4	2	0	5.75
Diesel Powered Welder	65	113	0	0	0	1	2	2	2	2	2	2	2	2	3	3	3	2	1	1	1	1	1.6
Light Plants	50	87	2	2	2	2	3	4	4	4	2	2	1	1	1	1	1	0	0	0	0	0	1.6
Portable Compaction- Vibratory Plate	70	121	1	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	1.25
Portable Compaction- Vibratory Ram	70	121	0	0	3	3	3	3	3	3	3	3	3	2	2	0	0	0	0	0	0	0	1.55
Articulating Boom Platforms	80	139	0	0	0	0	0	0	1	2	2	5	5	5	5	6	6	2	2	2	2	0	2.25
Pumps	50	87	5	5	5	5	5	4	4	4	4	4	4	3	3	3	2	2	1	1	0	0	3.2
Air Compressor 185 CFM	85	147	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0	0	1.6
Air Compressor 750 CFM	85	147	1	1	1	1	1	1	2	2	3	3	4	4	4	4	3	3	3	3	1	0	2.25
Concrete Vibrators	50	87	0	0	4	10	10	10	8	8	4	4	2	2	2	0	0	0	0	0	0	0	3.2
Concrete Trowel Machine	50	87	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Fusion Welder	80	139	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3
Asphalt Paver	85	147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.15
Asphalt Roller	85	147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.15
Portable Power Generators	50	87	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	0	2.85
TOTAL			**51**	**46**	**48**	**55**	**55**	**56**	**60**	**65**	**64**	**68**	**68**	**65**	**65**	**54**	**51**	**44**	**35**	**32**	**18**	**6**	

RUSSELL CITY ENERGY CENTER
TRUCK DELIVERY OF EQUIPMENT AND MATERIALS
(Number of Deliveries)

	Month of Construction																				
Equipment and Material	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**Total**
Major Equipment																					
Heat Recovery Steam Generators (HRSG)							5	25	45	65	70	70	65	45	25	5					420
Combustion Turbine Generator (CTG)									5	15	35	50	50	35	15	10	5				220
Steam Turbine Generator (STG)										10	20	20	20	10	10						90
Mechanical Equipment								7	22	48	48	28	21								174
Electrical Equipment and Material		4	6	6	6	10	20	30	40	40	40	30	30	20	10	5	5				302
Piping, Supports and Valves		2	4	10	10	20	30	50	55	55	55	50	40	20	10	5	5				421
Concrete and Reinforcing Steel		5	4	72	207	234	284	208	124	65											1203
Miscellaneous Steel, Roofing and Siding					10	10	38	75	57	20	10	10									230
Administration/Warehouse Buildings							5	10	10	10	5	5	5								50
Construction Consumables	20	20	30	30	30	35	35	35	40	40	45	45	45	45	40	30	30	20	5	2	622
Office Supplies	5	10	10	5	5	5	5	5	5	5	5	5	5	5	5	2	2	2	2		93
Contractor Mobilization/Demobilization	20	20	10	5													10	10	15	15	105
Construction Equipment-delivery/pickup	12	5	9	6	4	16	24	29	17	2	3	16	2	14	16	13	14	7	5	2	216
TOTAL	57	66	73	134	272	330	446	474	420	375	336	329	283	194	131	70	71	39	27	19	4146

HEAVY EQUIPMENT DELIVERY FOR RUSSELL CITY ENERGY CENTER

(Number of Deliveries)

	Months After Notice-to-Proceed																							
Equipment	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**#**	**Total**
Heat Recovery Steam Generators (HRSG)								22	22															44
Combustion Turbine Generator (CTG)									3	3														6
Steam Turbine Generator (STG)											3													3
AuxilaryBoilers												1												1
Main Transformers										4														4
TOTAL								22	25	7	3	1												58

RUSSELL CITY ENERGY CENTER CONSTRUCTION STAFFING

	Months After Notice-to-Proceed																							
Discipline	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**#**	**24**
Insulation Workers	0	0	0	0	0	0	0	0	0	0	0	6	12	24	30	36	36	36	36	24	12	0	0	0
Boilermakers	0	0	0	8	16	24	36	45	48	48	48	48	48	48	45	40	30	16	8	4	2	0	0	0
Bricklayers/Masons	0	1	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	0	0
Carpenters	2	12	24	36	36	36	36	30	20	20	20	20	20	20	20	20	20	20	16	8	2	0	0	0
Electricians	1	4	8	10	10	10	20	30	45	60	75	80	80	80	80	75	60	50	40	30	10	0	0	0
Ironworkers	0	4	16	30	30	30	35	40	45	45	35	30	24	16	12	8	8	8	8	4	0	0	0	0
Laborers	4	8	16	24	24	24	24	24	20	20	20	20	20	20	20	20	20	16	12	8	8	0	0	0
Millwrights	0	0	0	0	0	2	12	24	30	30	30	24	24	24	20	16	12	8	6	4	4	0	0	0
Operating Engineers	2	4	8	10	12	14	14	14	14	14	12	12	12	12	12	10	10	8	6	4	2	0	0	0
Painters	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	0	0	0
Pipefitters	1	6	12	12	12	16	20	30	45	70	100	110	110	110	110	110	100	80	60	30	12	0	0	0
Sheetmetal Workers	0	0	0	0	0	0	0	0	0	0	0	4	12	24	36	36	36	36	36	36	24	0	0	0
Surveyors	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0				
Teamsters	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
TOTAL MANUAL STAFF	13	42	91	137	147	163	204	244	274	314	347	361	369	385	388	378	339	283	233	157	81	0	0	0
TOTAL CONTRACTOR-STARTUP STAFF	6	12	18	24	30	36	39	42	46	46	47	51	55	57	57	57	54	48	42	32	24	18	#	6
TOTAL SITE STAFF	**19**	**54**	**109**	**161**	**177**	**199**	**243**	**286**	**320**	**360**	**394**	**412**	**424**	**442**	**445**	**435**	**393**	**331**	**275**	**189**	**105**	**18**	**#**	**6**

Table 8.1E-8

Construction Equipment Daily Exhaust Emissions (Month 5)
Russell City Energy Center

Equipment	Number of Units	Hrs/Day Per Unit	Gals/Hr Per Unit	Total Fuel Use (Gals/day)	Emission Factors (lbs/1000 gals)(1) NOx	CO	POC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	POC	SOx	PM10	Useage (%)
Crawler Crane- Greater than 300 ton	0	6.40	7.50	0.00	270.01	39.13	15.65	7.10	15.65	0.00	0.00	0.00	0.00	0.00	80
Crawler Crane- Greater than 200 ton	1	6.00	5.00	30.00	270.01	39.13	15.65	7.10	15.65	8.10	1.17	0.47	0.21	0.47	75
Crane - Mobile 65 ton	2	5.60	4.00	44.80	270.01	39.13	15.65	7.10	15.65	12.10	1.75	0.70	0.32	0.70	70
Cranes -Mobile 45 ton	2	6.00	4.00	48.00	270.01	39.13	15.65	7.10	15.65	12.96	1.88	0.75	0.34	0.75	75
Cranes - Mobile 35 ton	3	6.00	4.00	72.00	270.01	39.13	15.65	7.10	15.65	19.44	2.82	1.13	0.51	1.13	75
Bulldozer D6H	1	5.60	5.50	30.80	270.01	39.13	15.65	7.10	15.65	8.32	1.21	0.48	0.22	0.48	70
Bulldozer D4C	1	5.60	3.00	16.80	270.01	39.13	15.65	7.10	15.65	4.54	0.66	0.26	0.12	0.26	70
Excavator- Trencher	0	6.40	2.00	0.00	270.01	39.13	15.65	7.10	15.65	0.00	0.00	0.00	0.00	0.00	80
Excavator- Earth Scraper	3	6.40	9.00	172.80	270.01	39.13	15.65	7.10	15.65	46.66	6.76	2.70	1.23	2.70	80
Excavator-Motor Grader	1	5.60	5.00	28.00	270.01	39.13	15.65	7.10	15.65	7.56	1.10	0.44	0.20	0.44	70
Excavator- Backhoe/loader	3	6.00	2.50	45.00	270.01	39.13	15.65	7.10	15.65	12.15	1.76	0.70	0.32	0.70	75
Excavator - loader	1	5.60	2.50	14.00	270.01	39.13	15.65	7.10	15.65	3.78	0.55	0.22	0.10	0.22	70
Vibratory Roller	4	5.60	10.00	224.00	270.01	39.13	15.65	7.10	15.65	60.48	8.77	3.51	1.59	3.51	70
Portable Compaction roller	0	5.60	10.00	0.00	270.01	39.13	15.65	7.10	15.65	0.00	0.00	0.00	0.00	0.00	70
Truck- Water	1	5.20	3.13	16.28	170.68	106.79	15.33	7.10	9.59	2.78	1.74	0.25	0.12	0.16	65
Forklift	2	5.20	2.50	26.00	270.01	39.13	15.65	7.10	15.65	7.02	1.02	0.41	0.18	0.41	65
Dump Truck	2	6.00	3.13	37.56	170.68	106.79	15.33	7.10	9.59	6.41	4.01	0.58	0.27	0.36	75
Service Truck- 1 ton	5	5.20	1.56	40.56	74.40	59.47	5.57	7.10	4.83	3.02	2.41	0.23	0.29	0.20	65
Truck- Fuel/Lube	2	5.20	3.13	32.55	170.68	106.79	15.33	7.10	9.59	5.56	3.48	0.50	0.23	0.31	65
Concrete Pumper Truck	3	6.80	3.13	63.85	170.68	106.79	15.33	7.10	9.59	10.90	6.82	0.98	0.45	0.61	85
Tractor Truck 5th Wheel	2	5.60	3.13	35.06	270.01	39.13	15.65	7.10	15.65	9.47	1.37	0.55	0.25	0.55	70
Trucks- Pickup 3/4 ton	6	6.00	0.78	28.08	74.40	59.47	5.57	7.10	4.83	2.09	1.67	0.16	0.20	0.14	75
Trucks- 3 ton	1	5.60	1.56	8.74	74.40	59.47	5.57	7.10	4.83	0.65	0.52	0.05	0.06	0.04	70
Diesel Powered Welder	7	5.20	1.27	46.23	313.05	195.66	46.96	7.10	39.13	14.47	9.04	2.17	0.33	1.81	65
Light Plants	4	4.00	1.27	20.32	313.05	195.66	46.96	7.10	39.13	6.36	3.98	0.95	0.14	0.80	50
Portable Compaction- Vibratory Plate	3	5.60	0.25	4.20	313.05	195.66	46.96	7.10	39.13	1.31	0.82	0.20	0.03	0.16	70
Portable Compaction- Vibratory Ram	5	5.60	0.25	7.00	313.05	195.66	46.96	7.10	39.13	2.19	1.37	0.33	0.05	0.27	70
Articulating Boom Platforms	7	6.40	0.25	11.20	313.05	195.66	46.96	7.10	39.13	3.51	2.19	0.53	0.08	0.44	80
Pumps	4	4.00	1.27	20.32	313.05	195.66	46.96	7.10	39.13	6.36	3.98	0.95	0.14	0.80	50
Air Compressor 185 CFM	4	6.80	1.27	34.54	313.05	195.66	46.96	7.10	39.13	10.81	6.76	1.62	0.25	1.35	85
Air Compressor 750 CFM	4	6.80	1.27	34.54	313.05	195.66	46.96	7.10	39.13	10.81	6.76	1.62	0.25	1.35	85
Concrete Vibrators	0	4.00	0.25	0.00	313.05	195.66	46.96	7.10	39.13	0.00	0.00	0.00	0.00	0.00	50
Concrete Trowel Machine	0	4.00	1.27	0.00	313.05	195.66	46.96	7.10	39.13	0.00	0.00	0.00	0.00	0.00	50
Fusion Welder	0	6.40	1.27	0.00	313.05	195.66	46.96	7.10	39.13	0.00	0.00	0.00	0.00	0.00	80
Portable Power Generators	7	4.00	1.27	35.56	313.05	195.66	46.96	7.10	39.13	11.13	6.96	1.67	0.25	1.39	50
Total =										310.93	93.31	25.10	8.72	22.51	

Notes:
(1) See notes for combustion emissions.

Construction Equipment Daily Exhaust Emissions (Month 15)
Russell City Energy Center

Equipment	Number of Units	Hrs/Day Per Unit	Gals/Hr Per Unit	Total Fuel Use (Gals/day)	Emission Factors (lbs/1000 gals)(1) NOx	CO	POC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	POC	SOx	PM10	Useage (%)
Crawler Crane- Greater than 300 ton	1	6.40	7.50	48.00	270.01	39.13	15.65	7.10	15.65	12.96	1.88	0.75	0.34	0.75	80
Crawler Crane- Greater than 200 ton	3	6.00	5.00	90.00	270.01	39.13	15.65	7.10	15.65	24.30	3.52	1.41	0.64	1.41	75
Crane - Mobile 65 ton	2	5.60	4.00	44.80	270.01	39.13	15.65	7.10	15.65	12.10	1.75	0.70	0.32	0.70	70
Cranes - Mobile 45 ton	3	6.00	4.00	72.00	270.01	39.13	15.65	7.10	15.65	19.44	2.82	1.13	0.51	1.13	75
Cranes - Mobile 35 ton	3	6.00	4.00	72.00	270.01	39.13	15.65	7.10	15.65	19.44	2.82	1.13	0.51	1.13	75
Bulldozer D6H	0	5.60	5.50	0.00	270.01	39.13	15.65	7.10	15.65	0.00	0.00	0.00	0.00	0.00	70
Bulldozer D4C	0	5.60	3.00	0.00	270.01	39.13	15.65	7.10	15.65	0.00	0.00	0.00	0.00	0.00	70
Excavator- Trencher	0	6.40	2.00	0.00	270.01	39.13	15.65	7.10	15.65	0.00	0.00	0.00	0.00	0.00	80
Excavator- Earth Scraper	0	6.40	9.00	0.00	270.01	39.13	15.65	7.10	15.65	0.00	0.00	0.00	0.00	0.00	80
Excavator-Motor Grader	1	5.60	5.00	28.00	270.01	39.13	15.65	7.10	15.65	7.56	1.10	0.44	0.20	0.44	70
Excavator- Backhoe/loader	1	6.00	2.50	15.00	270.01	39.13	15.65	7.10	15.65	4.05	0.59	0.23	0.11	0.23	75
Excavator - loader	0	5.60	2.50	0.00	270.01	39.13	15.65	7.10	15.65	0.00	0.00	0.00	0.00	0.00	70
Vibratory Roller	1	5.60	10.00	56.00	270.01	39.13	15.65	7.10	15.65	15.12	2.19	0.88	0.40	0.88	70
Portable Compaction roller	1	5.60	10.00	56.00	270.01	39.13	15.65	7.10	15.65	15.12	2.19	0.88	0.40	0.88	70
Truck- Water	1	5.20	3.13	16.28	170.68	106.79	15.33	7.10	9.59	2.78	1.74	0.25	0.12	0.16	65
Forklift	2	5.20	2.50	26.00	270.01	39.13	15.65	7.10	15.65	7.02	1.02	0.41	0.18	0.41	65
Dump Truck	0	6.00	3.13	0.00	170.68	106.79	15.33	7.10	9.59	0.00	0.00	0.00	0.00	0.00	75
Service Truck- 1 ton	4	5.20	1.56	32.45	74.40	59.47	5.57	7.10	4.83	2.41	1.93	0.18	0.23	0.16	65
Truck- Fuel/Lube	2	5.20	3.13	32.55	170.68	106.79	15.33	7.10	9.59	5.56	3.48	0.50	0.23	0.31	65
Concrete Pumper Truck	2	6.80	3.13	42.57	170.68	106.79	15.33	7.10	9.59	7.27	4.55	0.65	0.30	0.41	85
Tractor Truck 5th Wheel	1	5.60	3.13	17.53	270.01	39.13	15.65	7.10	15.65	4.73	0.69	0.27	0.12	0.27	70
Trucks- Pickup 3/4 ton	6	6.00	0.78	28.08	74.40	59.47	5.57	7.10	4.83	2.09	1.67	0.16	0.20	0.14	75
Trucks- 3 ton	2	5.60	1.56	17.47	74.40	59.47	5.57	7.10	4.83	1.30	1.04	0.10	0.12	0.08	70
Diesel Powered Welder	5	5.20	1.27	33.02	313.05	195.66	46.96	7.10	39.13	10.34	6.46	1.55	0.23	1.29	65
Light Plants	9	4.00	1.27	45.72	313.05	195.66	46.96	7.10	39.13	14.31	8.95	2.15	0.32	1.79	50
Portable Compaction- Vibratory Plate	1	5.60	0.25	1.40	313.05	195.66	46.96	7.10	39.13	0.44	0.27	0.07	0.01	0.05	70
Portable Compaction- Vibratory Ram	1	5.60	0.25	1.40	313.05	195.66	46.96	7.10	39.13	0.44	0.27	0.07	0.01	0.05	70
Articulating Boom Platforms	18	6.40	0.25	28.80	313.05	195.66	46.96	7.10	39.13	9.02	5.63	1.35	0.20	1.13	80
Pumps	0	4.00	1.27	0.00	313.05	195.66	46.96	7.10	39.13	0.00	0.00	0.00	0.00	0.00	50
Air Compressor 185 CFM	4	6.80	1.27	34.54	313.05	195.66	46.96	7.10	39.13	10.81	6.76	1.62	0.25	1.35	85
Air Compressor 750 CFM	3	6.80	1.27	25.91	313.05	195.66	46.96	7.10	39.13	8.11	5.07	1.22	0.18	1.01	85
Concrete Vibrators	2	4.00	0.25	2.00	313.05	195.66	46.96	7.10	39.13	0.63	0.39	0.09	0.01	0.08	50
Concrete Trowel Machine	0	4.00	1.27	0.00	313.05	195.66	46.96	7.10	39.13	0.00	0.00	0.00	0.00	0.00	50
Fusion Welder	0	6.40	1.27	0.00	313.05	195.66	46.96	7.10	39.13	0.00	0.00	0.00	0.00	0.00	80
Portable Power Generators	8	4.00	1.27	40.64	313.05	195.66	46.96	7.10	39.13	12.72	7.95	1.91	0.29	1.59	50
Total =										230.06	76.71	20.08	6.45	17.83	

Notes:
(1) See notes for combustion emissions.

Construction Equipment Annual Exhaust Emissions
Russell City Energy Center

Equipment	Average Number of Units Per Year(1)	Average Operating Hrs/Day Per Unit	Gals/Hr Per Unit	Average Operating Days per Year	Total Fuel Use (Gals/yr)	Emission Factors (lbs/1000 gals)(2) NOx	CO	POC	SOx	PM10	Annual Emissions (tons/yr) NOx	CO	POC	SOx	PM10	Useage (%)
Crawler Crane- Greater than 300 ton	0.25	6.40	7.50	250.00	3000.00	270.01	39.13	15.65	7.10	15.65	0.41	0.06	0.02	0.01	0.02	80
Crawler Crane- Greater than 200 ton	1.25	6.00	5.00	250.00	9375.00	270.01	39.13	15.65	7.10	15.65	1.27	0.18	0.07	0.03	0.07	75
Crane - Mobile 65 ton	1.00	5.60	4.00	250.00	5600.00	270.01	39.13	15.65	7.10	15.65	0.76	0.11	0.04	0.02	0.04	70
Cranes -Mobile 45 ton	0.60	6.00	4.00	250.00	3600.00	270.01	39.13	15.65	7.10	15.65	0.49	0.07	0.03	0.01	0.03	75
Cranes - Mobile 35 ton	1.25	6.00	4.00	250.00	7500.00	270.01	39.13	15.65	7.10	15.65	1.01	0.15	0.06	0.03	0.06	75
Bulldozer D6H	0.20	5.60	5.50	250.00	1540.00	270.01	39.13	15.65	7.10	15.65	0.21	0.03	0.01	0.01	0.01	70
Bulldozer D4C	0.30	5.60	3.00	250.00	1260.00	270.01	39.13	15.65	7.10	15.65	0.17	0.02	0.01	0.00	0.01	70
Excavator- Trencher	0.30	6.40	2.00	250.00	960.00	270.01	39.13	15.65	7.10	15.65	0.13	0.02	0.01	0.00	0.01	80
Excavator- Earth Scraper	0.20	6.40	9.00	250.00	2880.00	270.01	39.13	15.65	7.10	15.65	0.39	0.06	0.02	0.01	0.02	80
Excavator-Motor Grader	0.45	5.60	5.00	250.00	3150.00	270.01	39.13	15.65	7.10	15.65	0.43	0.06	0.02	0.01	0.02	70
Excavator- Backhoe/loader	0.80	6.00	2.50	250.00	3000.00	270.01	39.13	15.65	7.10	15.65	0.41	0.06	0.02	0.01	0.02	75
Excavator - loader	0.30	5.60	2.50	250.00	1050.00	270.01	39.13	15.65	7.10	15.65	0.14	0.02	0.01	0.00	0.01	70
Vibratory Roller	0.50	5.60	10.00	250.00	7000.00	270.01	39.13	15.65	7.10	15.65	0.95	0.14	0.05	0.02	0.05	70
Portable Compaction roller	0.55	5.60	10.00	250.00	7700.00	270.01	39.13	15.65	7.10	15.65	1.04	0.15	0.06	0.03	0.06	70
Truck- Water	1.00	5.20	3.13	250.00	4069.00	170.68	106.79	15.33	7.10	9.59	0.35	0.22	0.03	0.01	0.02	65
Forklift	1.80	5.20	2.50	250.00	5850.00	270.01	39.13	15.65	7.10	15.65	0.79	0.11	0.05	0.02	0.05	65
Dump Truck	0.40	6.00	3.13	250.00	1878.00	170.68	106.79	15.33	7.10	9.59	0.16	0.10	0.01	0.01	0.01	75
Service Truck- 1 ton	1.35	5.20	1.56	250.00	2737.80	74.40	59.47	5.57	7.10	4.83	0.10	0.08	0.01	0.01	0.01	65
Truck- Fuel/Lube	1.80	5.20	3.13	250.00	7324.20	170.68	106.79	15.33	7.10	9.59	0.63	0.39	0.06	0.03	0.04	65
Concrete Pumper Truck	0.45	6.80	3.13	250.00	2394.45	170.68	106.79	15.33	7.10	9.59	0.20	0.13	0.02	0.01	0.01	85
Tractor Truck 5th Wheel	1.90	5.60	3.13	250.00	8325.80	270.01	39.13	15.65	7.10	15.65	1.12	0.16	0.07	0.03	0.07	70
Trucks- Pickup 3/4 ton	4.00	6.00	0.78	250.00	4680.00	74.40	59.47	5.57	7.10	4.83	0.17	0.14	0.01	0.02	0.01	75
Trucks- 3 ton	1.65	5.60	1.56	250.00	3603.60	74.40	59.47	5.57	7.10	4.83	0.13	0.11	0.01	0.01	0.01	70
Diesel Powered Welder	1.60	5.20	1.27	250.00	2641.60	313.05	195.66	46.96	7.10	39.13	0.41	0.26	0.06	0.01	0.05	65
Light Plants	1.60	4.00	1.27	250.00	2032.00	313.05	195.66	46.96	7.10	39.13	0.32	0.20	0.05	0.01	0.04	50
Portable Compaction- Vibratory Plate	1.25	5.60	0.25	250.00	437.50	313.05	195.66	46.96	7.10	39.13	0.07	0.04	0.01	0.00	0.01	70
Portable Compaction- Vibratory Ram	1.55	5.60	0.25	250.00	542.50	313.05	195.66	46.96	7.10	39.13	0.08	0.05	0.01	0.00	0.01	70
Articulating Boom Platforms	2.25	6.40	0.25	250.00	900.00	313.05	195.66	46.96	7.10	39.13	0.14	0.09	0.02	0.00	0.02	80
Pumps	3.20	4.00	1.27	250.00	4064.00	313.05	195.66	46.96	7.10	39.13	0.64	0.40	0.10	0.01	0.08	50
Air Compressor 185 CFM	1.60	6.80	1.27	250.00	3454.40	313.05	195.66	46.96	7.10	39.13	0.54	0.34	0.08	0.01	0.07	85
Air Compressor 750 CFM	2.25	6.80	1.27	250.00	4857.75	313.05	195.66	46.96	7.10	39.13	0.76	0.48	0.11	0.02	0.10	85
Concrete Vibrators	3.20	4.00	0.25	250.00	800.00	313.05	195.66	46.96	7.10	39.13	0.13	0.08	0.02	0.00	0.02	50
Concrete Trowel Machine	0.30	4.00	1.27	250.00	381.00	313.05	195.66	46.96	7.10	39.13	0.06	0.04	0.01	0.00	0.01	50
Fusion Welder	0.30	6.40	1.27	250.00	609.60	313.05	195.66	46.96	7.10	39.13	0.10	0.06	0.01	0.00	0.01	80
Portable Power Generators	2.85	4.00	1.27	250.00	3619.50	313.05	195.66	46.96	7.10	39.13	0.57	0.35	0.08	0.01	0.07	50
Total =											15.25	4.95	1.28	0.44	1.14	

Notes:
(1) Based on average number of units operating over 20-month construction period.
(2) See notes on combustion emissions.

Delivery Truck Daily Emissions (Month 5)
Russell City Energy Center

Number of Deliveries Per Day(1)	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Day	Emission Factors (lbs/vmt)(2)					Daily Emissions (lbs/day)				
			NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
10	60	600	0.0280	0.0175	0.0025	0.0012	0.0016	16.81	10.52	1.51	0.70	0.94

Notes:
(1) Based on average number of truck deliveries during this month and a scaling factor of 5 to account for the maximum number of deliveries expected on a single day.
(2) See notes for combustion emissions.

Delivery Truck Daily Emissions (Month 15)
Russell City Energy Center

Number of Deliveries Per Day(1)	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Day	Emission Factors (lbs/vmt)(2)					Daily Emissions (lbs/day)				
			NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
25	60	1500	0.0280	0.0175	0.0025	0.0012	0.0016	42.03	26.29	3.77	1.74	2.36

Notes:
(1) Based on average number of truck deliveries during this month and a scaling factor of 1.5 to account for the maximum number of deliveries expected on a single day.
(2) See notes for combustion emissions.

Delivery Truck Annual Emissions
Russell City Energy Center

Average Number of Deliveries Per Year(1)	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Year	Emission Factors (lbs/vmt)(2)					Annual Emissions (tons/yr)				
			NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
2369.14	60	142148.57	0.0280	0.0175	0.0025	0.0012	0.0016	1.99	1.25	0.18	0.08	0.11

Notes:
(1) Based on total of 4,146 truck deliveries over the 21-month construction period.
(2) See notes for combustion emissions.

Rail Delivery Daily Emissions (Month 15)
Russell City Energy Center

Inbound						Outbound					
Number of Railcars per day	Loaded Weight of Railcar (tons)	Total Gross Weight of Railcars (tons)	One-Way Haul Distance(1) (miles)	Unit Fuel Use Factor(2) (gal/KGTM)	Fuel Use (gals)	Number of Railcars per day	Tare Weight of Railcar (tons)	Total Gross Weight of Railcars (tons)	One-Way Haul Distance(1) (miles)	Unit Fuel Use Factor(2) (gal/KGTM)	Fuel Use (gals)
4	221.5	886	62	1.37	75	4	34	136	62	1.37	12

Total Fuel Use (gals)	Emission Factors (lbs/1000 gals)(3)					Daily Emissions (lbs/day)				
	NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
87	594.71	58.59	22.03	38.00	14.76	51.63	5.09	1.91	3.30	1.28

Notes:
(1) Distance within BAAQMD for Union Pacific Railroad line through Altamont.
(2) Based on Union Pacific Railroad system wide average fuel use factor.
(3) See notes for combustion emissions.

Rail Delivery Annual Emissions
Russell City Energy Center

Average Number of Rail Deliveries per Year(1)	Emissions per Delivery (lbs/rail delivery)					Annual Emissions (tons/yr)				
	NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
34.8	51.63	5.09	1.91	3.30	1.28	0.90	0.09	0.03	0.06	0.02

Notes:
(1) Based on total of 58 rail deliveries over the 20-month construction period.

Worker Travel Daily Emissions (Month 5)
Russell City Energy Center

Number of Workers Per Day(1)	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Vehicle Miles Traveled Per Day (Miles)	Emission Factors (lbs/vmt)(2)					Daily Emissions (lbs/day)				
					NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
177	1.3	136	60	8169	0.0029	0.0343	0.0027	0.0000	0.0001	23.47	280.57	22.40	0.02	0.48

Notes:
(1) Based expected number of construction workers during this phase of construction.
(2) See notes for combustion emissions.

Worker Travel Daily Emissions (Month 15)
Russell City Energy Center

Number of Workers Per Day(1)	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Vehicle Miles Traveled Per Day (Miles)	Emission Factors (lbs/vmt)(2)					Daily Emissions (lbs/day)				
					NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
445	1.3	342	60	20538	0.0029	0.0343	0.0027	0.0000	0.0001	59.00	705.38	56.33	0.04	1.20

Notes:
(1) Based expected number of construction workers during this phase of construction.
(2) See notes for combustion emissions.

Worker Travel Annual Emissions
Russell City Energy Center

Average Number of Workers Per Day(1)	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Days per Year	Vehicle Miles Traveled Per Year	Emission Factors (lbs/vmt)(2)					Annual Emissions (tons/yr)				
						NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
290.4	1.3	223	60	250	3,350,769	0.0029	0.0343	0.0027	0.0000	0.0001	4.81	57.54	4.59	0.00	0.10

Notes:
(1) Based on total of 5807 workers over the 20-month construction period.
(2) See notes for combustion emissions.

Table 8.1E-9
Russell City Energy Center (Month 5)

Equipment	Number of Units	Daily Process Rate Per Unit	Total Process Rate	Units	PM10 Emission Factor(1) (lbs/unit)	Control Factor(1) (%)	PM10 Emissions (lbs/day)
Bulldozer D6H	1	5.6	5.6	hours	0.3476		1.95
Bulldozer D4C	1	5.6	5.6	hours	0.3476		1.95
Excavator- Trencher Excavation							
Excavator- Earth Scraper Excavation	3	6.4	19.2	hours	0.3476		6.67
Excavator- Earth Scraper Unpaved Road Trave	3	4.9	14.8	vmt	0.1983	66%	0.99
Excavator-Motor Grader	1	16.8	16.8	vmt	0.2754		4.63
Excavator- Backhoe Excavation							
Excavator - Loader Excavation	1	480.0	480.0	tons	0.0001		0.05
Excavator - Loader Unpaved Road Travel	1	3.7	3.7	vmt	0.1012	66%	0.13
Water Truck Unpaved Road Travel	1	13.0	13.0	vmt	0.1136	66%	0.50
Forklift Unpaved Road Travel	1	10.4	10.4	vmt	0.0724	66%	0.25
Dump Truck Unpaved Road Travel	2	10.1	20.1	vmt	0.1186	66%	0.81
Dump Truck Unloading	2	1,371.5	2,743.0	tons	0.0001		0.26
Service Truck Unpaved Road Travel							
Fuel/Lube Truck Unpaved Road Travel	1	3.1	3.1	vmt	0.0881	66%	0.09
Concrete Pumper Truck Unpaved Road Travel							
Tractor Truck 5th Wheel Unpaved Road Travel							
Pickup Truck Unpaved Road Travel	2	15.4	30.9	vmt	0.0447	66%	0.47
3 ton Truck Unpaved Road Travel	1	7.7	7.7	vmt	0.0600	66%	0.16
Windblown Dust (active construction area)	N/A	612,763.0	612,763.0	sq.ft.	0.000006	66%	1.24
Worker Paved Road Travel	177	0.5	87.2	vmt	0.0005		0.04
Worker Unpaved Road Travel	177	0.2	27.3	vmt	0.0447	66%	0.41
Delivery Truck Paved Road Travel	10	0.5	4.9	vmt	0.0185		0.09
Delivery Truck Unpaved Road Travel	10	0.2	1.5	vmt	0.1186	66%	0.06
Total =							20.74

Notes:
(1) See notes for fugitive dust emission calculations.

Daily Fugitive Dust Emissions (Month 15)
Russell City Energy Center

Equipment	Number of Units	Daily Process Rate Per Unit	Total Process Rate	Units	PM10 Emission Factor(1) (lbs/unit)	Control Factor(1) (%)	PM10 Emissions (lbs/day)
Bulldozer D6H							
Bulldozer D4C							
Excavator- Trencher Excavation							
Excavator- Earth Scraper Excavation							
Excavator- Earth Scraper Unpaved Road Travel							
Excavator-Motor Grader							
Excavator- Backhoe Excavation	1	398.4	398.4	cu. yds.	0.0015		0.60
Excavator - Loader Excavation							
Excavator - Loader Unpaved Road Travel							
Water Truck Unpaved Road Travel	1	13.0	13.0	vmt	0.1136	66%	0.50
Forklift Unpaved Road Travel	1	10.4	10.4	vmt	0.0724	66%	0.25
Dump Truck Unpaved Road Travel							
Dump Truck Unloading							
Service Truck Unpaved Road Travel	1	7.7	7.7	vmt	0.0600	66%	0.16
Fuel/Lube Truck Unpaved Road Travel	1	3.1	3.1	vmt	0.0881	66%	0.09
Concrete Pumper Truck Unpaved Road Travel							
Tractor Truck 5th Wheel Unpaved Road Travel	1	7.7	7.7	vmt	0.0724	66%	0.19
Pickup Truck Unpaved Road Travel	4	15.4	61.7	vmt	0.0447	66%	0.93
3 Ton Truck Unpaved Road Travel	2	7.7	15.4	vmt	0.0600	66%	0.31
Windblown Dust (active construction area)	N/A	612,763.0	612,763.0	sq.ft.	0.000006	66%	1.24
Worker Paved Road Travel	445	0.5	219.1	vmt	0.0005		0.10
Worker Unpaved Road Travel	445	0.2	68.7	vmt	0.0447	66%	1.04
Delivery Truck Paved Road Travel	25	0.5	12.3	vmt	0.0185		0.23
Delivery Truck Unpaved Road Travel	25	0.2	3.9	vmt	0.1186	66%	0.15
Total =							5.80

Notes:
(1) See notes for fugitive dust emission calculations.

Annual Fugitive Dust Emissions
Russell City Energy Center

Activity	Average Daily PM10 Emissions(1) (lbs/day)	Days per Year	Annual PM10 Emissions (tons/yr)
Construction Activities	12.03	250	1.50
Windblown Dust	1.24	365	0.23
Total =			1.73

Notes:
(1) Based on average of daily emissions during Months 5 and 15.

Table 8.1E-10. Daily construction emissions, Russell City Energy Center.

Daily Construction Emissions (Month 5)					
Daily Emissions (lbs/day)					
	NOx	**CO**	**POC**	**SOx**	**PM10**
Onsite					
Construction Equipment	310.93	93.31	25.10	8.72	22.51
Fugitive Dust					20.74
Subtotal =	310.93	93.31	25.10	8.72	43.25
Offsite					
Worker Travel	23.47	280.57	22.40	0.02	0.48
Truck Deliveries	16.81	10.52	1.51	0.70	0.94
Rail Deliveries	0.00	0.00	0.00	0.00	0.00
Subtotal =	40.28	291.08	23.91	0.71	1.42
Total =	351.21	384.39	49.01	9.43	44.67
Daily Construction Emissions (Month 15)					
Daily Emissions (lbs/day)					
	NOx	**CO**	**POC**	**SOx**	**PM10**
Onsite					
Construction Equipment	230.06	76.71	20.08	6.45	17.83
Fugitive Dust					5.80
Subtotal =	230.06	76.71	20.08	6.45	23.63
Offsite					
Worker Travel	59.00	705.38	56.33	0.04	1.20
Truck Deliveries	42.03	26.29	3.77	1.74	2.36
Rail Deliveries	51.63	5.09	1.91	3.30	1.28
Subtotal =	152.66	736.76	62.01	5.07	4.84
Total =	382.72	813.47	82.09	11.52	28.47
Annual Construction Emissions					
Annual Emissions (tons/yr)					
	NOx	**CO**	**POC**	**SOx**	**PM10**
Onsite					
Construction Equipment	15.25	4.95	1.28	0.44	1.14
Fugitive Dust					1.73
Subtotal =	15.25	4.95	1.28	0.44	2.87
Offsite					
Worker Travel	4.81	57.54	4.59	0.00	0.10
Truck Deliveries	1.99	1.25	0.18	0.08	0.11
Rail Deliveries	0.90	0.09	0.03	0.06	0.02
Subtotal =	7.70	58.87	4.81	0.14	0.23
Total =	22.95	63.82	6.09	0.58	3.10

Table 8.1E-11	gals/hr	% Usage	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Crawler Crane- Greater than 300 ton	7.50	80								1	1	1	1	1								
Crawler Crane- Greater than 200 ton	5.00	75								1	2	3	3	3	3	2	2	2	1			
Crane - Mobile 65 ton	4.00	70						1	1	1	2	2	2	2	2	2	1	1	1	1	1	
Cranes -Mobile 45 ton	4.00	75								1	1	1	1	1	1	1	1	1				
Cranes - Mobile 35 ton	4.00	75				1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1
Bulldozer D6H	5.50	70	1	1	1																	
Bulldozer D4C	3.00	70	1	1	1	1																
Excavator- Trencher	2.00	80			1	1	1	1	1	1												
Excavator- Earth Scraper	9.00	80	3																			
Excavator-Motor Grader	5.00	70	1	1	1	1	1												1	1		
Excavator- Backhoe/loader	2.50	75			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Excavator - loader	2.50	70	1	1	1	1																
Vibratory Roller	10.00	70	1	1	1	1	1	1	1	1												
Portable Compaction roller	10.00	70				1	1	1	1	1	1	1	1									
Truck- Water	3.13	65	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Forklift	2.50	65	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Dump Truck	3.13	75	2	2	2																	
Service Truck- 1 ton	1.56	65								1	1	1	1	1	1	1	1	1				
Truck- Fuel/Lube	3.13	65	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Concrete Pumper Truck		85			1	1	1	1	1													
Tractor Truck 5th Wheel	3.13	70			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Trucks- Pickup 3/4 ton	0.78	75	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	2	1
Trucks- 3 ton	1.56	70	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1
		85						1	4	4	8	10	12	12	12	8	8	8	4	4	2	
Diesel Powered Welder	1.27	65			1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1
Light Plants	1.27	50	2	2	2	2	2	2	2	2												
Portable Compaction- Vibratory Plate	0.25	70			2	2	2	2	2	2	2	2	2	2	2							
Portable Compaction- Vibratory Ram	0.25	70			2	2	2	2	2	2	2	2	2	2	2							
Articulating Boom Platforms	0.25	80							1	2	2	5	5	5	5	6	6	2	2	2	2	
Pumps	0.25	50	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1		
Air Compressor 185 CFM	1.27	85	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Air Compressor 750 CFM	1.27	85							1	1	2	2	3	3	3	3	2	2	2	2		
Concrete Vibrators	0.25	50			4	10	10	10	8	8	4	4	2	2	2							
Concrete Trowel Machine	1.27	50			1	1	1	1	1	1												
Fusion Welder	1.27	80				1	1	1	1	1	1											
Asphalt Paver	10.00	85																		1	1	
Asphalt Roller	10.00	85																		1	1	
Portable Power Generators	1.27	50	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1				

RUSSELL CITY ENERGY CENTER-FUGITVE DUST AND COMBUSTION EMISSIONS RANKING

	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	6.00	6.00	6.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.75	7.50	11.25	11.25	11.25	11.25	7.50	7.50	7.50	3.75	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	2.80	2.80	2.80	5.60	5.60	5.60	5.60	5.60	5.60	2.80	2.80	2.80	2.80	2.80	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	3.00	3.00	3.00	3.00	3.00	6.00	6.00	6.00	6.00	6.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	3.85	3.85	3.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2.10	2.10	2.10	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	1.60	1.60	1.60	1.60	1.60	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	21.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3.50	3.50	3.50	3.50	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50	3.50	0.00	0.00
	0.00	0.00	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	0.00	0.00
	1.75	1.75	1.75	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	0.00	0.00
	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
	4.70	4.70	4.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	0.00	0.00	0.00	0.00
	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19
	1.17	1.17	1.17	1.17	1.17	1.17	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	1.17	0.59
	1.09	1.09	1.09	1.09	1.09	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	1.09	1.09
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.83	0.83	0.83	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	0.83	0.83	0.83	0.83
	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.40	0.40	1.00	1.00	1.00	1.00	1.20	1.20	0.40	0.40	0.40	0.40	0.00
	0.38	0.38	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.13	0.13	0.00	0.00
	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	1.08	1.08	2.16	2.16	3.24	3.24	3.24	3.24	2.16	2.16	2.16	2.16	0.00	0.00
	0.00	0.00	0.50	1.25	1.25	1.25	1.00	1.00	0.50	0.50	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.64	0.64	0.64	0.64	0.64	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	1.02	1.02	1.02	1.02	1.02	1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.50	8.50	0.00
	1.27	1.27	1.27	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.00	0.00	0.00	0.00
Total =	**56.45**	34.85	43.05	45.63	41.78	43.00	45.20	59.16	58.79	62.12	**62.95**	55.95	49.95	42.45	38.57	37.77	31.92	43.14	30.10	9.32
	(Maximum Dust Generating Equipment)										(Maximum Onsite Combustion)									

Russell City Energy Center
Short Term Impacts (24 hours and less)

Table 8.1E-12. Long-term impacts (annual).

	Month 15 NOx	Month 15 CO	Month 15 POC	Month 15 SOx	Month 5 PM10
Combustion (lbs/day)	230.06	76.71	20.08	6.45	22.51
Combustion (hrs/day)	8	8	8	8	8
Combustion (lbs/hr)	28.76	9.59	2.51	0.81	2.81
Combustion (g/sec)	3.63	1.21	0.32	0.10	0.35
Construction Dust (lbs/day)					19.50
Construction Dust (hrs/day)					8
Construction Dust (lbs/hr)					2.44
Construction Dust (g/sec)					0.31
Windblown Dust (lbs/day)					1.24
Windblown Dust (hrs/day)					24
Windblown Dust (lbs/hr)					0.05
Windblown Dust (g/sec)					0.01

	NOx	CO	POC	SOx	PM10
Combustion (tons/yr)	15.25	4.95	1.28	0.44	1.14
Combustion (days/yr)	250	250	250	250	250
Combustion (hrs/day)	8	8	8	8	8
Combustion (lbs/hr)	15.25	4.95	1.28	0.44	1.14
Combustion (g/sec)	1.92	0.62	0.16	0.05	0.14
Construction Dust (tons/yr)					1.50
Construction Dust (days/yr)					250
Construction Dust (hrs/day)					8
Construction Dust (lbs/hr)					1.50
Construction Dust (g/sec)					0.19
Windblown Dust (tons/yr)					0.23
Windblown Dust (days/yr)					365
Windblown Dust (hrs/day)					24
Windblown Dust (lbs/hr)					0.05
Windblown Dust (g/sec)					0.01

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Appendix 8.1-F
Evaluation of Best Available Control Technology

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APPENDIX 8.1F
EVALUATION OF BEST AVAILABLE CONTROL TECHNOLOGY

To evaluate BACT for the proposed turbine, the guideline for large gas turbines (heat input rating greater than 23 MMBtu/hr) in the BAAQMD BACT/TBACT Workbook was reviewed. The relevant BACT determinations for this analysis are shown in Table 8.1F-1.

Table 8.1F-1. BAAQMD BACT guideline for large gas turbines.

Pollutant	BACT	Typical Technology
Nitrogen Oxides	1. <5 ppm dry @ 15% O_2	1. SCR + Combustion Modifications
	2. 5 ppm dry @ 15% O_2	2. SCR + Combustion Modifications
Sulfur Dioxide	1. Natural gas fuel	1. Fuel selection
Carbon Monoxide	1. 10 ppm dry @ 15% O_2	1. Catalytic oxidation
	2. 10 ppm dry @ 15% O_2	2. Catalytic oxidation
POC	1. >50% reduction by weight	1. Catalytic oxidation
	2. 50% reduction by weight	2. Catalytic oxidation
PM_{10}	1. Natural gas fuel	1. Fuel selection

1. Technologically feasible and cost effective
2. Achieved in practice

The USEPA RACT-BACT-LAER Clearinghouse (RBLC) was also consulted to review recent USEPA BACT decisions for gas-fired gas turbines. These recent BACT decisions are summarized in Table 8.1F-2. NO_x levels shown in these BACT determinations are very high, although USEPA has recently stated that the SCONOx technology has demonstrated that 2.5 ppm is achievable in practice. CO levels in this listing are also relatively high, and do not indicate that oxidation catalysts have been considered BACT for CO or POCs.

Additionally, the ARB's BACT Clearinghouse Database was reviewed for recent BACT decisions regarding large gas turbine projects in California. Relevant BACT decisions are summarized in Table 8.1F-3. NO_x levels shown in these determinations are generally around 5 ppm. None of these recent BACT decisions include a determination for CO, and the determinations for POC include extremely low catalyst destruction efficiencies (5 to 10 percent).

Finally, EPA Region XI has recently published a series of BACT determinations for gas turbine based power plant facilities. These determinations can be found in the Federal Register (66 FR 19480, April 16, 2001). These determinations are summarized in Table 8.1F-4.

RCEC proposes to use dry low-NO_x combustors with selective catalytic reduction that will achieve a NO_x exhaust concentration of 2.0 ppmv or less (annual average) and 2.5 ppm short term average, and a CO exhaust concentrations of 6 ppmv or less. The turbines will be fueled with natural gas to minimize SO_2 and PM_{10} emissions. These pollutant levels will achieve emission levels consistent with the BAAQMD, CARB, and EPA Region XI BACT guidelines.

Table 8.1F-2. Gas Turbine BACT Determinations for USEPA RBLC Clearinghouse.

Facility/Location	Date Permit Issued	Equipment/Rating	NO_x Limit/Control Technology	CO Limit/Control Technology
Alabama Power Company McIntosh, AL	7/10/97	100 MW combustion turbine w/duct burner	15 ppm (dry low-NO_x burners)	N/A
Lordsburg L.P. Lordsburg, NM	6/18/97	100 MW combustion turbine	15 ppm (dry low-NO_x technology)	50 ppm (dry low-NO_x technology)
Mead Coated Board, Inc. Phoenix City, AL	3/12/97	25 MW combustion turbine w/fired HRSG	25 ppm (dry low-NO_x combustor)	28 ppm (proper design and good combustion practices)
Northern California Power Agency Lodi, CA	10/02/97	GE Frame 5 gas turbine	25 ppm	N/A
Portside Energy Corp. Portage, IN	5/13/96	63 MW gas turbine w/unfired HRSG	N/A	10 ppm (good combustion)
Southwestern Public Service Hobbs, NM	2/15/97	gas turbine	15 ppm w/o power augmentation 25 ppm w/augmentation	good combustion practices

Table 8.1F-3. Summary of BACT determinations from ARB BACT Clearinghouse

Facility/District	Permit No.	Equipment/Rating	NO_x Limit/Control Technology	VOC/HC Limit/Control Technology
Sacramento Cogeneration Authority Sacramento Metropolitan AQMD	A330-849-98 A330-850-98 A330-851-98	GE LM6000 combined cycle gas turbine w/supplemental firing (42 MW each)	5 ppm (dry low-NO_x combustion and SCR)	oxidation catalyst (10% destruction efficiency)
Sacramento Power Authority Sacramento Metropolitan AQMD	A330-852-98	Siemens V84.2 combined cycle gas turbine w/supplemental firing (103 MW)	3 ppm (water injection and SCR)	oxidation catalyst (5% destruction efficiency)
Carson Energy Sacramento Metropolitan AQMD	A330-854-98	GE LM6000 combined cycle gas turbine w/supplemental firing (42 MW)	5 ppm (water injection and SCR)	oxidation catalyst (10% destruction efficiency)

Table 8.1F-3. Summary of BACT determinations from ARB BACT Clearinghouse

SEPCO	A330-855-98	GE Frame 7EA gas turbine w/supplemental firing (82 MW)	5 ppm (dry low-NO_x combustion and SCR)[a]	oxidation catalyst (5% destruction efficiency)

[a] District indicates that applicant proposed 2.6 ppm to lower offset liability.

Table 8.1F-4. Gas Turbine BACT determinations per EPA Region XI (66 FR 19480, 4-16-01).

Facility/Location	Decision Date	Rating/Fuel	NO_x Limit/Control Technology	CO Limit/Control Technology
Elk Hills Power LLC California	2/5/01	500 MW, Natural Gas	2.5 ppm (dry low-NO_x burners w/ SCR or SCONOX)	4 ppm w/Catalytic Oxidation and Good Combustion Practices
Pastoria Energy Facility California	2/12/01	750 MW, Natural Gas	2.5 ppm (dry low-NO_x technology w/SCR or Xonon Catalyst)	6 ppm w/Catalytic Oxidation and Good Combustion Practices
Blythe Energy Project LLC California	3/5/01	520 MW, Natural Gas	2.5 ppm (dry low-NO_x combustor w/SCR)	5 ppm (Proper Design and Good Combustion Practices)

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Appendix 8.1-G
Offset Listing

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APPENDIX 8.1-G OFFSET LISTING

The Calpine/Bechtel Joint Development has purchased sufficient emission reduction credits to offset project emissions and has dedicated those offsets to the Russell City Energy Center project. Because the assignment of offset credits is proprietary information, proof that Calpine/Bechtel has obtained these offset credits has been filed under separate cover, with a request for confidentiality.

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Table 8.1G-1. BAAQMD Emission Bank Status Emission Reduction Credits Available, (tons/year) March 15, 2001.

No.	Certificate Owner	PM	POC	NOx	SO_2	CO	NPOC	PM_{10}
11	Hewlett-Packard Co; Printed Circuit Divsn						159.5	
16	Hunt-Wesson Foods; Inc	1.0		21.0		1.8		
17	Allied Corporation				182.9			
18	National Can Corporation		31.1					
28	Carnation Company	3.7						
29	Stauffer Chemical Company	0.2		1.2		0.2		
36	United Airlines; Maintenance Operations Ctr						1.8	
37	Morton International Inc			0.4		0.4		
38	FMC Corporation						53.7	
39	FMC Corporation		5.8					
40	Stauffer Chemical Co; San Jose	0.7	0.7	28.5		9.1	0.4	
47	United Airlines; Maintenance Operations Ctr		6.4					
49	Owens Corning			22.3				
51	Continental Can Company		71.0					
53	A O Smith Corporation		10.8					
57	Tosco Refining Company	3.6				4.9		
59	Continental Can Company		4.5					
68	FMC Corporation		0.4					
69	FMC Corporation		1.0					
70	Chevron Products Company		29.3					
96	U.S. Navy		1.018					
110	Myers Container Corporation		20.03				7.39	
112	Owens Corning	1.3	14.4	0.22		0.15		0.7
117	Chevron Products Company	0.5	20.7	10.6	0.1	2.1		
118	Chevron Products Company	0.25	9.63	5.04	0.05	1.0		
131	Tosco Refining Company		0.38					
132	U.S. Navy			0.39		0.34		
135	Gallagher & Burk; Inc							6.23
141	Tosco Refining Company		0.373					
142	Tosco Refining Company		0.34					
149	Varian Oncology Systems						12.25	
151	Lawrence Livermore National Laboratory						1.66	
155	U.S. Navy		0.065	1.878	10.66	0.939		0.375
160	National Semiconductor Corporation		1.747					
168	Martinez Refining Company		11.62					
172	Chevron Products Company							0.384
173	Varian Oncology Systems		0.235				4.469	

No.	Certificate Owner	PM	POC	NOx	SO_2	CO	NPOC	PM_{10}
177	Gilroy Foods; Inc		0.338					
180	United Technologies Corporation		0.076				4.397	
181	Advanced Micro Devices Inc		10.88					
182	Chevron Research and Technology Co	0.07	0.039	0.7	0.008	0.003		
183	Chevron Research and Technology Co		0.31					
194	RMC Lonestar	0.73						0.44
195	RMC Lonestar	0.4						0.24
205	U.S. Navy						6.034	
207	Owens Corning	17.9	23.3	9.5		3.9		
215	Monsanto Company							0.067
218	New United Motor Manufacturing; Inc		78.83					
223	Chevron Products Company		60.122	20.674	1.047	9.129		5.37
227	HMT Technology Corporation		0.2				2.24	
232	American Lithographers Inc.		6.164	0.095		0.1		
239	IBM Corporation						24.37	
241	Dexter Hysol Aerospace; Inc		4.7					
243	United Can Company		0.002					
248	Chevron Products Company		3.56					
251	Triangle Wire & Cable; Inc			0.594				
252	General Electric Co		0.003					
259	Burke Industries; Inc		3.026				24.85	
262	Lawrence Livermore National Laboratory						1.05	
265	Solectron Corporation		3.71				3.35	
266	Santa Rosa Memorial Hospital			0.97				0.3
270	Stanford University			17.3				
280	California Canners & Growers	0.8				6.0		
287	Philips Semiconductor		2.61					
288	Philips Semiconductor		9.039				0.32	
302	Chevron Products Company		7.948					
310	Trumbull Asphalt Company		8.9	0.4	25.9	24.2		4.2
312	North American Refractories Co		0.017	1.026				
315	Chevron Research and Technology Co		0.747					
316	United Airlines; Maintenance Operations Ctr		0.5					
325	New United Motor Manufacturing; Inc		20.79					
328	Crockett Cogeneration; A Cal Ltd Partnership		11.05	0.84		0.2		
329	Advanced Micro Devices Inc		9.615					
332	Rexam Beverage Can Company		15.55					
333	U.S. Navy		13.49					

No.	Certificate Owner	PM	POC	NOx	SO_2	CO	NPOC	PM_{10}
337	American Lithographers Inc.		4.23					
341	Pacific Lithograph Company		5.862	1.3				
344	Chevron Products Company		8.992					
345	Chevron Products Company		94.6					
350	Hewlett-Packard Company		3.29					
351	U.S. Navy		22.786				54.6	
353	Chevron Products Company		8.55					
360	Gallagher & Burk; Inc		0.2	0.17	0.17	0.53		0.18
366	Amdahl Corporation		0.046				7.528	
367	Amdahl Corporation		0.977				5.12	
368	Amdahl Corporation		0.143				2.26	
370	Pacific Refining Company			1.0				
371	Zanker Road Resource Management;Ltd		0.65	10.7	0.77			
372	Pacific Refining Company		0.44	0.224				
376	George Rice & Sons		45.0					
381	Laidlaw Environmental Services (San Jose); Inc		1.4				1.46	
382	California Oils Corporation		0.195					
385	Quantum Corporation						3.2	
387	Martinez Refining Company		0.096					
392	Richard Mariani	0.6				3.3		
393	Anacomp Inc		7.13					
408	Rexam Beverage Can Company		36.526					
410	IBM Corporation						13.98	
412	Amdahl Corporation		0.13				2.03	
414	Intel Corporation		13.92				2.14	
415	Martinez Refining Company				15.1			8.92
419	Phoenix Iron Works							1.197
423	Ciba Corning Diagnostics Corp		0.53					
424	Chevron Products Company		1.608					
425	Beckman Coulter						3.11	
428	Martinez Refining Company		6.288					
434	Genentech; Inc		0.384	6.646		7.798		2.66
443	Lawrence Livermore National Laboratory						0.121	
445	Stanford University		3.79	14.84				
446	Red Wing Co /California Div	0.07	0.052	0.419	0.002	0.083		0.091
452	Solectron Corporation		2.674					
462	Intel Corporation			30.0				
465	Ball Metal Beverage Container Corporation			0.275				

No.	Certificate Owner	PM	POC	NOx	SO_2	CO	NPOC	PM_{10}
471	Container Management Service-LLC		10.787	0.559		0.11	4.85	0.028
475	U.S. Navy		0.3	0.13		0.42		0.3
477	U.S. Navy		7.911					
478	Central Contra Costa Sanitary District		0.581	2.243		30.937		
483	The Glidden Company		4.7					
486	U.S. Navy		3.44	1.21	1.2	2.71		0.98
487	Chevron Chemical Company	3.504		3.028				5.254
489	Chevron Products Company			71.4				
491	U.S. Navy		1.62	5.762	0.46	1.241	1.03	0.405
495	Tosco Refining Company	0.4	0.527		2.15	42.7		
500	San Francisco Energy Company		102.6					
501	U.S. Navy		0.315	8.432	0.135	9.001		0.563
503	U.S. Navy		0.354	4.342	0.347	0.935		0.305
504	Chevron Products Company		1.995	1.027	0.06	0.537		0.312
505	New United Motor Manufacturing; Inc		18.47					
510	U.S. Navy		3.49	2.43	0.21	0.58	0.22	0.59
512	IBM Corporation			0.059				
514	Owens Corning		6.457					
520	New United Motor Manufacturing; Inc		112.76					
521	UCSF/Parnassus			0.5		0.13		
525	Central Contra Costa Sanitary District		0.153	1.12		8.158		
529	U.S. Navy		2.88	14.75	1.43	11.47		3.71
531	Crown Cork & Seal Company		20.249	4.595		0.965		0.345
532	Martinez Cogen Limited Partnership			50.2				
538	New United Motor Manufacturing; Inc		131.9					
540	New United Motor Manufacturing; Inc		0.218					
541	Chevron Chemical Company		0.047				1.6	
543	Hanson Permanente Cement							25.074
545	U.S. Navy		2.495					
546	Alameda Reuse & Redevelopment Authority		29.97					
547	Cirrus Logic		1.34	0.34				
550	Chevron Products Company		43.402	36.225	133.81	485.47		31.134
554	Lawrence Livermore National Laboratory			0.051			2.4	
555	U.S. Navy			1.05	0.02	0.89		0.11
557	U.S. Navy		0.65	9.09	0.14	8.16		0.7
559	U.S. Navy		0.34	2.11				
560	Criterion Catalysts Company LP		0.34					
561	Pechiney Plastic Packaging; Inc		1.249					

No.	Certificate Owner	PM	POC	NOx	SO_2	CO	NPOC	PM_{10}
562	United Technologies Corporation		2.432	0.623				
563	Owens Corning		1.245					
566	Shell Martinez Catalyst Plant		11.62					
570	Quebecor World San Jose Inc		6.11	1.81				
571	Huntway Refining Company		0.657					
573	LSI Logic Corporation		15.856					
577	Lockheed Martin Corporation		0.308					
578	Chevron Chemical Company		0.212	1.802	0.046	0.357		0.57
580	Tosco Refining Company		1.29	21.23	4.19	16.14		6.45
581	Tosco Refining Company		3.17	6.88	0.01	5.78		0.2
583	WinCup Holdings;L P		0.426					
584	Chevron Products Company		1.265					
588	Chevron Chemical Company			31.771		2.069		
593	Dow Chemical Company		15.34					
598	USS-POSCO Industries				0.14	0.79		0.7
600	U.S. Navy		0.55	3.21	0.06	8.43		0.76
602	Calpine Corporation	0.2	40.97	2.143		0.357		
603	Port of Oakland			2.45				
605	Owens-Brockway Glass Container Inc	11.2	0.4			0.74		
609	Martinez Refining Company				50.61			
613	Martinez Refining Company			89.783				
617	Chevron Products Company		68.898	8.79	0.473	7.449		1.514
619	Raisch Products					0.84		
622	Huntway Refining Company		0.898					
623	Huntway Refining Company		1.526					
625	Quebecor World San Jose Inc		356.0					
628	Owens Brockway Glass Containers		10.78			10.78		
630	USS-POSCO Industries			14.821	0.09	2.51		0.36
633	Crown Cork & Seal Co.		0.086	1.564	0.009	1.308	0.036	0.119
635	Calpine Corp. & Bechtel Enterprises Hold		0.1	1.31				7.7
637	Huntway Refining Company		0.174					
640	New United Motor Manufacturing; Inc		27.94					13.63
643	Homestake Mining Company	87.53				86.97		
644	USS-POSCO Industries	3.0	1.1	3.8	0.2	2.4		
645	Calpine Corporation			107.9				
648	Emerald Packaging Inc						40.0	
652	Shore Terminals - Selby		10.802	11.352				
656	Duke Energy Oakland LLC		324.81					

No.	Certificate Owner	PM	POC	NOx	SO_2	CO	NPOC	PM_{10}
658	Calpine Corporation		10.0	32.9		14.38		
659	Calpine Construction Finance Co.;L.P.				30.4			
660	Calpine Corporation			39.55	5.92			
661	Calpine Corporation		31.75					
662	Calpine Corporation			73.62	46.3			
665	Calpine Corp. & Bechtel Enterprises Hold		22.778					
666	Calpine Corp. & Bechtel Enterprises Hold		15.518					
671	Calpine Corp. & Bechtel Enterprises Hold		2.7	468.0	90.0	33.0		28.0
674	Calpine Corp. & Bechtel Enterprises Hold					9.797	0.669	
675	Calpine Corp. & Bechtel Enterprises Hold				18.285			
679	Calpine Corp. & Bechtel Enterprises Hold		45.8					
680	Calpine Corp. & Bechtel Enterprises Hold		4.4					
682	Valero Refining Company - California		14.769					
684	Stapleton - Spence		0.028	0.312	0.006	0.008	0.03	0.14
685	Calpine Corp. & Bechtel Enterprises Hold	0.21	0.91	6.42	0.03	1.65		7.64
686	Calpine Corp. & Bechtel Enterprises Hold			6.5				12.33
687	Calpine Corp. & Bechtel Enterprises Hold		43.819	0.601				
688	Calpine Corp. & Bechtel Enterprises Hold		52.27					
689	SFPP; LP		2.358					
691	Burns Philip Food Inc.		0.001					
692	Chevron Products Company		1.608					
693	Southern Energy California		125.88	437.56	321.9	450.6		209.9
694	Southern Energy California		5.3	299.0	158.2	114.0		25.0
695	Southern Energy California	4.2	0.39	1.173	0.179	14.602		6.443
696	Siliconix; Incorporated		1.362				0.001	
697	Calpine Corp. & Bechtel Enterprises Hold		85.863					
698	Chevron Products Company		0.319					
699	Calpine Corporation			20.9				
703	Valero Refining Company - California			31.418				
704	Enron North America Corp.		5.868					
705	Enron North America Corp.		7.08					
706	Martinez Refining Company		35.51	13.8	0.1			
707	Chevron Products Company		2.426					
708	Exar Corporation						4.689	
709	Enron North America Corp.		17.367					
710	Midway Power; LLC		5.14					
711	Tosco Distribution Company		119.25					
712	Enron North America Corp.		8.816					

No.	Certificate Owner	PM	POC	NOx	SO_2	CO	NPOC	PM_{10}
713	Enron North America Corp.		6.153					
714	Enron North America Corp.		1.0					
715	Louis Roesch Company		0.716					
716	Calpine Corporation		0.2	11.66	0.04	1.13		0.67
717	Calpine Corporation		0.46	32.24	0.09	2.61		1.54
718	Midway Power; LLC		44.995					
719	Midway Power; LLC		4.9					
720	Midway Power; LLC			48.962				
721	C & H Sugar Company; Inc		2.353			37.282		0.094
722	Catalytica Combustion Systems Inc		0.011					
723	Catalytica Combustion Systems Inc			0.015		1.632		
724	Calpine Corporation			7.1				
725	United Airlines; Maintenance Operations Ctr		49.601					
726	New United Motor Manufacturing; Inc			0.343				
727	Calpine Corp. & Bechtel Enterprises Hold			142.21	436.47	54.34		
728	Calpine Corp. & Bechtel Enterprises Hold		88.04	57.19	1.03	33.32		9.97
729	Valero Refining Company - California		28.326					
	Total Emission Reduction Credits Available	**142**	**3120**	**2473**	**1541**	**1596**	**459**	**435**

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Appendix 8.1-H
Cumulative Impacts Analysis Protocol

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APPENDIX 8.1H. CUMULATIVE IMPACTS ANALYSIS PROTOCOL

Potential cumulative air quality impacts that might be expected to occur resulting from RCEC and other reasonably foreseeable projects are both regional and localized in nature. These cumulative impacts were evaluated as follows.

Regional Impacts

Regional air quality impacts are possible for pollutants such as ozone, which involve photochemical processes that can take hours to occur. RCEC will provide emissions offsets (mitigation) for ozone precursors at a 1.15 to 1.0 ratio for NOx and 1.0 to 1.0 for POC. Additional mitigation for other pollutants will be required by the CEC.

Although the relative importance of POC and NO_x emissions in ozone formation differs from region to region, and from day to day, most air pollution control plans in California require roughly equivalent controls (on a ton per year basis) for these two pollutants. The change in emissions of the sum of these pollutants, equally weighted, will be used to provide a reasonable estimate of the impact of RCEC on ozone levels. The net change in emissions of ozone precursors from RCEC will be compared with emissions from all sources within Alameda County (Table 8.1H-1), and within the Bay Area Air Basin (Table 8.1H-2) as a whole.

Table 8.1H-1. Estimated Alameda County emissions inventory for 2000 (tons/day).

Source Category	TOG	ROG	CO	NOx	SOx	PM	PM10
Total Stationary Sources	189.62	27.93	2.12	7.74	1.53	5.92	3.54
Total Area Sources	29.10	18.48	30.91	3.49	0.21	43.14	23.11
Total Mobile Sources	74.12	67.91	605.33	102.32	8.47	4.42	4.37
Total Natural Sources	0.07	0.04	0.66	0.02	-	0.12	0.12
County Total	292.91	114.36	639.02	113.57	10.21	53.61	31.13

Source: CARB

Table 8.1H-2. Estimated Bay Area Air Basin Emissions Inventory for 2000 (tons/day).

Source Category	TOG	ROG	CO	NOx	SOx	PM	PM10
Total Stationary Sources	734.96	125.16	35.36	89.16	54.67	26.09	17.31
Total Area Sources	160.60	90.21	169.04	17.09	1.35	238.26	130.12
Total Mobile Sources	346.51	318.87	2662.88	451.67	35.32	21.19	20.85
Total Natural Sources	0.53	0.30	6.11	0.23	-	1.19	1.15
Basin Total	1242.60	534.55	2873.39	558.15	92.33	286.73	169.43

Source: CARB

Air quality impacts of fine particulate, or PM_{10}, have the potential to be either regional or localized in nature. On a regional basis, an analysis similar to that presented above for ozone was performed, looking at the three pollutants that can form PM_{10} in the atmosphere, i.e., POC, SO_x, and NO_x as well as at directly emitted particulate matter. BAAQMD regulations do not require offsets to be provided for PM_{10} emissions from the project, as facility emissions do not exceed 100 tons per year. However, full mitigation will be required by the CEC.

As in the case of ozone precursors, emissions of PM_{10} precursors are expected to have approximately equivalent ambient impacts in forming PM_{10}, per ton of emissions on a regional basis. Table 8.1H-3 provides the comparison of emissions of the criteria pollutants from RCEC with emissions from all sources within Alameda County, and within the Bay Area Air Basin as a whole.

Table 8.1H-3. Comparison of RCEC Project Emissions to Estimated Inventory for 2000.

Category	TOG	ROG[1]	CO	NOx	SOx	PM	PM10
RCEC Emissions (tons/yr)	-	28.5	610.2	134.6	12.4	-	86.3
RCEC Emissions (tons/day)	-	0.078	1.67	0.37	0.034	-	0.24
County Total (tons/day)	292.91	114.36	639.02	113.57	10.21	53.61	31.13
Air Basin Total (tons/day)	1242.60	534.55	2873.39	558.15	92.33	286.73	169.43
RCEC % of County Total	-	0.068	0.26	0.325	0.33	-	0.77
RCEC % of Air Basin Total	-	0.015	0.058	0.066	0.037	-	0.14

[1] RCEC POC emissions compared to inventory ROG emissions.

Localized Impacts

Localized impacts from RCEC could result from emissions of carbon monoxide, oxides of nitrogen, sulfur oxides, and directly emitted PM_{10}. A dispersion modeling analysis of potential cumulative air quality impacts has been performed for all four of these pollutants.

In evaluating the potential cumulative localized impacts of RCEC in conjunction with the impacts of existing facilities and facilities not yet in operation but that are reasonably foreseeable, a potential impact area in which cumulative localized impacts could occur was identified by CEC staff as an area with a radius of 8 miles around the plant site. Based on the results of the air quality modeling analyses described above, "significant" air quality impacts, as that term is defined in federal air quality modeling guidelines, were determined. If the project's impacts do not exceed the significance levels, no cumulative impacts will be expected to occur, and no further analysis will be required. Otherwise, in order to ensure that other projects that might have significant cumulative impacts in conjunction with RCEC are identified, a search area with a radius of 8 miles beyond the project's impact area will be used for the cumulative impacts analysis. Within this search area, three categories of projects with combustion sources will be used as criteria for identification:

- Projects that are existing and have been in operation since at least 1-1-98 (emissions are included in the overall background air quality assessment).
- Projects for which air pollution permits to construct have been issued and that began operation after 1-1-98.
- Projects for which air pollution permits to construct have not been issued, but that are reasonably foreseeable.

Projects that are existing and have been in operation since at least 1-1-98 will be reflected in the ambient air quality data that has been used to represent background concentrations; consequently, no further analysis of the emissions from this category of facilities will be performed. The cumulative impacts analysis adds the modeled impacts of selected facilities to the maximum measured background air quality levels, thus ensuring that these existing projects are taken into account.

Projects for which air pollution permits to construct have been issued but that were not operational by 1-1-98 will be identified through a request of permit records from the Bay Area Air Quality Management District. The search will be requested to be performed at two levels. For permits that are considered "major modifications" (i.e., emissions increases greater than 40 tons/year of NO_x or SO_2, 25 tons/year of total suspended particulate, 15 tons/year of PM_{10}), a region within 8 miles of the proposed project site was evaluated. For projects that had smaller emissions changes, but still greater than 15 tons/year, a region within 8 miles of the proposed project site was also evaluated. Projects that satisfy either of these criteria and that had a permit to construct issued after January 1, 1998, were included in the cumulative air quality impacts analysis. The January 1, 1998 date was selected based on the typical length of time a permit to construct is valid and typical project construction times, to ensure that projects that are not reflected in the 2000 ambient air quality data are included in the analysis. Projects for which the emissions change was smaller than 15 tons/year will be assumed to be *de minimus*, and will not be included in the dispersion modeling analysis.

A list of projects within the project region meeting the above noted criteria has been requested from the BAAQMD staff. (As of May 18, 2001 the requested data has not been received.)

Given the potentially wide geographic area over which the dispersion modeling analysis is to be performed, the ISCST3 model will be used to evaluate cumulative localized air quality impacts. The detailed modeling procedures, ISCST3 options, and meteorological data used in the cumulative impacts dispersion analysis were the same as those described above. The receptor grid was spaced at the same distance as for the RCEC analysis and covered the area in which the detailed modeling analysis (described above) indicated that the project will have impacts that exceed the PSD significance levels.

Cumulative Impacts Dispersion Modeling

The dispersion modeling analysis of cumulative localized air quality impacts for the proposed project was evaluated in combination with other reasonably foreseeable projects and air quality levels attributable to existing emission sources, and the impacts were compared to state or federal air quality standards for significant impact. As discussed above, the highest second-highest modeled concentrations will be used to demonstrate compliance with standards based on short-term averaging periods (24 hours or less).

Supporting information used in the analysis includes the following:

- 2000 estimated emissions inventory for Alameda County (Table 8.1H-1) and for the San Francisco Bay Area Air Basin (Table 8.1H-2);
- List of projects resulting from the screening analysis of permit files by the BAAQMD (Table 8.1H-4);
- Map showing locations of sources included in the cumulative air quality impacts dispersion modeling analysis (Figure 8.1H-1);
- Stack parameters for sources included in the cumulative air quality impacts dispersion modeling analysis (Table 8.1H-5); and
- Output files for the dispersion modeling analysis.

Russell City Energy Center

Appendix 8.1-I
Calculation of Reasonable Worst-Case Day Emissions for Mitigation

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Table 8.1I-1. Reasonable maximum daily and annual emissions.

Maximum Hourly, Daily and Annual Emissions								NOx		
		Base Load		Cold Start		Hot Start		Base Load	Cold Start	Hot Start
	max. hour	hrs/day	hrs/yr	hrs/day	hrs/yr	hrs/day	hrs/yr	lb/hr	lb/hr	lb/hr
Turbine 1, no DB	1	4	6844	3	156	1	260	19.5	80	80
Turbine 2, no DB	0	2	6844	3	156	1	260	19.5	80	80
Turbine 1, w/ DB&PA	0	16	1500	0	0	0	0	21.4	0	0
Turbine 2, w/ DB&PA	1	16	1500	0	0	0	0	21.4	0	0
Emergency generator	1	1	200	0	0	0	0	1.77	0	0
Fire pump engine	1	1	30	0	0	0	0	3.9	0	0
Cooling tower	1	24	8760	0	0	0	0	0	0	0

	SO2	CO			POC			
		Base Load	Cold Start	Hot Start	Base Load	Cold Start	Hot Start	PM10
	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
Turbine 1, no DB	1.4	28.8	838	902	2.6	16	16	9
Turbine 2, no DB	1.4	28.8	838	902	2.6	16	16	9
Turbine 1, w/ DB&PA	1.5	31.7	0	0	2.8	0	0	12
Turbine 2, w/ DB&PA	1.5	31.7	0	0	2.8	0	0	12
Emergency generator	0.004	3.02	0	0	1.42	0	0	0.0006
Fire pump engine	0.106	2.35	0	0	0.48	0	0	0.13
Cooling tower	0	0	0	0	0	0	0	0.69

	NOx			SO2			CO			POC			PM10		
	Max	Max	Total	Max	Max	Total	Max	Max	Total	Max	Max	Total	Max	Max	Total
	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy
Turbine 1, no DB	80	398	83.4	1.4	11.2	5.1	902	3,531.20	281.2	16	74.2	12.1	9	72	32.7
Turbine 2, no DB	0	359	83.4	0	8.4	5.1	0	3,473.60	281.2	0	69.1	12.1	0	54	32.7
Turbine 1, w/ DB	0	342.4	16.1	0	24	1.1	0	507.2	23.8	0	44.8	2.1	0	192	9
Turbine 2, w/ DB	21.4	342.4	16.1	1.5	24	1.1	31.7	507.2	23.8	2.8	44.8	2.1	12	192	9
Emergency generator	0	0	0.18	0	0	0.0004	3	3	0.3	1.4	1.4	0.142	0	0	0.0001
Fire pump engine	3.9	3.9	0.0585	0.106	0.106	0.0016	0	0	0.0353	0	0	0.0072	0	0	0.0019
Cooling tower	0	0	0	0	0	0	0	0	0	0	0	0	0.7	16.4	3
Total	105.3	1445.7	134.6	3	67.7	12.4	936.7	8,022.20	610.2	20.2	234.3	28.5	21.7	526.4	86.3
	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy

Assumptions:

Each turbine has one cold start and one hot start on worst case day; startups lag by two hours.

Emergency generator and fire pump will not both be tested on the same day.

Fire pump will not be tested more than 30 hours per year.

Emergency generator will not be tested over 200 hours per year.

Notes for Table 8.1I-1
Calculation of Reasonable Maximum Daily and Annual Emissions for Mitigation

Calculation of Maximum Daily Emissions

a. Turbines/HRSGs

Hourly NO_x, CO and POC emissions are highest during startup. The operating conditions having the next highest hourly emissions are full load operation at 94 degF with power augmentation and duct firing, followed by full load operation at 34 degF. Duct burner operation will not exceed 16 hours a day. On a reasonable worst-case day one turbine will have a cold start and one turbine will have a hot start, and then both turbines will operate at full load with power augmentation and duct firing for 16 hours, and at full load without power augmentation and duct burning for the rest of the day.

b. Auxiliary Boiler

No auxiliary boiler is proposed for the RCEC facility.

c. Emergency Generator and Fire Pump

The emergency generator and fire pump will operate a maximum of one hour per day for testing, and the two units will not be tested on the same day. Therefore maximum daily emissions correspond to one hour of operation of the unit that has the higher emissions.

d. Cooling Tower

Maximum daily cooling tower emissions will occur while the cooling tower is in operation for 24 hours.

Maximum Annual Emissions

Maximum annual emissions are based upon the proposed operations scenarios as delineated in Section 8.1.

Russell City Energy Center

Appendix 8.2-A
Results of the California Natural Diversity/ Rarefind Data Base Search

May 2001

Russell City Energy Center AFC

May 2001

California Department of Fish and Game
Natural Diversity Data Base
Full Expanded Report - One Record Per Page

RANA AURORA DRAYTONII
CALIFORNIA RED-LEGGED FROG — Element Code: AAABH01022

Status — NDDB Element Ranks — Other Lists
Federal: Threatened — Global: G4T2T3 — CDFG Status: SC
State: None — State: S2S3

Habitat Associations
General: LOWLANDS & FOOTHILLS IN OR NEAR PERMANENT SOURCES OF DEEP WATER WITH DENSE, SHRUBBY OR EMERGENT RIPARIAN VEGETATION.
Micro: REQUIRES 11-20 WEEKS OF PERMANENT WATER FOR LARVAL DEVELOPMENT. MUST HAVE ACCESS TO ESTIVATION HABITAT.

Occurrence No. 34 — Map Index: 17146 — Dates Last Seen
Occ Rank: Poor — Element: 1990-07-10
Origin: Natural/Native occurrence — Site: 1990-07-10
Presence: Presumed Extant
Trend: Unknown
Main Source: STEARNS, D. 1990 (OBS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:
Location: GARIN REGIONAL PARK, 2.6 MI SE OF CSU HAYWARD, ALAMEDA COUNTY.
Lat/Long: 37ø37'52" / 122ø00'56" — Township: 03S
UTM: Zone-10 N4165143 E586862 — Range: 01W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 80 meters — Elevation: 900 ft

Comments
Distribution: 1 ADULT FOUND IN POND.
Ecological: POND IN GRASSLAND COMMUNITY. 10% VEGETATIVE COVER (PONDWEED, ALGAE). 85% VEGETATIVE COVER AROUND POND PERIMETER (GRASS, THISTLE).
Threat: CATTLE USE.
General: RED-LEGGED FROGS PREFER MORE CATTAIL COVER FOR PROTECTION. HABITAT COULD BE IMPROVED BY FENCING OFF POND TO AVOID OVERGRAZING AND TRAMPLING.
Owner/Manager: EBRPD-GARIN/DRY CREEK RP

Source Codes
STE90F04

RANA AURORA DRAYTONII (cont.)
CALIFORNIA RED-LEGGED FROG — Element Code: AAABH01022

Status — NDDB Element Ranks — Other Lists
Federal: Threatened — Global: G4T2T3 — CDFG Status: SC
State: None — State: S2S3

Habitat Associations
General: LOWLANDS & FOOTHILLS IN OR NEAR PERMANENT SOURCES OF DEEP WATER WITH DENSE, SHRUBBY OR EMERGENT RIPARIAN VEGETATION.
Micro: REQUIRES 11-20 WEEKS OF PERMANENT WATER FOR LARVAL DEVELOPMENT. MUST HAVE ACCESS TO ESTIVATION HABITAT.

Occurrence No. 305 — Map Index: 41241 — Dates Last Seen
Occ Rank: Fair — Element: 1999-05-10
Origin: Natural/Native occurrence — Site: 1999-05-10
Presence: Presumed Extant
Trend: Unknown
Main Source: JENNINGS, M. R. 1999 (OBS)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:
Location: UNNAMED DITCH, 0.2 MILE SW OF THE INTERSECTION OF HIGHWAY 238 (MISSION BOULEVARD) AND SEVENTH STREET, UNION CITY.
Lat/Long: 37ø35'21" / 122ø00'11" — Township: 04S
UTM: Zone-10 N4160502 E587997 — Range: 01W
Mapping Precision: SPECIFIC — Section: 17 Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 8.8 ac — Elevation: 45 ft

Comments
Distribution:
Ecological: HABITAT CONSISTS OF A DIRT-LINED CANAL, VEGETATED BY CATTAIL, WATERCRESS, WATER SPEEDWELL, AND ITALIAN RYEGRASS.
Threat: THREATENED BY DEVELOPMENT, FLOODING, AND FLOOD CONTROL MAINTENANCE.
General: 1 ADULT OBSERVED/COLLECTED (#MRJ 1474, DEPOSITED AT CAS) ON 10 MAY 1999.
Owner/Manager: PVT

Source Codes
JEN99F07

PHALACROCORAX AURITUS (ROOKERY SITE)
DOUBLE-CRESTED CORMORANT — Element Code: ABNFD01020

Status — NDDB Element Ranks — Other Lists

Federal: None — Global: G5 — CDFG Status: SC
State: None — State: S3

Habitat Associations

General: COLONIAL NESTER ON COASTAL CLIFFS AND OFFSHORE ISLANDS, AND ALONG LAKE MARGINS IN THE INTERIOR OF THE STATE.
Micro: NEST ALONG COAST ON SEQUESTERED ISLETS, USUALLY ON GROUND WITH SLOPING SURFACE, OR IN TALL TREES ALONG LAKE MARGINS.

Occurrence No. 27 — Map Index: 25571 — Dates Last Seen
Occ Rank: Unknown — Element: 1988-XX-XX
Origin: Natural/Native occurrence — Site: 1988-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: CARTER, H. ET AL 1989 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)*, SAN MATEO (3712253/448D)
County Summary: ALAMEDA, SAN MATEO
SNA Summary:

Location: HAYWARD-SAN MATEO BRIDGE, SOUTH SAN FRANCISCO BAY.

Lat/Long: 37ø35'43" / 122ø13'40" — Township: 04S
UTM: Zone-10 N4160972 E568168 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 560.5 ac — Elevation: 30 ft

Comments

Distribution: NESTS FOUND ON UTILITY TOWERS NEXT TO THE BRIDGE.
Ecological:
Threat:
General: DATA REPORTED IN FEBRUARY 1989 REPORT BY POINT REYES BIRD OBSERVATORY.
Owner/Manager: CALTRANS

Source Codes

CAR89R01

ARDEA HERODIAS (ROOKERY)
GREAT BLUE HERON — Element Code: ABNGA04010

Status — NDDB Element Ranks — Other Lists

Federal: None — Global: G5 — CDFG Status:
State: None — State: S4

Habitat Associations

General: COLONIAL NESTER IN TALL TREES, CLIFFSIDES, AND SEQUESTERED SPOTS ON MARSHES.
Micro: ROOKERY SITES IN CLOSE PROXIMITY TO FORAGING AREAS: MARSHES, LAKE MARGINS, TIDE-FLATS, RIVERS AND STREAMS, WET MEADOWS.

Occurrence No. 37 — Map Index: 17153 — Dates Last Seen
Occ Rank: Good — Element: 1990-06-13
Origin: Natural/Native occurrence — Site: 1990-06-13
Presence: Presumed Extant
Trend: Stable
Main Source: DI DONATO, J. 1990 (OBS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:

Location: LAKE CHABOT, IN THE SAN LEANDRO HILLS.

Lat/Long: 37ø43'57" / 122ø06'46" — Township: 02S
UTM: Zone-10 N4176291 E578180 — Range: 02W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 10.9 ac — Elevation: 300 ft

Comments

Distribution: 35 ACTIVE NESTS, WITH 1-3 YOUNG PER NEST, LOCATED IN A EUCALYPTUS GROVE SITUATED ON A PENINSULA ON THE NW SIDE OF THE LAKE.
Ecological:
Threat: POSSIBLE THREATS INCLUDE DISTURBANCE FROM VISITOR USE IN THE AREA.
General: ROOKERY SITE OBSERVED ON 12 FEB 1990; HELICOPTER SURVEY MADE ON 13 JUNE 1990.
Owner/Manager: EBRPD

Source Codes

DID90F09, DID90F08

ELANUS LEUCURUS (NESTING)
WHITE-TAILED KITE — Element Code: ABNKC06010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5 — CDFG Status:
State: None — State: S3

Habitat Associations
General: LOW ROLLING FOOTHILLS/VALLEY MARGINS WITH SCATTERED OAKS AND RIVER BOTTOMLANDS OR MARSHES ADJACENT TO DECIDUOUS WOODLAND
Micro: OPEN GRASSLANDS, MEADOWS, OR MARSHES FOR FORAGING CLOSE TO ISOLATED, DENSE-TOPPED TREES FOR NESTING AND PERCHING.

Occurrence No. 2 — Map Index: 24571 — Dates Last Seen
Occ Rank: Unknown — Element: 1971-06-18
Origin: Natural/Native occurrence — Site: 1971-06-18
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1971 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:
Location: 1 MILE EAST OF THE COYOTE HILLS, NW OF NEWARK.
Lat/Long: 37ø32'53" / 122ø03'48" — Township: 04S
UTM: Zone-10 N4155871 E582729 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 2/5 mile — Elevation: 10 ft
Comments
Distribution:
Ecological: NEST LOCATED IN A WILLOW OR SYCAMORE TREE.
Threat:
General:
Owner/Manager: UNKNOWN

Source Codes
GIL71R01

ELANUS LEUCURUS (NESTING) (cont.)
WHITE-TAILED KITE — Element Code: ABNKC06010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5 — CDFG Status:
State: None — State: S3

Habitat Associations
General: LOW ROLLING FOOTHILLS/VALLEY MARGINS WITH SCATTERED OAKS AND RIVER BOTTOMLANDS OR MARSHES ADJACENT TO DECIDUOUS WOODLAND
Micro: OPEN GRASSLANDS, MEADOWS, OR MARSHES FOR FORAGING CLOSE TO ISOLATED, DENSE-TOPPED TREES FOR NESTING AND PERCHING.

Occurrence No. 3 — Map Index: 24572 — Dates Last Seen
Occ Rank: Unknown — Element: 1971-06-18
Origin: Natural/Native occurrence — Site: 1971-06-18
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1971 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:
Location: 0.6 MILE WEST OF THE NORTH END OF COYOTE HILLS, WITHIN COYOTE HILLS REGIONAL PARK.
Lat/Long: 37ø33'24" / 122ø04'39" — Township: 04S
UTM: Zone-10 N4156834 E581489 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 2/5 mile — Elevation: 5 ft
Comments
Distribution:
Ecological: NEST LOCATED IN A WILLOW OR A SYCAMORE TREE.
Threat:
General: NEST OBSERVED ON 18 JUN 1971.
Owner/Manager: UNKNOWN

Source Codes
GIL71R01

ELANUS LEUCURUS (NESTING) (cont.)
WHITE-TAILED KITE Element Code: ABNKC06010

Status NDDB Element Ranks Other Lists
Federal: None Global: G5 CDFG Status:
State: None State: S3

Habitat Associations
General: LOW ROLLING FOOTHILLS/VALLEY MARGINS WITH SCATTERED OAKS AND RIVER BOTTOMLANDS OR MARSHES ADJACENT TO DECIDUOUS WOODLAND
Micro: OPEN GRASSLANDS, MEADOWS, OR MARSHES FOR FORAGING CLOSE TO ISOLATED, DENSE-TOPPED TREES FOR NESTING AND PERCHING.

Occurrence No. 4 Map Index: 24573 Dates Last Seen
Occ Rank: Unknown Element: 1986-06-XX
Origin: Natural/Native occurrence Site: 1986-06-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1971 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:
Location: 0.4 MILE WEST OF MARSH ROAD, 1.5 MILES SOUTH OF UNION CITY, SOUTH SAN FRANCISCO BAY.
Lat/Long: 37ø34'13" / 122ø05'12" Township: 04S
UTM: Zone-10 N4158323 E580666 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 2/5 mile Elevation: 5 ft
Comments
Distribution:
Ecological: 1971 NEST LOCATED IN A WILLOW OR SYCAMORE TREE.
Threat:
General: NESTING OBSERVED IN 1971 AND 1986.
Owner/Manager: UNKNOWN

Source Codes
WES86R01, GIL71R01

ELANUS LEUCURUS (NESTING) (cont.)
WHITE-TAILED KITE Element Code: ABNKC06010

Status NDDB Element Ranks Other Lists
Federal: None Global: G5 CDFG Status:
State: None State: S3

Habitat Associations
General: LOW ROLLING FOOTHILLS/VALLEY MARGINS WITH SCATTERED OAKS AND RIVER BOTTOMLANDS OR MARSHES ADJACENT TO DECIDUOUS WOODLAND
Micro: OPEN GRASSLANDS, MEADOWS, OR MARSHES FOR FORAGING CLOSE TO ISOLATED, DENSE-TOPPED TREES FOR NESTING AND PERCHING.

Occurrence No. 5 Map Index: 24576 Dates Last Seen
Occ Rank: Unknown Element: 1971-XX-XX
Origin: Natural/Native occurrence Site: 1971-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1971 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary:
Location: BAIR ISLAND, JUST NORTH OF THE JUNCTION OF CORKSCREW SLOUGH AND REDWOOD CREEK, NORTH OF THE PORT OF REDWOOD CITY.
Lat/Long: 37ø31'30" / 122ø12'16" Township: 05S
UTM: Zone-10 N4153217 E570288 Range: 03W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1/5 mile Elevation: 5 ft
Comments
Distribution: 1 OF 3 NESTS LOCATED ON THE NE PART OF BAIR ISLAND IN 1971.
Ecological: NEST WAS LOCATED IN A COYOTE BUSH, 4-8 FEET IN HEIGHT; SURROUNDING HABITAT CONSISTED OF SALT MARSH.
Threat:
General: ALL 3 NESTING PAIRS ON BAIR ISLAND IN 1971 PRODUCED EGGS, AND AT LEAST 2 OF THE PAIRS FLEDGED YOUNG. FLEDGED YOUNG.
Owner/Manager: DFG-BAIR ISLAND ER, PVT

Source Codes
GIL71R01

ELANUS LEUCURUS (NESTING) (cont.)
WHITE-TAILED KITE — Element Code: ABNKC06010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5 — CDFG Status:
State: None — State: S3

Habitat Associations
General: LOW ROLLING FOOTHILLS/VALLEY MARGINS WITH SCATTERED OAKS AND RIVER BOTTOMLANDS OR MARSHES ADJACENT TO DECIDUOUS WOODLAND
Micro: OPEN GRASSLANDS, MEADOWS, OR MARSHES FOR FORAGING CLOSE TO ISOLATED, DENSE-TOPPED TREES FOR NESTING AND PERCHING.

Occurrence No. 6 — Map Index: 24575 — Dates Last Seen
Occ Rank: Unknown — Element: 1971-XX-XX
Origin: Natural/Native occurrence — Site: 1971-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1971 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary:
Location: BAIR ISLAND, 0.5 MILE NORTH OF THE JUNCTION OF CORKSCREW SLOUGH AND REDWOOD CREEK, NORTH OF THE PORT OF REDWOOD CITY.
Lat/Long: 37ø31'48" / 122ø12'19" — Township: 05S
UTM: Zone-10 N4153775 E570213 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 5 ft

Comments
Distribution: 1 OF 3 NESTS LOCATED ON THE NE PART OF BAIR ISLAND IN 1971.
Ecological: NEST WAS LOCATED IN A COYOTE BUSH, 4-8 FEET IN HEIGHT; SURROUNDING HABITAT CONSISTED OF SALT MARSH.
Threat:
General: ALL 3 NESTING PAIRS ON BAIR ISLAND IN 1971 PRODUCED EGGS, AND AT LEAST 2 OF THE PAIRS FLEDGED YOUNG.
Owner/Manager: DFG-BAIR ISLAND ER

Source Codes
GIL71R01

ELANUS LEUCURUS (NESTING) (cont.)
WHITE-TAILED KITE — Element Code: ABNKC06010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5 — CDFG Status:
State: None — State: S3

Habitat Associations
General: LOW ROLLING FOOTHILLS/VALLEY MARGINS WITH SCATTERED OAKS AND RIVER BOTTOMLANDS OR MARSHES ADJACENT TO DECIDUOUS WOODLAND
Micro: OPEN GRASSLANDS, MEADOWS, OR MARSHES FOR FORAGING CLOSE TO ISOLATED, DENSE-TOPPED TREES FOR NESTING AND PERCHING.

Occurrence No. 7 — Map Index: 24574 — Dates Last Seen
Occ Rank: Unknown — Element: 1971-XX-XX
Origin: Natural/Native occurrence — Site: 1971-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1971 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary:
Location: BAIR ISLAND, 0.5 MILE NW OF REDWOOD POINT, NORTH OF THE PORT OF REDWOOD CITY.
Lat/Long: 37ø32'17" / 122ø12'03" — Township: 04S
UTM: Zone-10 N4154654 E570601 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 5 ft

Comments
Distribution: 1 OF 3 NESTS LOCATED ON THE NE PART OF BAIR ISLAND IN 1971.
Ecological: NEST WAS LOCATED IN A COYOTE BUSH, 4-8 FEET IN HEIGHT; SURROUNDING HABITAT CONSISTED OF SALT MARSH.
Threat:
General: ALL 3 NESTING PAIRS ON BAIR ISLAND IN 1971 PRODUCED EGGS, AND AT LEAST 2 OF THE PAIRS FLEDGED YOUNG.
Owner/Manager: DFG-BAIR ISLAND ER, PVT

Source Codes
GIL71R01

CIRCUS CYANEUS (NESTING)
NORTHERN HARRIER — Element Code: ABNKC11010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5 — CDFG Status: SC
State: None — State: S3

Habitat Associations
General: COASTAL SALT MARSH AND FRESH-WATER MARSH. NEST AND FORAGE IN GRASSLANDS, FROM SALT GRASS IN DESERT SINK TO MTN CIENAGAS.
Micro: NESTS ON GROUND IN SHRUBBY VEGETATION, USUALLY AT MARSH EDGE; NEST BUILT OF A LARGE MOUND OF STICKS IN WET AREAS.

Occurrence No. 1 — Map Index: 09494 — Dates Last Seen
Occ Rank: Unknown — Element: 1973-04-16
Origin: Natural/Native occurrence — Site: 1973-04-16
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1973 (PERS)
Quad Summary: REDWOOD POINT (3712252/447C)*, NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh
Location: W OF ALVARADO (UNION CITY), ALONG SAN FRANCISCO BAY MARGINS.
Lat/Long: 37ø35'37" / 122ø07'49" — Township: 04S
UTM: Zone-10 N4160866 E576774 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 10 ft

Comments
Distribution:
Ecological: HABITAT IS SALT MARSH. 6 EGGS OBSERVED IN EXPOSED NEST ON SALICORNIA, 04/16/73.
Threat:
General:
Owner/Manager: UNKNOWN

Source Codes
GIL73F01

CIRCUS CYANEUS (NESTING) (cont.)
NORTHERN HARRIER — Element Code: ABNKC11010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5 — CDFG Status: SC
State: None — State: S3

Habitat Associations
General: COASTAL SALT MARSH AND FRESH-WATER MARSH. NEST AND FORAGE IN GRASSLANDS, FROM SALT GRASS IN DESERT SINK TO MTN CIENAGAS.
Micro: NESTS ON GROUND IN SHRUBBY VEGETATION, USUALLY AT MARSH EDGE; NEST BUILT OF A LARGE MOUND OF STICKS IN WET AREAS.

Occurrence No. 2 — Map Index: 09604 — Dates Last Seen
Occ Rank: Unknown — Element: 1971-05-07
Origin: Natural/Native occurrence — Site: 1971-05-07
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1971 (PERS)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:
Location: APPROX 0.4 MI E OF MOUTH OF PLUMMER CREEK, E SIDE OF SAN FRANCISCO BAY.
Lat/Long: 37ø30'12" / 122ø04'31" — Township: 05S
UTM: Zone-10 N4150908 E581735 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 10 ft

Comments
Distribution: 2 NESTS LOCATED; ONE WAS 0.3 MI E AND THE SECOND WAS 0.5 MI E OF PLUMMER CREEK MOUTH.
Ecological: SALT MARSH HABITAT, CONSISTING OF SPARTINA & SALICORNIA.
Threat:
General: BOTH NESTS CONTAINED 6 EGGS EACH AND THE FEMALES WERE INCUBATING AT THE TIME OF OBSERVATION.
Owner/Manager: UNKNOWN

Source Codes
GIL71F03, GIL71F02

CIRCUS CYANEUS (NESTING) (cont.)
NORTHERN HARRIER — Element Code: ABNKC11010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5 — CDFG Status: SC
State: None — State: S3

Habitat Associations
General: COASTAL SALT MARSH AND FRESH-WATER MARSH. NEST AND FORAGE IN GRASSLANDS, FROM SALT GRASS IN DESERT SINK TO MTN CIENAGAS.
Micro: NESTS ON GROUND IN SHRUBBY VEGETATION, USUALLY AT MARSH EDGE; NEST BUILT OF A LARGE MOUND OF STICKS IN WET AREAS.

Occurrence No. 5 — Map Index: 09599 — Dates Last Seen
Occ Rank: Unknown — Element: 1971-06-29
Origin: Natural/Native occurrence — Site: 1971-06-29
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1971 (PERS)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Coyote Hills North Marsh
Location: COYOTE HILLS REGIONAL PARK, APPROX 3 MI W OF FREMONT.
Lat/Long: / — Township:
UTM: — Range:
Mapping Precision: — Section: Qtr
Symbol Type: — Meridian:
Radius: — Elevation:

Comments
Distribution: FOUR FLEDGLINGS AND ADULT OBSERVED AT NEST IN FIELD 06/29/71.
Ecological: FRESHWATER MARSH & GRASSLAND HABITAT. VEGETATION INCLUDES WILLOW.
Threat:
General:
Owner/Manager: EBRPD-COYOTE HILLS RP

Source Codes
GIL71F04

CIRCUS CYANEUS (NESTING) (cont.)
NORTHERN HARRIER — Element Code: ABNKC11010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5 — CDFG Status: SC
State: None — State: S3

Habitat Associations
General: COASTAL SALT MARSH AND FRESH-WATER MARSH. NEST AND FORAGE IN GRASSLANDS, FROM SALT GRASS IN DESERT SINK TO MTN CIENAGAS.
Micro: NESTS ON GROUND IN SHRUBBY VEGETATION, USUALLY AT MARSH EDGE; NEST BUILT OF A LARGE MOUND OF STICKS IN WET AREAS.

Occurrence No. 6 — Map Index: 09305 — Dates Last Seen
Occ Rank: Unknown — Element: 1971-06-18
Origin: Natural/Native occurrence — Site: 1971-06-18
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1971 (PERS)
Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary: Bair and Greco Islands
Location: BAIR ISLAND, SOUTH SAN FRANCISCO BAY.
Lat/Long: 37ø31'41" / 122ø13'02" — Township: 05S
UTM: Zone-10 N4153543 E569166 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 10 ft

Comments
Distribution: 5 YOUNG OBSERVED IN NEST ON LOOSE SALICORNIA MATERIAL 06/18/71.
Ecological: SALT MARSH HABITAT. VEGETATION INCLUDES COYOTE BUSH AND SALICORNIA.
Threat:
General:
Owner/Manager: DFG-BAIR ISLAND ER, USFWS

Source Codes
GIL71F01

California Department of Fish and Game
Natural Diversity Data Base
Full Expanded Report Ä One Record Per Page

ACCIPITER STRIATUS (NESTING)
SHARP-SHINNED HAWK — Element Code: ABNKC12020

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G4 — CDFG Status: SC
State: None — State: S3

Habitat Associations
General: BREEDS IN PONDEROSA PINE, BLACK OAK, RIPARIAN DECIDUOUS, MIXED CONIFER & JEFFREY PINE HABITATS. PREFERS RIPARIAN AREAS.
Micro: NORTH-FACING SLOPES, WITH PLUCKING PERCHES ARE CRITICAL REQUIREMENTS. NESTS USUALLY WITHIN 275 FT OF WATER.

Occurrence No. 1 — Map Index: 30175 — Dates Last Seen
Occ Rank: Excellent — Element: 1994-07-14
Origin: Natural/Native occurrence — Site: 1994-07-14
Presence: Presumed Extant
Trend: Unknown
Main Source: DI DONATO, J. 1994 (OBS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:
Location: SW END OF WALPER RIDGE, 2.5 MILES SE OF CSU HAYWARD.
Lat/Long: 37ø38'34" / 122ø00'36" — Township: 03S
UTM: Zone-10 N4166439 E587348 — Range: 01W
Mapping Precision: SPECIFIC — Section: 30 Qtr SE
Symbol Type: POINT — Meridian: M
Radius: 80 meters — Elevation: 1180 ft

Comments
Distribution:
Ecological: HABITAT CONSISTS OF A YOUNG STAND OF LIVE OAK WOODLAND, MIXED WITH BAY LAUREL; EDGE HABITAT CONSISTS OF COYOTE BUSH, POISON OAK, AND GRASSLAND. SITE BORDERS A DEEP CANYON WITH DENSE OAK/BAY WOODLAND AND MIXED CHAPARRAL.
Threat:
General: 2 ADULTS WITH AT LEAST 3 JUVENILES OBSERVED AT THE NEST ON 14 JULY 1994.
Owner/Manager: EBRPD

Source Codes
DID94F02

California Department of Fish and Game
Natural Diversity Data Base
Full Expanded Report Ä One Record Per Page

AQUILA CHRYSAETOS (NESTING AND WINTERING)
GOLDEN EAGLE — Element Code: ABNKC22010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G4 — CDFG Status: SC
State: None — State: S3

Habitat Associations
General: ROLLING FOOTHILL OR COAST-RANGE TERRAIN, WHERE OPEN GRASSLAND TURNS TO SCATTERED OAKS, SYCAMORES, OR LARGE DIGGER PINES.
Micro: CLIFF-WALLED CANYONS PROVIDE NESTING HABITAT IN MOST PARTS OF RANGE; ALSO, LARGE TREES IN OPEN AREAS.

Occurrence No. 55 — Map Index: 30176 — Dates Last Seen
Occ Rank: Excellent — Element: 1994-06-06
Origin: Natural/Native occurrence — Site: 1994-06-06
Presence: Presumed Extant
Trend: Unknown
Main Source: DI DONATO, J. 1994 (OBS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:
Location: SW END OF WALPERT RIDGE, 2.5 MILES SE OF CSU HAYWARD.
Lat/Long: 37ø38'29" / 122ø00'42" — Township: 03S
UTM: Zone-10 N4166280 E587203 — Range: 01W
Mapping Precision: SPECIFIC — Section: 30 Qtr SE
Symbol Type: POINT — Meridian: M
Radius: 80 meters — Elevation: 950 ft

Comments
Distribution:
Ecological: NEST SITE IS LOCATED ALONG A STEEP, NORTH-FACING SLOPE IN OAK/BAY WOODLAND HABITAT; SURROUNDING HABITAT CONSISTS OF GRASSLAND ON THE RIDGE TOP AND CHAPARRAL IN THE CANYON.
Threat:
General: 2 ADULTS AND 2 JUVENILES OBSERVED AT THE NEST SITE ON 6 JUNE 1994. SOME TIME AFTER THIS, A FIRE IN THE AREA WAS CAUSED BY A GOLDEN EAGLE ELECTROCUTION; THE DEAD BIRD COLLECTED MAY HAVE BEEN ONE OF THE FOUR BIRDS OBSERVED.
Owner/Manager: EBRPD

Source Codes
DID94F01

LATERALLUS JAMAICENSIS COTURNICULUS
CALIFORNIA BLACK RAIL — Element Code: ABNME03041

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G4T1 — CDFG Status:
State: Threatened — State: S1

Habitat Associations
General: MAINLY INHABITS SALT-MARSHES BORDERING LARGER BAYS.
Micro: OCCURS IN TIDAL SALT MARSH HEAVILY GROWN TO PICKLEWEED; ALSO IN FRESH-WATER AND BRACKISH MARSHES, ALL AT LOW ELEVATION.

Occurrence No. 12 — Map Index: 09280 — Dates Last Seen
Occ Rank: Unknown — Element: 1972-08-XX
Origin: Natural/Native occurrence — Site: 1977-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: MANOLIS, T. 1977 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)*, SAN MATEO (3712253/448D)
County Summary: SAN MATEO
SNA Summary: Belmont Slough

Location: BELMONT SLOUGH.

Lat/Long: 37ø32'31" / 122ø14'59" — Township: 04S
UTM: Zone-10 N4155039 E566282 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 514.5 ac — Elevation: 15 ft

Comments

Distribution:
Ecological:
Threat:
General: ONE RAIL OBSERVED IN 1972. RAILS WERE NOT FOUND IN THE SOUTH BAY IN 1977 SURVEY. LACK OF SUITABLE HABITAT (HIGH MARSH) PROBABLY PREVENTS NESTING IN THIS REGION.
Owner/Manager: UNKNOWN

Source Codes

MAN77R01

LATERALLUS JAMAICENSIS COTURNICULUS (cont.)
CALIFORNIA BLACK RAIL — Element Code: ABNME03041

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G4T1 — CDFG Status:
State: Threatened — State: S1

Habitat Associations
General: MAINLY INHABITS SALT-MARSHES BORDERING LARGER BAYS.
Micro: OCCURS IN TIDAL SALT MARSH HEAVILY GROWN TO PICKLEWEED; ALSO IN FRESH-WATER AND BRACKISH MARSHES, ALL AT LOW ELEVATION.

Occurrence No. 51 — Map Index: 09530 — Dates Last Seen
Occ Rank: Unknown — Element: 1972-11-XX
Origin: Natural/Native occurrence — Site: 1972-11-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: WILBUR, S. 1974 (LIT)
Quad Summary: NEWARK (3712251/447D)*, MOUNTAIN VIEW (3712241/428A)
County Summary: ALAMEDA
SNA Summary: Dumbarton Point

Location: DUMBARTON POINT.

Lat/Long: 37ø30'04" / 122ø06'09" — Township: 05S
UTM: Zone-10 N4150649 E579329 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: 17 Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation:

Comments

Distribution:
Ecological:
Threat:
General: ONE OBSERVED.
Owner/Manager: UNKNOWN

Source Codes

WIL74R01

LATERALLUS JAMAICENSIS COTURNICULUS (cont.)
CALIFORNIA BLACK RAIL — Element Code: ABNME03041

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G4T1 — CDFG Status:
State: Threatened — State: S1

Habitat Associations
General: MAINLY INHABITS SALT-MARSHES BORDERING LARGER BAYS.
Micro: OCCURS IN TIDAL SALT MARSH HEAVILY GROWN TO PICKLEWEED; ALSO IN FRESH-WATER AND BRACKISH MARSHES, ALL AT LOW ELEVATION.

Occurrence No. 100 — Map Index: 09348 — Dates Last Seen
Occ Rank: Excellent — Element: 1995-11-21
Origin: Natural/Native occurrence — Site: 1995-11-21
Presence: Presumed Extant
Trend: Unknown
Main Source: BOBZIEN, S. 1995 (OBS)
Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary: Oakland Airport Shoreline
Location: ARROWHEAD (MELROSE) MARSH, JUST NORTH OF OAKLAND AIRPORT, SAN LEANDRO BAY.
Lat/Long: 37ø44'40" / 122ø12'45" — Township: 02S
UTM: Zone-10 N4177538 E569390 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 45.9 ac — Elevation: 1 ft

Comments
Distribution: RAIL FLEW FROM ARROWHEAD MARSH TO A WETLAND ADJACENT TO DOOLITTLE DRIVE.
Ecological: HABITAT CONSISTS OF SALTMARSH, DOMINATED BY PICKLEWEED AND CORDGRASS. THIS ENTIRE MARSH IS SUBMERGED DURING HIGH-HIGH TIDES, WITH ONLY A FEW ISOLATED AREAS OF CORDGRASS ABOVE WATER.
Threat: THREATENED BY PREDATION FROM INTRODUCED RED FOXES, AS WELL AS NATIVE HERONS, EGRETS, AND RAPTORS.
General: 1 RAIL OBSERVED ON 21 NOVEMBER 1995.
Owner/Manager: EBRPD

Source Codes
BOB95F03

LATERALLUS JAMAICENSIS COTURNICULUS (cont.)
CALIFORNIA BLACK RAIL — Element Code: ABNME03041

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G4T1 — CDFG Status:
State: Threatened — State: S1

Habitat Associations
General: MAINLY INHABITS SALT-MARSHES BORDERING LARGER BAYS.
Micro: OCCURS IN TIDAL SALT MARSH HEAVILY GROWN TO PICKLEWEED; ALSO IN FRESH-WATER AND BRACKISH MARSHES, ALL AT LOW ELEVATION.

Occurrence No. 110 — Map Index: 34893 — Dates Last Seen
Occ Rank: Good — Element: 1992-06-25
Origin: Natural/Native occurrence — Site: 1992-06-25
Presence: Presumed Extant
Trend: Unknown
Main Source: DI DONATO, J. 1992 (OBS)
Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary:
Location: WEST OF RUSSELL CITY; EAST OF HAYWARD LANDING; BORDERED BY HAYWARD CITY LIMITS AND LEVEES.
Lat/Long: 37ø38'37" / 122ø09'09" — Township: 03S
UTM: Zone-10 N4166415 E574781 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 7.0 ac — Elevation: 3 ft

Comments
Distribution:
Ecological: HABITAT CONSISTS OF MUTED TIDAL WETLAND WITH DOMINANT PLANTS PICKLEWEED AND CORDGRASS.
Threat: POSSIBLE THREAT: REGIONAL PARK USAGE, RED FOX POPULATION.
General: 1 ADULT RESPONDED TO A BROADCAST TAPED CALL OF SAME SPECIES; THIS IS FIRST SIGHTING OF BLACK RAIL IN MANY YEARS.
Owner/Manager: EBRPD

Source Codes
DID92F03

LATERALLUS JAMAICENSIS COTURNICULUS (cont.)

CALIFORNIA BLACK RAIL — Element Code: ABNME03041

Status — NDDB Element Ranks — Other Lists

Federal: None — Global: G4T1 — CDFG Status:
State: Threatened — State: S1

Habitat Associations

General: MAINLY INHABITS SALT-MARSHES BORDERING LARGER BAYS.
Micro: OCCURS IN TIDAL SALT MARSH HEAVILY GROWN TO PICKLEWEED; ALSO IN FRESH-WATER AND BRACKISH MARSHES, ALL AT LOW ELEVATION.

Occurrence No. 111 — Map Index: 34894 — Dates Last Seen

Occ Rank: Unknown — Element: 1993-03-30
Origin: Natural/Native occurrence — Site: 1993-03-30
Presence: Presumed Extant
Trend: Unknown
Main Source: RIENSCHE, D.1993 (OBS)

Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:

Location: NORTH EDGE OF COYOTE HILLS REGIONAL PARK; 1.1 KM WSW OF MARSH ROAD/NEWARD BLVD X LOWRY ROAD.

Lat/Long: 37ø33'39" / 122ø04'41" — Township: 04S
UTM: Zone-10 N4157295 E581420 — Range: 02W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 7.0 ac — Elevation: 5 ft

Comments

Distribution: WILLOW RUN AREA EAST OF THE CHOCHENYO TRAIL. LAND USE IS INTERPRETIVE PARKLAND.
Ecological: FRESH WATER, SEASONAL WETLAND-NATURAL (EBRPD COMMUNITY CODE #7.7 WITH SOME 3.3).
Threat: POSSIBLE THREAT: CHANNEL DREDGING IN CLOSE PROXIMITY.
General: 1 RAIL OBSERVED FOR APPROX. 2 MINUTES.
Owner/Manager: ALAMEDA FLOOD CONTROL DIST

Source Codes

RIE93F01

RALLUS LONGIROSTRIS OBSOLETUS

CALIFORNIA CLAPPER RAIL — Element Code: ABNME05016

Status — NDDB Element Ranks — Other Lists

Federal: Endangered — Global: G5T1 — CDFG Status:
State: Endangered — State: S1

Habitat Associations

General: SALT-WATER & BRACKISH MARSHES TRAVERSED BY TIDAL SLOUGHS IN THE VICINITY OF SAN FRANCISCO BAY.
Micro: ASSOCIATED WITH ABUNDANT GROWTHS OF PICKLEWEED, BUT FEEDS AWAY FROM COVER ON INVERTEBRATES FROM MUD-BOTTOMED SLOUGHS.

Occurrence No. 9 — Map Index: 09494 — Dates Last Seen

Occ Rank: Unknown — Element: 1975-XX-XX
Origin: Natural/Native occurrence — Site: 1975-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1979 (LIT)

Quad Summary: REDWOOD POINT (3712252/447C)*, NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh

Location: MARSHES AT THE MOUTH OF ALAMEDA CREEK.

Lat/Long: 37ø35'37" / 122ø07'49" — Township: 04S
UTM: Zone-10 N4160866 E576774 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 10 ft

Comments

Distribution:
Ecological:
Threat:
General:
Owner/Manager: UNKNOWN

Source Codes

GIL79A01

RALLUS LONGIROSTRIS OBSOLETUS (cont.)
CALIFORNIA CLAPPER RAIL — Element Code: ABNME05016

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G5T1	CDFG Status:
State: Endangered	State: S1	

Habitat Associations

General: SALT-WATER & BRACKISH MARSHES TRAVERSED BY TIDAL SLOUGHS IN THE VICINITY OF SAN FRANCISCO BAY.

Micro: ASSOCIATED WITH ABUNDANT GROWTHS OF PICKLEWEED, BUT FEEDS AWAY FROM COVER ON INVERTEBRATES FROM MUD-BOTTOMED SLOUGHS.

Occurrence No. 34 — Map Index: 09348 — Dates Last Seen
Occ Rank: Excellent — Element: 1995-12-20
Origin: Natural/Native occurrence — Site: 1995-12-20
Presence: Presumed Extant
Trend: Stable
Main Source: GILL, R. 1979 (LIT)

Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary: Oakland Airport Shoreline

Location: ARROWHEAD MARSH, AT MARTIN LUTHER KING SHORELINE, IN SAN LEANDRO BAY.

Lat/Long: 37ø44'40" / 122ø12'45" — Township: 02S
UTM: Zone-10 N4177538 E569390 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 45.9 ac — Elevation: 1 ft

Comments

Distribution: DURING THE DECEMBER 1995 SURVEY, THE MARSH WAS ALMOST ENTIRELY SUBMERGED BY A 7.0 FT HIGH TIDE.

Ecological: HABITAT CONSISTS OF SALT WATER EMERGENT WETLANDS, DOMINATED BY PICKLEWEED AND TWO SPECIES OF CORDGRASS (ONE NATIVE, ONE NON-NATIVE). TWO SALT MARSH YELLOWTHROATS WERE ALSO OBSERVED AT THIS SITE.

Threat: THREATENED BY PREDATION FROM NON-NATIVE RED FOXES.

General: CLAPPER RAILS KNOWN FROM THIS SITE SINCE THE EARLY 1970'S. 13 ADULTS OBSERVED ON 20 DECEMBER 1995.

Owner/Manager: EBRPD

Source Codes

GIL79A01, BOB95F05

RALLUS LONGIROSTRIS OBSOLETUS (cont.)
CALIFORNIA CLAPPER RAIL — Element Code: ABNME05016

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G5T1	CDFG Status:
State: Endangered	State: S1	

Habitat Associations

General: SALT-WATER & BRACKISH MARSHES TRAVERSED BY TIDAL SLOUGHS IN THE VICINITY OF SAN FRANCISCO BAY.

Micro: ASSOCIATED WITH ABUNDANT GROWTHS OF PICKLEWEED, BUT FEEDS AWAY FROM COVER ON INVERTEBRATES FROM MUD-BOTTOMED SLOUGHS.

Occurrence No. 36 — Map Index: 09562 — Dates Last Seen
Occ Rank: Unknown — Element: 1979-04-08
Origin: Natural/Native occurrence — Site: 1979-04-08
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1979 (LIT)

Quad Summary: NEWARK (3712251/447D)*, MOUNTAIN VIEW (3712241/428A)
County Summary: ALAMEDA
SNA Summary: Dumbarton Point

Location: DUMBARTON POINT/NEWARK SLOUGH MARSHES ON THE SOUTH SIDE OF HWY 84, WEST OF NEWARK.

Lat/Long: 37ø30'59" / 122ø04'51" — Township: 05S
UTM: Zone-10 N4152352 E581223 — Range: 02W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 888.1 ac — Elevation: 3 ft

Comments

Distribution: BIRDS NOTED AS OCCURING IN MARSHES FRINGING NEWARK SLOUGH TO THE DUMBARTON BRIDGE.

Ecological: HABITAT CONSISTS OF PICKLEWEED, CORDGRASS, & GUMPLANT.

Threat:

General: UNKNOWN NUMBER OBSERVED IN FEBRUARY 1971 TO DECEMBER 1975 SURVEY. DURING JANUARY - APRIL 1979 SURVEY, 28 BIRDS WERE OBSERVED IN NEWARK SLOUGH AREA & 40 BIRDS OBSERVED IN PART OF DUMBARTON POINT AREA.

Owner/Manager: USFWS-SAN FRANCISCO BAY NWR

Source Codes

GIL79A01, HAR80R02

RALLUS LONGIROSTRIS OBSOLETUS (cont.)
CALIFORNIA CLAPPER RAIL — Element Code: ABNME05016

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G5T1 — CDFG Status:
State: Endangered — State: S1

Habitat Associations
General: SALT-WATER & BRACKISH MARSHES TRAVERSED BY TIDAL SLOUGHS IN THE VICINITY OF SAN FRANCISCO BAY.
Micro: ASSOCIATED WITH ABUNDANT GROWTHS OF PICKLEWEED, BUT FEEDS AWAY FROM COVER ON INVERTEBRATES FROM MUD-BOTTOMED SLOUGHS.

Occurrence No. 38 — Map Index: 09571 — Dates Last Seen
Occ Rank: Unknown — Element: 1993-12-11
Origin: Natural/Native occurrence — Site: 1993-12-11
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1979 (LIT)
Quad Summary: NEWARK (3712251/447D)*, MOUNTAIN VIEW (3712241/428A)
County Summary: ALAMEDA
SNA Summary: Dumbarton Point
Location: SALT MARSH ALONG PLUMMER SLOUGH.
Lat/Long: 37ø30'06" / 122ø04'16" — Township: 05S
UTM: Zone-10 N4150753 E582104 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: 15 Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 263.6 ac — Elevation: 1 ft

Comments
Distribution: THIS AREA ALSO REFERRED TO AS MOWRY MARSH NORTH.
Ecological:
Threat:
General: UNKNOWN NUMBER OBSERVED IN FEBRUARY 1971 TO DECEMBER 1975 SURVEY. 56 RAILS OBSERVED 11 DEC 1993 IN AIRBOAT SURVEY DURING 7.1 TIDE.
Owner/Manager: UNKNOWN

Source Codes
GIL79A01, SFB94U01

RALLUS LONGIROSTRIS OBSOLETUS (cont.)
CALIFORNIA CLAPPER RAIL — Element Code: ABNME05016

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G5T1 — CDFG Status:
State: Endangered — State: S1

Habitat Associations
General: SALT-WATER & BRACKISH MARSHES TRAVERSED BY TIDAL SLOUGHS IN THE VICINITY OF SAN FRANCISCO BAY.
Micro: ASSOCIATED WITH ABUNDANT GROWTHS OF PICKLEWEED, BUT FEEDS AWAY FROM COVER ON INVERTEBRATES FROM MUD-BOTTOMED SLOUGHS.

Occurrence No. 39 — Map Index: 15937 — Dates Last Seen
Occ Rank: Unknown — Element: 1975-XX-XX
Origin: Natural/Native occurrence — Site: 1975-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1979 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Dumbarton Point
Location: DUMBARTON POINT (MARSH), 2 MILES NORTH OF THE EASTERN END OF DUMBARTON BRIDGE.
Lat/Long: 37ø32'18" / 122ø06'47" — Township: 04S
UTM: Zone-10 N4154752 E578350 — Range: 02W
Mapping Precision: SPECIFIC — Section: 31 Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 172.5 ac — Elevation: 2 ft

Comments
Distribution:
Ecological: HABITAT CONSISTS OF NORTHERN COASTAL SALTMARSH, VEGETATED BY MIXED SPARTINA-SALICORNIA COVER IN A BAYSIDE, FULLY-TIDAL MARSH OF APPROXIMATELY 200 ACRES.
Threat:
General: OCCURRING IN ALL FRINGING MARSH FROM APPROXIMATELY 1 KM NORTH OF DUMBARTON BRIDGE TO THE MOUTH OF MT EDEN CREEK.
Owner/Manager: PVT-IDEAL CEMENT COMPANY

Source Codes
GIL79A01

RALLUS LONGIROSTRIS OBSOLETUS (cont.)
CALIFORNIA CLAPPER RAIL — Element Code: ABNME05016

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G5T1 — CDFG Status:
State: Endangered — State: S1

Habitat Associations
General: SALT-WATER & BRACKISH MARSHES TRAVERSED BY TIDAL SLOUGHS IN THE VICINITY OF SAN FRANCISCO BAY.
Micro: ASSOCIATED WITH ABUNDANT GROWTHS OF PICKLEWEED, BUT FEEDS AWAY FROM COVER ON INVERTEBRATES FROM MUD-BOTTOMED SLOUGHS.

Occurrence No. 40 — Map Index: 09331 — Dates Last Seen
Occ Rank: Unknown — Element: 1975-XX-XX
Origin: Natural/Native occurrence — Site: 1975-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1979 (LIT)

Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary: Bair and Greco Islands

Location: MARSHES BORDERING BAIR ISLAND, CORKSCREW SLOUGH, STEINBERGER SLOUGH, AND REDWOOD CREEK.

Lat/Long: 37ø31'46" / 122ø11'49" — Township: 05S
UTM: Zone-10 N4153716 E570962 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 819.3 ac — Elevation:

Comments

Distribution:
Ecological: HABITAT CONSISTS OF NORTHERN COASTAL SALTMARSH, VEGETATED BY MIXED SALICORNIA/SPARTINA.
Threat:
General: BREEDING POPULATIONS OBSERVED DURING A 1975 SURVEY.
Owner/Manager: DFG-BAIR ISLAND ER, USFWS, PVT

Source Codes
GIL79A01

RALLUS LONGIROSTRIS OBSOLETUS (cont.)
CALIFORNIA CLAPPER RAIL — Element Code: ABNME05016

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G5T1 — CDFG Status:
State: Endangered — State: S1

Habitat Associations
General: SALT-WATER & BRACKISH MARSHES TRAVERSED BY TIDAL SLOUGHS IN THE VICINITY OF SAN FRANCISCO BAY.
Micro: ASSOCIATED WITH ABUNDANT GROWTHS OF PICKLEWEED, BUT FEEDS AWAY FROM COVER ON INVERTEBRATES FROM MUD-BOTTOMED SLOUGHS.

Occurrence No. 46 — Map Index: 09280 — Dates Last Seen
Occ Rank: Unknown — Element: 1975-XX-XX
Origin: Natural/Native occurrence — Site: 1975-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1979 (LIT)

Quad Summary: REDWOOD POINT (3712252/447C)*, SAN MATEO (3712253/448D)
County Summary: SAN MATEO
SNA Summary: Belmont Slough

Location: MARSHES BORDERING BELMONT SLOUGH.

Lat/Long: 37ø32'31" / 122ø14'59" — Township: 04S
UTM: Zone-10 N4155039 E566282 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 514.5 ac — Elevation: 15 ft

Comments

Distribution:
Ecological:
Threat:
General: BREEDING POPULATIONS.
Owner/Manager: UNKNOWN

Source Codes
GIL79A01

RALLUS LONGIROSTRIS OBSOLETUS (cont.)
CALIFORNIA CLAPPER RAIL — Element Code: ABNME05016

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G5T1 — CDFG Status:
State: Endangered — State: S1

Habitat Associations
General: SALT-WATER & BRACKISH MARSHES TRAVERSED BY TIDAL SLOUGHS IN THE VICINITY OF SAN FRANCISCO BAY.
Micro: ASSOCIATED WITH ABUNDANT GROWTHS OF PICKLEWEED, BUT FEEDS AWAY FROM COVER ON INVERTEBRATES FROM MUD-BOTTOMED SLOUGHS.

Occurrence No. 48 — Map Index: 33652 — Dates Last Seen
Occ Rank: Unknown — Element: 1975-XX-XX
Origin: Natural/Native occurrence — Site: 1975-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1979 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary: Bair and Greco Islands
Location: MARSHES BORDERING SMITHS SLOUGH.
Lat/Long: 37ø30'18" / 122ø13'40" — Township: 05S
UTM: Zone-10 N4150958 E568259 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 100.7 ac — Elevation: 0

Comments
Distribution:
Ecological:
Threat:
General: AREA SUPPORTS BREEDING POPULATIONS.
Owner/Manager: UNKNOWN

Source Codes
GIL79A01

RALLUS LONGIROSTRIS OBSOLETUS (cont.)
CALIFORNIA CLAPPER RAIL — Element Code: ABNME05016

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G5T1 — CDFG Status:
State: Endangered — State: S1

Habitat Associations
General: SALT-WATER & BRACKISH MARSHES TRAVERSED BY TIDAL SLOUGHS IN THE VICINITY OF SAN FRANCISCO BAY.
Micro: ASSOCIATED WITH ABUNDANT GROWTHS OF PICKLEWEED, BUT FEEDS AWAY FROM COVER ON INVERTEBRATES FROM MUD-BOTTOMED SLOUGHS.

Occurrence No. 50 — Map Index: 09374 — Dates Last Seen
Occ Rank: Unknown — Element: 1975-XX-XX
Origin: Natural/Native occurrence — Site: 1975-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1979 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)*, PALO ALTO (3712242/428B)
County Summary: SAN MATEO
SNA Summary: Bair and Greco Islands
Location: MARSHES ON GRECO ISLAND AND BORDERING WESTPOINT SLOUGH, SOUTH SAN FRANCISCO BAY.
Lat/Long: 37ø30'21" / 122ø11'02" — Township: 05S
UTM: Zone-10 N4151095 E572139 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 1,073.1 ac — Elevation: 1 ft

Comments
Distribution:
Ecological: HABITAT CONSISTS OF NORTHERN COASTAL SALTMARSH, BORDERED BY SALT PONDS; VEGETATED BY MIXED SALICORNIA/SPARTINA.
Threat:
General: BREEDING POPULATION.
Owner/Manager: UNKNOWN

Source Codes
GIL79A01

RALLUS LONGIROSTRIS OBSOLETUS (cont.)
CALIFORNIA CLAPPER RAIL — Element Code: ABNME05016

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G5T1 — CDFG Status:
State: Endangered — State: S1

Habitat Associations
General: SALT-WATER & BRACKISH MARSHES TRAVERSED BY TIDAL SLOUGHS IN THE VICINITY OF SAN FRANCISCO BAY.
Micro: ASSOCIATED WITH ABUNDANT GROWTHS OF PICKLEWEED, BUT FEEDS AWAY FROM COVER ON INVERTEBRATES FROM MUD-BOTTOMED SLOUGHS.

Occurrence No. 77 — Map Index: 33350 — Dates Last Seen
Occ Rank: Excellent — Element: 1996-01-19
Origin: Natural/Native occurrence — Site: 1996-01-19
Presence: Presumed Extant
Trend: Unknown
Main Source: BOBZIEN, S. 1996 (OBS)
Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary:

Location: COGSWELL MARSH, HAYWARD SHORELINE REGIONAL PARK.

Lat/Long: 37ø38'09" / 122ø08'41" — Township: 03S
UTM: Zone-10 N4165552 E575456 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 102.8 ac — Elevation: 0

Comments
Distribution:
Ecological: HABITAT CONSISTS OF SALT WATER EMERGENT WETLANDS, DOMINATED BY EASTERN CORD GRASS (SPARTINA ALTERNIFLORA), PLUS SOME NATIVE SPARTINA AND SALICORNIA. NORTHERN HARRIERS AND SHORT-EARED OWLS ALSO FOUND AT THIS SITE.
Threat: THREATENED BY PREDATION FROM EXOTIC RED FOXES.
General: 7 CLAPPER RAILS OBSERVED ON 19 JANUARY 1996.
Owner/Manager: EBRPD-HAYWARD SHORELINE RP

Source Codes
BOB96F01

RALLUS LONGIROSTRIS OBSOLETUS (cont.)
CALIFORNIA CLAPPER RAIL — Element Code: ABNME05016

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G5T1 — CDFG Status:
State: Endangered — State: S1

Habitat Associations
General: SALT-WATER & BRACKISH MARSHES TRAVERSED BY TIDAL SLOUGHS IN THE VICINITY OF SAN FRANCISCO BAY.
Micro: ASSOCIATED WITH ABUNDANT GROWTHS OF PICKLEWEED, BUT FEEDS AWAY FROM COVER ON INVERTEBRATES FROM MUD-BOTTOMED SLOUGHS.

Occurrence No. 78 — Map Index: 33651 — Dates Last Seen
Occ Rank: Good — Element: 1993-07-XX
Origin: Natural/Native occurrence — Site: 1993-07-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: TATTERSALL, E. 1993 (OBS)
Quad Summary: REDWOOD POINT (3712252/447C)*, SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary:

Location: WEST OF HAYWARD SHORELINE INTERPRETIVE CENTER, HAYWARD AREA RECREATION DISTRICT MARSH, HAYWARD.

Lat/Long: 37ø37'24" / 122ø08'14" — Township: 03S
UTM: Zone-10 N4164166 E576142 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 3 ft

Comments
Distribution:
Ecological: HABITAT CONSISTS OF NORTHERN COASTAL SALTMARSH DOMINATED BY PICKLEWEED.
Threat: THREATENED BY PREDATION FROM EXOTIC, NON-NATIVE RED FOXES, AND BY RECREATIONAL DISTURBANCE (HIGH USE RECREATIONAL AREA).
General: 1 ADULT OBSERVED IN JULY 1993.
Owner/Manager: EBRPD-HAYWARD SHORELINE RP

Source Codes
TAT93F04

CHARADRIUS ALEXANDRINUS NIVOSUS (NESTING)
WESTERN SNOWY PLOVER — Element Code: ABNNB03031

Status — NDDB Element Ranks — Other Lists
Federal: Threatened — Global: G4T2 — CDFG Status: SC
State: None — State: S2

Habitat Associations
General: FEDERAL LISTING APPLIES ONLY TO THE PACIFIC COASTAL POPULATION.
Micro: SANDY BEACHES, SALT POND LEVEES & SHORES OF LARGE ALKALI LAKES. NEEDS SANDY, GRAVELLY OR FRIABLE SOILS FOR NESTING.

Occurrence No. 2 — Map Index: 09694 — Dates Last Seen
Occ Rank: Unknown — Element: 1971-06-03
Origin: Natural/Native occurrence — Site: 1971-06-03
Presence: Presumed Extant
Trend: Unknown
Main Source: GILL, R. 1971 (OBS)

Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:

Location: NEWARK.

Lat/Long: 37ø31'52" / 122ø02'38" — Township: 05S
UTM: Zone-10 N4154017 E584478 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: 02 Qtr NE
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 10 ft

Comments

Distribution:
Ecological:
Threat:
General: THREE NESTS SEEN; FROM NORTH AMERICAN NEST RECORD CARD PROGRAM.
Owner/Manager: UNKNOWN

Source Codes
GIL71F08

CHARADRIUS ALEXANDRINUS NIVOSUS (NESTING) (cont.)
WESTERN SNOWY PLOVER — Element Code: ABNNB03031

Status — NDDB Element Ranks — Other Lists
Federal: Threatened — Global: G4T2 — CDFG Status: SC
State: None — State: S2

Habitat Associations
General: FEDERAL LISTING APPLIES ONLY TO THE PACIFIC COASTAL POPULATION.
Micro: SANDY BEACHES, SALT POND LEVEES & SHORES OF LARGE ALKALI LAKES. NEEDS SANDY, GRAVELLY OR FRIABLE SOILS FOR NESTING.

Occurrence No. 4 — Map Index: 09517 — Dates Last Seen
Occ Rank: Unknown — Element: 1975-05-10
Origin: Natural/Native occurrence — Site: 1975-05-10
Presence: Presumed Extant
Trend: Unknown
Main Source: ANDERSON, J. 1975 (OBS)

Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Dumbarton Point

Location: E SIDE OF DUMBARTON BRIDGE.

Lat/Long: 37ø30'38" / 122ø06'36" — Township: 05S
UTM: Zone-10 N4151679 E578658 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 15 ft

Comments

Distribution:
Ecological: HABITAT IS ROCKY SHORELINE OF BAY.
Threat:
General: FROM NORTH AMERICAN NEST RECORD CARD PROGRAM.
Owner/Manager: UNKNOWN

Source Codes
AND75F01

CHARADRIUS ALEXANDRINUS NIVOSUS (NESTING) (cont.)
WESTERN SNOWY PLOVER — Element Code: ABNNB03031

Status — NDDB Element Ranks — Other Lists
Federal: Threatened — Global: G4T2 — CDFG Status: SC
State: None — State: S2

Habitat Associations
General: FEDERAL LISTING APPLIES ONLY TO THE PACIFIC COASTAL POPULATION.
Micro: SANDY BEACHES, SALT POND LEVEES & SHORES OF LARGE ALKALI LAKES. NEEDS SANDY, GRAVELLY OR FRIABLE SOILS FOR NESTING.

Occurrence No. 86 — Map Index: 09246 — Dates Last Seen
Occ Rank: Unknown — Element: 1976-XX-XX
Origin: Natural/Native occurrence — Site: 1978-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: PAGE, G. & L. STENZEL 1981 (LIT)
Quad Summary: SAN MATEO (3712253/448D)*, REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary: Belmont Slough
Location: NEAR BELMONT, SOUTH SAN FRANCISCO BAY.
Lat/Long: 37ø32'32" / 122ø15'03" — Township: 04S
UTM: Zone-10 N4155084 E566183 — Range: 04W
Mapping Precision: NON-SPECIFIC — Section: 36 Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 10 ft

Comments
Distribution:
Ecological: LIKELY HABITAT IS SALT EVAPORATORS.
Threat:
General: TWO ADULTS OBSERVED IN 1972; NESTS OBSERVED IN 1975-76; 19 ADULTS OBSERVED DURING 1978 STUDY IN SAN MATEO COUNTY PORTION OF THE SOUTH BAY (UNKNOWN WHETHER THIS AREA WAS USED FOR NESTING).
Owner/Manager: UNKNOWN

Source Codes
PAG81R01

CHARADRIUS ALEXANDRINUS NIVOSUS (NESTING) (cont.)
WESTERN SNOWY PLOVER — Element Code: ABNNB03031

Status — NDDB Element Ranks — Other Lists
Federal: Threatened — Global: G4T2 — CDFG Status: SC
State: None — State: S2

Habitat Associations
General: FEDERAL LISTING APPLIES ONLY TO THE PACIFIC COASTAL POPULATION.
Micro: SANDY BEACHES, SALT POND LEVEES & SHORES OF LARGE ALKALI LAKES. NEEDS SANDY, GRAVELLY OR FRIABLE SOILS FOR NESTING.

Occurrence No. 87 — Map Index: 09305 — Dates Last Seen
Occ Rank: Unknown — Element: 1977-XX-XX
Origin: Natural/Native occurrence — Site: 1978-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: PAGE, G. & L. STENZEL 1981 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary: Bair and Greco Islands
Location: BAIR ISLAND, SOUTH SAN FRANCISCO BAY.
Lat/Long: 37ø31'41" / 122ø13'02" — Township: 05S
UTM: Zone-10 N4153543 E569166 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 10 ft

Comments
Distribution: PARTIALLY WITHIN THE SAN FRANCISCO BAY NWR.
Ecological:
Threat:
General: TWO ADULTS OBSERVED BY TIM MANOLIS IN MAY-JUNE OF 1977; 19 ADULTS OBSERVED DURING 1978 STUDY IN SAN MATEO COUNTY PORTION OF THE SOUTH BAY (UNKNOWN WHETHER ANY WERE USING THIS SITE FOR NESTING).
Owner/Manager: USFWS, PVT-LESLIE SALT, OTHERS

Source Codes
PAG81R01

CHARADRIUS ALEXANDRINUS NIVOSUS (NESTING) (cont.)
WESTERN SNOWY PLOVER Element Code: ABNNB03031

Status NDDB Element Ranks Other Lists
Federal: Threatened Global: G4T2 CDFG Status: SC
State: None State: S2

Habitat Associations
General: FEDERAL LISTING APPLIES ONLY TO THE PACIFIC COASTAL POPULATION.
Micro: SANDY BEACHES, SALT POND LEVEES & SHORES OF LARGE ALKALI LAKES.
NEEDS SANDY, GRAVELLY OR FRIABLE SOILS FOR NESTING.

Occurrence No. 88 Map Index: 09304 Dates Last Seen
Occ Rank: None Element: 1919-XX-XX
Origin: Natural/Native occurrence Site: 1978-XX-XX
Presence: Possibly Extirpated
Trend: Unknown
Main Source: PAGE, G. & L. STENZEL 1981 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)*, PALO ALTO (3712242/428B)
County Summary: SAN MATEO
SNA Summary:
Location: REDWOOD CITY, SOUTH SAN FRANCISCO BAY.
Lat/Long: 37ø30'22" / 122ø13'31" Township: 05S
UTM: Zone-10 N4151102 E568466 Range: 03W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1 mile Elevation: 5 ft
Comments
Distribution:
Ecological:
Threat:
General: ONE MUSEUM EGG SET COLLECTED IN 1919; 19 ADULTS OBSERVED DURING 1978 STUDY IN SAN MATEO COUNTY PORTION OF THE SOUTH BAY (UNKNOWN WHETHER ANY BIRDS WERE NESTING AT THIS LOCATION).
Owner/Manager: UNKNOWN

Source Codes
PAG81R01

CHARADRIUS ALEXANDRINUS NIVOSUS (NESTING) (cont.)
WESTERN SNOWY PLOVER Element Code: ABNNB03031

Status NDDB Element Ranks Other Lists
Federal: Threatened Global: G4T2 CDFG Status: SC
State: None State: S2

Habitat Associations
General: FEDERAL LISTING APPLIES ONLY TO THE PACIFIC COASTAL POPULATION.
Micro: SANDY BEACHES, SALT POND LEVEES & SHORES OF LARGE ALKALI LAKES.
NEEDS SANDY, GRAVELLY OR FRIABLE SOILS FOR NESTING.

Occurrence No. 89 Map Index: 09464 Dates Last Seen
Occ Rank: Unknown Element: 1965-XX-XX
Origin: Natural/Native occurrence Site: 1965-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: PAGE, G. & L. STENZEL 1981 (LIT)
Quad Summary: SAN LEANDRO (3712262/447B)*, REDWOOD POINT (3712252/447C)
County Summary: ALAMEDA
SNA Summary: Johnson Landing
Location: HAYWARD, SOUTH SAN FRANCISCO BAY.
Lat/Long: 37ø38'17" / 122ø08'52" Township: 03S
UTM: Zone-10 N4165794 E575191 Range: 03W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1 mile Elevation: 5 ft
Comments
Distribution:
Ecological:
Threat:
General: NEST(S) OBSERVED IN 1965.
Owner/Manager: UNKNOWN

Source Codes
PAG81R01

CHARADRIUS ALEXANDRINUS NIVOSUS (NESTING) (cont.)
WESTERN SNOWY PLOVER — Element Code: ABNNB03031

Status — NDDB Element Ranks — Other Lists
Federal: Threatened — Global: G4T2 — CDFG Status: SC
State: None — State: S2

Habitat Associations
General: FEDERAL LISTING APPLIES ONLY TO THE PACIFIC COASTAL POPULATION.
Micro: SANDY BEACHES, SALT POND LEVEES & SHORES OF LARGE ALKALI LAKES. NEEDS SANDY, GRAVELLY OR FRIABLE SOILS FOR NESTING.

Occurrence No. 90 — Map Index: 24694 — Dates Last Seen
Occ Rank: Unknown — Element: 1979-05-XX
Origin: Natural/Native occurrence — Site: 1979-05-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: PAGE, G. & L. STENZEL 1981 (LIT)
Quad Summary: SAN LEANDRO (3712262/447B)*, HUNTERS POINT (3712263/448A)
County Summary: ALAMEDA
SNA Summary:
Location: BAY FARM ISLAND, SAN FRANCISCO BAY, ADJACENT TO OAKLAND.
Lat/Long: 37ø43'26" / 122ø12'28" — Township: 99X
UTM: Zone-10 N4175269 E569816 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 2,630.6 ac — Elevation: 5 ft

Comments
Distribution: MAPPED ACCORDING TO 1959 TOPO MAP OF THE ISLAND. (THE ISLAND HAS "GROWN" SIGNIFICANTLY SINCE 1906).
Ecological:
Threat:
General: ONE ADULT AND 1 CHICK DETECTED IN MAY OR JUNE 1974 BY E. ROEMER; 8 ADULTS DETECTED IN MAY OR JUNE 1977 BY T. MANOLIS; 5 ADULTS DETECTED IN MAY OR JUNE 1979 BY L. FEENEY.
Owner/Manager: UNKNOWN

Source Codes
PAG81R01

CHARADRIUS ALEXANDRINUS NIVOSUS (NESTING) (cont.)
WESTERN SNOWY PLOVER — Element Code: ABNNB03031

Status — NDDB Element Ranks — Other Lists
Federal: Threatened — Global: G4T2 — CDFG Status: SC
State: None — State: S2

Habitat Associations
General: FEDERAL LISTING APPLIES ONLY TO THE PACIFIC COASTAL POPULATION.
Micro: SANDY BEACHES, SALT POND LEVEES & SHORES OF LARGE ALKALI LAKES. NEEDS SANDY, GRAVELLY OR FRIABLE SOILS FOR NESTING.

Occurrence No. 122 — Map Index: 24693 — Dates Last Seen
Occ Rank: Excellent — Element: 1990-06-30
Origin: Natural/Native occurrence — Site: 1990-06-30
Presence: Presumed Extant
Trend: Unknown
Main Source: DI DONATO, J. 1990 (OBS)
Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary:
Location: HAYWARD SHORELINE REGIONAL PARK, HAYWARD.
Lat/Long: 37ø37'56" / 122ø08'37" — Township: 03S
UTM: Zone-10 N4165145 E575559 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 80 meters — Elevation: 3 ft

Comments
Distribution: LOCATED IN BASIN 3A, ISLAND #4.
Ecological: HABITAT CONSISTS OF A DREDGED, MAN-MADE ISLAND WITHIN A RESTORED TIDAL SALT MARSH. VEGETATIVE COVER ON THE ISLAND IS LESS THAN 5%. SUBSTRATE PLACED ON THE ISLAND TO ATTRACT BIRDS.
Threat:
General: 1990 WAS THE FIRST RECORD OF NESTING ON THE ISLAND. SITE IS MANAGED AND PROTECTED BY EAST BAY REGIONAL PARK DISTRICT.
Owner/Manager: EBRPD-HAYWARD SHORELINE RP

Source Codes
DID90F11

STERNA ANTILLARUM BROWNI (NESTING COLONY)
CALIFORNIA LEAST TERN — Element Code: ABNNM08103

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G4T2T3	CDFG Status:
State: Endangered	State: S2S3	

Habitat Associations

General: NESTS ALONG THE COAST FROM SAN FRANCISCO BAY SOUTH TO NORTHERN BAJA CALIFORNIA.

Micro: COLONIAL BREEDER ON BARE OR SPARSELY VEGETATED, FLAT SUBSTRATES: SAND BEACHES, ALKALI FLATS, LAND FILLS, OR PAVED AREAS.

Occurrence No. 2 — Map Index: 09269 — Dates Last Seen
Occ Rank: None — Element: 1975-XX-XX
Origin: Natural/Native occurrence — Site: 1976-XX-XX
Presence: Extirpated
Trend: Unknown
Main Source: ANDERSON, W. 1970 (LIT)
Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary:
Location: THE NORTH END OF BAY FARM ISLAND (AKA THE "UTAH FILL" AREA)
Lat/Long: 37ø44'43" / 122ø14'46" — Township: 02S
UTM: Zone-10 N4177630 E566418 — Range: 04W
Mapping Precision: NON-SPECIFIC — Section: 24 Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 5 ft

Comments

Distribution: IN 1969 THE COLONY WAS SCATTERED OVER AT LEAST 200 ACRES OF SANDY FLATS. THE MAPPED LOCATION IS BASED ON A 1975 MAP SHOWING THE "UTAH FILL" AREA.

Ecological:
Threat: IN 1974 THERE WAS CONSIDERABLE DISTURBANCE BY CONSTRUCTION VEHICLES & PEOPLE.
General: 1969: 30 PRS, EGGS & YOUNG IN ALL STAGES OF DEVELOPMENT OBS. 1971: OBS FROM NORTH AMERICAN NEST RECORD CARD PROGRAM. 1972: 200 PRS OBS. 1974: 19 PRS EST. 1975: 11 PRS EST. 1976: ADULTS OBS IN UTAH FILL AREA, BUT NO NESTS FOUND IN 5 VISITS.

Owner/Manager: UNKNOWN

Source Codes

GIL71F09, MAS75R01, ATW79R01, AND70A01, BEN74R01

STERNA ANTILLARUM BROWNI (NESTING COLONY) (cont.)
CALIFORNIA LEAST TERN — Element Code: ABNNM08103

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G4T2T3	CDFG Status:
State: Endangered	State: S2S3	

Habitat Associations

General: NESTS ALONG THE COAST FROM SAN FRANCISCO BAY SOUTH TO NORTHERN BAJA CALIFORNIA.

Micro: COLONIAL BREEDER ON BARE OR SPARSELY VEGETATED, FLAT SUBSTRATES: SAND BEACHES, ALKALI FLATS, LAND FILLS, OR PAVED AREAS.

Occurrence No. 3 — Map Index: 09287 — Dates Last Seen
Occ Rank: Unknown — Element: 1992-XX-XX
Origin: Natural/Native occurrence — Site: 1996-XX-XX
Presence: Presumed Extant
Trend: Decreasing
Main Source: ATWOOD, J. ET AL 1977 (LIT)
Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary: Oakland Airport Shoreline
Location: OAKLAND AIRPORT ON BAY FARM ISLAND.
Lat/Long: 37ø43'28" / 122ø14'43" — Township: 02S
UTM: Zone-10 N4175309 E566490 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: 30 Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 5 ft

Comments

Distribution: NESTING AREA LOCATED AT NW END OF MAIN RUNWAY WHERE THERE IS SPARSE VEGETATION AND ROLLING SAND DUNES.

Ecological:
Threat: PREDATION BY HARRIERS AND OTHER NATIVE PREDATORS.
General: 1971: 3 NESTS. 1973: 40 PRS OBS. '75: 3 PRS OBS. '76: 7-8 NESTS OBS. '77: 7 PRS. '78: 0 PRS. '85: 10-14 PRS, 8-10 FLDGD; '86: 29 PRS. '87: 9 PRS, 2-5 FLDGD; '88: 6-7 PRS, 0 FLDGD. 1990: 6 PRS, 0 FLDGD. 1991: 0 PRS. 1992: 2 PRS. 1996: 0 PRS.

Owner/Manager: PORT OF OAKLAND

Source Codes

AMB85A01, COL87R01, JOH92R01, CAP98R01, MAS75R01, ATW79R01, CAP93R01, ATW77R01, OBS92R01, COL86R01, MAS88R01, BEN76R01, GIL71F10

STERNA ANTILLARUM BROWNI (NESTING COLONY) (cont.)

CALIFORNIA LEAST TERN — Element Code: ABNNM08103

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G4T2T3	CDFG Status:
State: Endangered	State: S2S3	

Habitat Associations

General: NESTS ALONG THE COAST FROM SAN FRANCISCO BAY SOUTH TO NORTHERN BAJA CALIFORNIA.

Micro: COLONIAL BREEDER ON BARE OR SPARSELY VEGETATED, FLAT SUBSTRATES: SAND BEACHES, ALKALI FLATS, LAND FILLS, OR PAVED AREAS.

Occurrence No. 4 — Map Index: 09519 — Dates Last Seen

Occ Rank: Unknown — Element: 1988-XX-XX
Origin: Natural/Native occurrence — Site: 1988-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: ATWOOD, J. ET AL 1979 (LIT)

Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh

Location: ALVARADO SALT PONDS BETWEEN OLD ALAMEDA CREEK CHANNEL & NEW ALAMEDA COUNTY FLOOD CONTROL CHANNEL.

Lat/Long: 37ø34'57" / 122ø06'35" — Township: 04S
UTM: Zone-10 N4159662 E578608 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 3 ft

Comments

Distribution:

Ecological: NESTING OCCURS ON NARROW DIKE SURROUNDED BY SALT EVAPORATOR PONDS.

Threat:

General: NESTING FIRST RECORDED IN 1978, WHEN 2 PRS FLEDGED 1 YOUNG. 1979: 3 PRS FLEDGED 2 YOUNG. 1980: 12 NESTS OBS & 5 YOUNG COUNTED.

Owner/Manager: PVT-LESLIE SALT CO

Source Codes

COO79R01, ATW79R01

STERNA ANTILLARUM BROWNI (NESTING COLONY) (cont.)

CALIFORNIA LEAST TERN — Element Code: ABNNM08103

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G4T2T3	CDFG Status:
State: Endangered	State: S2S3	

Habitat Associations

General: NESTS ALONG THE COAST FROM SAN FRANCISCO BAY SOUTH TO NORTHERN BAJA CALIFORNIA.

Micro: COLONIAL BREEDER ON BARE OR SPARSELY VEGETATED, FLAT SUBSTRATES: SAND BEACHES, ALKALI FLATS, LAND FILLS, OR PAVED AREAS.

Occurrence No. 5 — Map Index: 09305 — Dates Last Seen

Occ Rank: Unknown — Element: 1982-XX-XX
Origin: Natural/Native occurrence — Site: 1988-08-XX
Presence: Presumed Extant
Trend: Decreasing
Main Source: ATWOOD, J. ET AL 1977 (LIT)

Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary: Bair and Greco Islands

Location: BAIR ISLAND.

Lat/Long: 37ø31'41" / 122ø13'02" — Township: 05S
UTM: Zone-10 N4153543 E569166 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 10 ft

Comments

Distribution:

Ecological: HABITAT HAS DETERIORATED, WITH A HEAVY GROWTH OF PICKLEWEED. IN 1986 3 TIDEGATES INSTALLED TO CONTROL WATER LEVEL AND ERADICATE PICKLEWEED. OYSTER SHELL SUBSTRATE LAID DOWN ON CONSTRUCTED PLATFORM TO TRY AND ENCOURAGE NESTING.

Threat:

General: FROM 1969-71, UP TO 15 PAIRS NESTED HERE; NO NESTING IN 1972 OR 1973; FROM 1974-76, 8-14 PAIRS NESTED; 1 PAIR NESTED IN 1977; NO NESTING IN 1978; IN 1982, 48 PAIRS NESTED; NO NESTING IN 1987 OR 1988, 1990 - 1992 OR 1996.

Owner/Manager: UNKNOWN

Source Codes

COL87R01, JOH92R01, CAF98R01, LEV82A01, CAF93R01, ATW77R01, OBS92R01, MAS88R01, DFG86U15

STERNA ANTILLARUM BROWNI (NESTING COLONY) (cont.)

CALIFORNIA LEAST TERN — Element Code: ABNNM08103

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G4T2T3	CDFG Status:
State: Endangered	State: S2S3	

Habitat Associations

General: NESTS ALONG THE COAST FROM SAN FRANCISCO BAY SOUTH TO NORTHERN BAJA CALIFORNIA.

Micro: COLONIAL BREEDER ON BARE OR SPARSELY VEGETATED, FLAT SUBSTRATES: SAND BEACHES, ALKALI FLATS, LAND FILLS, OR PAVED AREAS.

Occurrence No. 6 — Map Index: 09393 — Dates Last Seen

Occ Rank: None — Element: 1976-XX-XX
Origin: Natural/Native occurrence — Site: 1976-XX-XX
Presence: Extirpated
Trend: Unknown
Main Source: ATWOOD, J. ET AL 1979 (LIT)
Quad Summary: PALO ALTO (3712242/428B)*, REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary:
Location: REDWOOD CITY SALT PONDS. NORTH OF HWY 101 & SOUTH OF WESTPOINT SLOUGH. BETWEEN MARSH RD AND HARBOR BLVD.
Lat/Long: 37ø29'49" / 122ø11'28" — Township: 05S
UTM: Zone-10 N4150112 E571500 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: 16 Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 1,761.7 ac — Elevation: 1 ft

Comments

Distribution:
Ecological: THE SITE WAS SAID TO BE UNDER WATER IN 1977 & 1978.
Threat:
General: IN 1976, A FEW PAIRS NESTED NEAR SOME FORSTER'S TERNS ON A DRIED SALT EVAPORATING POND, 3-5 KM SSE OF BAIR ISLAND. FURTHER SE OF THESE PONDS, PALO ALTO BAYLANDS SERVES AS A FREQUENT POST-BREEDING HAUNT.
Owner/Manager: UNKNOWN

Source Codes

ATW79R01

STERNA ANTILLARUM BROWNI (NESTING COLONY) (cont.)

CALIFORNIA LEAST TERN — Element Code: ABNNM08103

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G4T2T3	CDFG Status:
State: Endangered	State: S2S3	

Habitat Associations

General: NESTS ALONG THE COAST FROM SAN FRANCISCO BAY SOUTH TO NORTHERN BAJA CALIFORNIA.

Micro: COLONIAL BREEDER ON BARE OR SPARSELY VEGETATED, FLAT SUBSTRATES: SAND BEACHES, ALKALI FLATS, LAND FILLS, OR PAVED AREAS.

Occurrence No. 69 — Map Index: 09493 — Dates Last Seen

Occ Rank: Unknown — Element: 1980-XX-XX
Origin: Natural/Native occurrence — Site: 1980-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: HARVEY, T. 1980 (PERS)
Quad Summary: REDWOOD POINT (3712252/447C)*, NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh
Location: LESLIE SALT PONDS JUST SOUTH OF COYOTE HILLS SLOUGH.
Lat/Long: 37ø33'56" / 122ø07'34" — Township: 04S
UTM: Zone-10 N4157768 E577177 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation:

Comments

Distribution:
Ecological:
Threat:
General: 3 PAIRS NESTED ALONG ROAD WHICH RUNS PARALLEL TO COYOTE HILLS SLOUGH, BETWEEN SALT PONDS A1 AND A2, IN 1979. IN 1980, 12 PAIRS NESTED AT THIS SITE.
Owner/Manager: PVT-LESLIE SALT CO

Source Codes

HAR80U01

STERNA ANTILLARUM BROWNI (NESTING COLONY) (cont.)
CALIFORNIA LEAST TERN — Element Code: ABNNM08103

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G4T2T3	CDFG Status:
State: Endangered	State: S2S3	

Habitat Associations

General: NESTS ALONG THE COAST FROM SAN FRANCISCO BAY SOUTH TO NORTHERN BAJA CALIFORNIA.

Micro: COLONIAL BREEDER ON BARE OR SPARSELY VEGETATED, FLAT SUBSTRATES: SAND BEACHES, ALKALI FLATS, LAND FILLS, OR PAVED AREAS.

Occurrence No. 70 — Map Index: 09479 — Dates Last Seen
Occ Rank: Unknown — Element: 1988-08-30
Origin: Natural/Native occurrence — Site: 1988-08-30
Presence: Presumed Extant
Trend: Unknown
Main Source: MASSEY, B. 1988 (LIT)

Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh

Location: BAUMBERG SALT PONDS.

Lat/Long: 37ø36'41" / 122ø08'21" — Township: 04S
UTM: Zone-10 N4162842 E575978 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation:

Comments

Distribution:
Ecological: THIS SITE SERVES AS A MAJOR POST-BREEDING STAGING AREA.
Threat:
General: ALTHOUGH THIS IS MAINLY A POST-BREEDING STAGING AREA, ONE NESTING ATTEMPT WAS MADE IN 1985.
Owner/Manager: PVT

Source Codes

COL87R01, MAS88R01

RYNCHOPS NIGER (NESTING COLONY)
BLACK SKIMMER — Element Code: ABNNM14010

Status	NDDB Element Ranks	Other Lists
Federal: None	Global: G5	CDFG Status: SC
State: None	State: S1S3	

Habitat Associations

General: NESTS ALONG THE NORTH AND SOUTH ENDS OF THE SALTON SEA; ALSO, ON SALT POND DIKES OF SOUTH SAN DIEGO BAY.

Micro: NESTS ON GRAVEL BARS, LOW ISLETS, AND SANDY BEACHES, IN UNVEGETATED SITES. NESTING COLONIES USUALLY LESS THAN 200 PAIRS.

Occurrence No. 3 — Map Index: 30174 — Dates Last Seen
Occ Rank: Excellent — Element: 1994-07-07
Origin: Natural/Native occurrence — Site: 1994-07-07
Presence: Presumed Extant
Trend: Unknown
Main Source: DI DONATO, J. 1994 (OBS)

Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary:

Location: JUST EAST OF JOHNSON LANDING, SOUTH OF SAN LEANDRO.

Lat/Long: 37ø37'42" / 122ø08'49" — Township: 03S
UTM: Zone-10 N4164720 E575277 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 80 meters — Elevation: 3 ft

Comments

Distribution: ISLAND UPON WHICH NESTING OCCURRED IS ONE OF 15 ISLANDS IN FOUR BASINS IN AN EXPERIMENTAL MARSH USING TREATED WASTEWATER.
Ecological: NEST SITE IS BRACKISH-WATER POND ON AN ISLAND. HABITAT IS OPEN WATER WITH DREDGED ISLANDS; SUBSTRATE IS BARE MUD/SILT WITH SPARSE VEGETATION (PICKLEWEED, THISTLE, AND FATHEN). AREA IS CLOSED TO THE GENERAL PUBLIC.
Threat:
General: 2 ADULTS OBSERVED NESTING WITH 4 JUVENILES ON 7 JULY 1994. UP TO 75 PAIRS OF FORSTER'S TERNS, AS WELL AS AMERICAN AVOCETS, KILLDEER, AND BLACK-NECKED STILTS, NEST ON THIS ISLAND.
Owner/Manager: EBRPD

Source Codes

DID94F03

ATHENE CUNICULARIA (BURROW SITES)
BURROWING OWL — Element Code: ABNSB10010

Status — NDDB Element Ranks — Other Lists

Federal: None — Global: G4 — CDFG Status: SC
State: None — State: S2

Habitat Associations

General: FOUND IN OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.

Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 18 — Map Index: 09647 — Dates Last Seen
Occ Rank: None — Element: 1979-XX-XX
Origin: Natural/Native occurrence — Site: 1983-XX-XX
Presence: Possibly Extirpated
Trend: Unknown
Main Source: EDWARDS, A. 1983 (PERS)

Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Dumbarton Point

Location: JARVIS LANDING, E END OF DUMBARTON BRIDGE, NW OF JCT JARVIS RD & THORNTON AVE, W OF NEWARK

Lat/Long: 37ø31'47" / 122ø03'48" — Township: 05S
UTM: Zone-10 N4153846 E582762 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 10 ft

Comments

Distribution:
Ecological:
Threat: SITE DISTURBED BY THE INSTALLATION OF THE EAST BAY SUPER SEWER; ALSO BY ACCESS ROADS TO THE NEW DUMBARTON BRIDGE.
General: BETWEEN 1972 AND 1979, REPEATED OBSERVATIONS OF UP TO 16 INDIVIDUALS BY BLAKE AND EDWARDS. SITE NOW POSSIBLY EXTIRPATED.
Owner/Manager: PVT

Source Codes

BLA83U01, JOH88U01, EDW83U01

ATHENE CUNICULARIA (BURROW SITES) (cont.)
BURROWING OWL — Element Code: ABNSB10010

Status — NDDB Element Ranks — Other Lists

Federal: None — Global: G4 — CDFG Status: SC
State: None — State: S2

Habitat Associations

General: FOUND IN OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.

Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 19 — Map Index: 09291 — Dates Last Seen
Occ Rank: Unknown — Element: 1983-05-30
Origin: Natural/Native occurrence — Site: 1983-05-30
Presence: Presumed Extant
Trend: Unknown
Main Source: CONLEY, M. 1983 (PERS)

Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary: Oakland Airport Shoreline

Location: BAY FARM ISLAND, NORTHWEST OF OAKLAND INTERNATIONAL AIRPORT IN THE VICINITY OF CATALINA AVE AND LEEWARD AVE.

Lat/Long: 37ø43'26" / 122ø14'14" — Township: 02S
UTM: Zone-10 N4175266 E567203 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: 30 Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 2/5 mile — Elevation:

Comments

Distribution:
Ecological:
Threat:
General: TWO PAIRS OBSERVED BY JULES EVANS IN 1983.
Owner/Manager: PVT

Source Codes

JOH88U01, CON83U01

ATHENE CUNICULARIA (BURROW SITES) (cont.)
BURROWING OWL — Element Code: ABNSB10010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G4 — CDFG Status: SC
State: None — State: S2

Habitat Associations
General: FOUND IN OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.
Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 51 — Map Index: 09693 — Dates Last Seen
Occ Rank: None — Element: 1950-XX-XX
Origin: Natural/Native occurrence — Site: 1950-XX-XX
Presence: Possibly Extirpated
Trend: Unknown
Main Source: CARLEY, F. 1983 (PERS)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:
Location: VICINITY OF NEWARK.
Lat/Long: 37ø31'51" / 122ø02'38" — Township: 05S
UTM: Zone-10 N4153986 E584478 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 10 ft

Comments
Distribution:
Ecological:
Threat:
General: FAIRLY COMMON RESIDENT IN THE 1950'S, BUT NONE WERE OBSERVED IN 1981 OR 1982. OWLS AT THIS SITE HAVE SUFFERED A MARKED, STEADY DECLINE DURING THE PAST 25 YEARS DUE TO HABITAT LOSS FROM CONVERSION OF FIELDS TO COMMERCIAL CONSTRUCTION.
Owner/Manager: UNKNOWN

Source Codes
JOH88U01, CAR83U01

California Department of Fish and Game
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ATHENE CUNICULARIA (BURROW SITES) (cont.)
BURROWING OWL — Element Code: ABNSB10010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G4 — CDFG Status: SC
State: None — State: S2

Habitat Associations
General: FOUND IN OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.
Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 52 — Map Index: 09365 — Dates Last Seen
Occ Rank: Unknown — Element: 1983-05-XX
Origin: Natural/Native occurrence — Site: 1983-05-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: CONLEY, M. 1983 (PERS)
Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary: Oakland Airport Shoreline
Location: SE OF SAN LEANDRO BAY, IN A FIELD NORTHWEST OF JUNCTION OF EDGEWATER DR & PARDEE LN, OAKLAND.
Lat/Long: 37ø44'32" / 122ø12'12" — Township: 02S
UTM: Zone-10 N4177317 E570174 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: 21 Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 5 ft

Comments
Distribution:
Ecological: COLONY IS LOCATED ON AN UNDEVELOPED TRACT OF OPEN GRASSLAND POSTED "NO TRESPASSING," ADJACENT TO A NEW BUSINESS PARK.
Threat:
General: SEVERAL JUVENILES OBSERVED IN 1982; TWO OWLS OBSERVED AT BURROWS IN 1983.
Owner/Manager: PVT-PORT OF OAKLAND

Source Codes
JOH88U01, CON83U01

ATHENE CUNICULARIA (BURROW SITES) (cont.)

BURROWING OWL — Element Code: ABNSB10010

Status — NDDB Element Ranks — Other Lists

Federal: None — Global: G4 — CDFG Status: SC

State: None — State: S2

Habitat Associations

General: FOUND IN OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.

Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 164 — Map Index: 23819 — Dates Last Seen

Occ Rank: Fair — Element: 1991-06-26

Origin: Natural/Native occurrence — Site: 1991-06-26

Presence: Presumed Extant

Trend: Decreasing

Main Source: CULP, L. & J. DI DONATO 1991 (OBS)

Quad Summary: SAN LEANDRO (3712262/447B)

County Summary: ALAMEDA

SNA Summary:

Location: NW OF SKYWEST GOLF COURSE, ALONG THE HAYWARD SHORELINE.

Lat/Long: 37ø39'58" / 122ø08'44" — Township: 03S

UTM: Zone-10 N4168904 E575359 — Range: 03W

Mapping Precision: SPECIFIC — Section: XX Qtr XX

Symbol Type: POINT — Meridian: M

Radius: 80 meters — Elevation: 2 ft

Comments

Distribution:

Ecological: HABITAT CONSISTS OF INTRODUCED ANNUAL GRASSES MIXED WITH LOW QUALITY SEASONAL WETLANDS, PRIMARILY COMPOSED OF PICKLEWEED.

Threat: THREATS INCLUDE EXOTIC RED FOX PREDATION AND UNMONITORED RODENT POISONING IN ADJACENT AREAS.

General: THE LAND HAS NOT BEEN GRAZED SINCE FEB 1991, AND THE GROUND SQUIRREL AND OWL POPULATION HAS SHOWN A MARKED DECREASE, AS A RESULT, SINCE LAST BREEDING SEASON, WHEN AT LEAST 4 OWL PAIRS WERE PRESENT. IN 1991, A SINGLE OWL PAIR WAS OBSERVED.

Owner/Manager: EBRPD-HAYWARD SHORELINE RP

Source Codes

CUL91F02

ATHENE CUNICULARIA (BURROW SITES) (cont.)

BURROWING OWL — Element Code: ABNSB10010

Status — NDDB Element Ranks — Other Lists

Federal: None — Global: G4 — CDFG Status: SC

State: None — State: S2

Habitat Associations

General: FOUND IN OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.

Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 183 — Map Index: 24570 — Dates Last Seen

Occ Rank: Good — Element: 1993-06-29

Origin: Natural/Native occurrence — Site: 1993-06-29

Presence: Presumed Extant

Trend: Unknown

Main Source: DRAMER, P. 1993 (OBS)

Quad Summary: NEWARK (3712251/447D)

County Summary: ALAMEDA

SNA Summary:

Location: EAST SIDE OF COYOTE HILLS, 0.8 MILE NORTH OF DUMBARTON ROAD, NW OF NEWARK.

Lat/Long: 37ø32'38" / 122ø04'18" — Township: 04S

UTM: Zone-10 N4155425 E582003 — Range: 02W

Mapping Precision: SPECIFIC — Section: XX Qtr XX

Symbol Type: POINT — Meridian: M

Radius: 80 meters — Elevation: 10 ft

Comments

Distribution:

Ecological: HABITAT CONSISTS OF OVERGRAZED HORSE PASTURE.

Threat: MAIN THREAT IS RED FOX (INTRODUCED) PREDATION.

General: 2 ADULTS AND 5 JUVENILES OBSERVED AT BURROW SITE IN 1993.

Owner/Manager: PVT-CARGILL/LESLIE SALT CO

Source Codes

DRA93F01

ATHENE CUNICULARIA (BURROW SITES) (cont.)
BURROWING OWL — Element Code: ABNSB10010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G4 — CDFG Status: SC
State: None — State: S2

Habitat Associations
General: FOUND IN OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.
Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 270 — Map Index: 39309 — Dates Last Seen
Occ Rank: Good — Element: 1998-07-23
Origin: Natural/Native occurrence — Site: 1998-07-23
Presence: Presumed Extant
Trend: Unknown
Main Source: REARDON, L. 1998 (OBS)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:

Location: SOUTH SIDE OF CHERRY STREET, 0.2 MILE EAST OF MOWRY AVENUE, NEWARK
Lat/Long: 37ø31'07" / 122ø00'22" — Township: 05S
UTM: Zone-10 N4152692 E587820 — Range: 01W
Mapping Precision: NON-SPECIFIC — Section: 07 Qtr NE
Symbol Type: POINT — Meridian: M
Radius: 1/10 mile — Elevation: 15 ft

Comments
Distribution: ONE BURROW IS LOCATED NEXT TO 39201 CHERRY STREET (HEWLETT-PACKARD), A FEW FEET FROM THE SIDEWALK. SECOND BURROW IS NEXT TO THE CHAINLINK FENCE DIVIDING SUN AND H-P PROPERTIES.
Ecological: BURROW SITES ARE OLD GROUND SQUIRREL HOLES; HAYFIELD ADJACENT.
Threat: THREATENED BY HUMAN ACTIVITIES.
General: FROM MID-JUNE TO MID-JULY 1998, 2 PAIRS OBSERVED IN THIS BURROW COMPLEX; 1 PAIR WITH 2 YOUNG.
Owner/Manager: PVT-SUN MICROSYSTEMS

Source Codes
REA98F01, REA98F02

ATHENE CUNICULARIA (BURROW SITES) (cont.)
BURROWING OWL — Element Code: ABNSB10010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G4 — CDFG Status: SC
State: None — State: S2

Habitat Associations
General: FOUND IN OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.
Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 271 — Map Index: 39310 — Dates Last Seen
Occ Rank: Good — Element: 1998-07-22
Origin: Natural/Native occurrence — Site: 1998-07-22
Presence: Presumed Extant
Trend: Unknown
Main Source: REARDON, L. 1998 (OBS)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:

Location: 0.5 MILE SE OF THE INTERSECTION OF CHERRY STREET AND MOWRY AVENUE, NEWARK
Lat/Long: 37ø30'58" / 122ø00'08" — Township: 05S
UTM: Zone-10 N4152412 E588169 — Range: 01W
Mapping Precision: NON-SPECIFIC — Section: 08 Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/10 mile — Elevation: 15 ft

Comments
Distribution: BURROW LOCATED IN GROUND SQUIRREL BURROWS 20-30 FEET NORTH OF A CHAINLINK FENCE SEPARATING THE FLOOD CONTROL CHANNEL ROAD.
Ecological: HABITAT CONSISTS OF AN UNDEVELOPED FIELD WHERE HAY IS FARMED.
Threat: THREATENED BY FARMING ACTIVITIES (DISCING).
General: 1 PAIR OBSERVED AT THE BURROW SITE ON 22 JULY 1998.
Owner/Manager: PVT-SUN MICROSYSTEMS

Source Codes
REA98F03

ASIO FLAMMEUS (NESTING)
SHORT-EARED OWL — Element Code: ABNSB13040

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5 — CDFG Status: SC
State: None — State: S3

Habitat Associations
General: FOUND IN SWAMP LANDS, BOTH FRESH AND SALT; LOWLAND MEADOWS; IRRIGATED ALFALFA FIELDS.
Micro: TULE PATCHES/TALL GRASS NEEDED FOR NESTING/DAYTIME SECLUSION. NESTS ON DRY GROUND IN DEPRESSION CONCEALED IN VEGETATION.

Occurrence No. 4 — Map Index: 09305 — Dates Last Seen
Occ Rank: Unknown — Element: 1977-XX-XX
Origin: Natural/Native occurrence — Site: 1977-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: REMSEN, V. 1978 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary: Bair and Greco Islands
Location: BAIR ISLAND IN SF BAY (3 MI SE FOSTER CITY).
Lat/Long: 37ø31'41" / 122ø13'02" — Township: 05S
UTM: Zone-10 N4153543 E569166 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 10 ft

Comments
Distribution:
Ecological:
Threat:
General: BIRDS NESTING.
Owner/Manager: UNKNOWN

Source Codes
REM78R01

RIPARIA RIPARIA (NESTING)
BANK SWALLOW — Element Code: ABPAU08010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5 — CDFG Status:
State: Threatened — State: S2S3

Habitat Associations
General: COLONIAL NESTER; NESTS PRIMARILY IN RIPARIAN AND OTHER LOWLAND HABITATS WEST OF THE DESERT.
Micro: REQUIRES VERTICAL BANKS/CLIFFS WITH FINE-TEXTURED/SANDY SOILS NEAR STREAMS, RIVERS, LAKES, OCEAN TO DIG NESTING HOLE.

Occurrence No. 74 — Map Index: 09599 — Dates Last Seen
Occ Rank: Unknown — Element: 1983-XX-XX
Origin: Natural/Native occurrence — Site: 1983-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: HUMPHREY, J. 1986 (PERS)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Coyote Hills North Marsh
Location: COYOTE HILLS REGIONAL PARK.
Lat/Long: / — Township:
UTM: — Range:
Mapping Precision: — Section: Qtr
Symbol Type: — Meridian:
Radius: — Elevation:

Comments
Distribution:
Ecological:
Threat:
General: POSSIBLE COLONY AT THIS SITE.
Owner/Manager: UNKNOWN

Source Codes
HUM86U01

DENDROICA PETECHIA BREWSTERI (NESTING)
YELLOW WARBLER — Element Code: ABPBX03018

Status — NDDB Element Ranks — Other Lists

Federal: None — Global: G5T2 — CDFG Status: SC
State: None — State: S2

Habitat Associations

General: RIPARIAN PLANT ASSOCIATIONS. PREFERS WILLOWS, COTTONWOODS, ASPENS, SYCAMORES, & ALDERS FOR NESTING AND FORAGING.
Micro: ALSO NESTS IN MONTANE SHRUBBERY IN OPEN CONIFER FORESTS.

Occurrence No. 76 — Map Index: 44072 — Dates Last Seen

Occ Rank: Good — Element: 2000-06-01
Origin: Natural/Native occurrence — Site: 2000-06-01
Presence: Presumed Extant
Trend: Unknown
Main Source: DREIER, J. 2000 (OBS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:

Location: CULL CREEK, 0.6 MILE NORTH OF CULL CREEK DAM, 1 MILE ESE OF PROCTOR SCHOOL, CASTRO VALLEY.

Lat/Long: 37ø42'44" / 122ø03'15" — Township: 02S
UTM: Zone-10 N4174130 E583346 — Range: 02W
Mapping Precision: SPECIFIC — Section: 35 Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 80 meters — Elevation: 280 ft

Comments

Distribution: CULL CANYON REGIONAL RECREATION AREA.
Ecological: RIPARIAN VEGETATION
Threat:
General: 1 MALE OBSERVED EXIBITING BREEDING/TERRITORIAL BEHAVIOR SUCH AS SINGING AND CHASING OTHER BIRDS.
Owner/Manager: EBRPD-CULL CANYON RA

Source Codes

DRE00F02

GEOTHLYPIS TRICHAS SINUOSA
SALTMARSH COMMON YELLOWTHROAT — Element Code: ABPBX1201A

Status — NDDB Element Ranks — Other Lists

Federal: None — Global: G5T2 — CDFG Status: SC
State: None — State: S2

Habitat Associations

General: RESIDENT OF THE SAN FRANCISCO BAY REGION, IN FRESH AND SALT WATER MARSHES.
Micro: REQUIRES THICK, CONTINUOUS COVER DOWN TO WATER SURFACE FOR FORAGING; TALL GRASSES, TULE PATCHES, WILLOWS FOR NESTING.

Occurrence No. 6 — Map Index: 09577 — Dates Last Seen

Occ Rank: Unknown — Element: 1985-XX-XX
Origin: Natural/Native occurrence — Site: 1985-XX-XX
Presence: Presumed Extant
Trend: Increasing
Main Source: U.S. FISH & WILDLIFE SERVICE 1986 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Coyote Hills North Marsh

Location: DIKED MARSH AREA ADJACENT TO COYOTE HILLS, COYOTE HILLS REGIONAL PARK.

Lat/Long: 37ø33'10" / 122ø05'09" — Township: 04S
UTM: Zone-10 N4156373 E580738 — Range: 02W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 159.3 ac — Elevation: 10 ft

Comments

Distribution: 32 BREEDING PAIRS OBS DURING 1987 SURVEY. BIRDS NESTING IN CATTAILS OR IN UPLAND VEGETATION IN WEEDY FIELDS. 27 PAIRS OBS IN 1977.
Ecological: FRESHWATER MARSH IS SUPPLIED FROM WINTER RUNOFF & WELLS IN THE SUMMER. MARSH HAS BEEN EXPANDED SINCE 1977.
Threat:
General:
Owner/Manager: EBRPD-COYOTE HILLS RP

Source Codes

FWS86R03, FOS77R01

GEOTHLYPIS TRICHAS SINUOSA (cont.)
SALTMARSH COMMON YELLOWTHROAT — Element Code: ABPBX1201A

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5T2 — CDFG Status: SC
State: None — State: S2

Habitat Associations
General: RESIDENT OF THE SAN FRANCISCO BAY REGION, IN FRESH AND SALT WATER MARSHES.
Micro: REQUIRES THICK, CONTINUOUS COVER DOWN TO WATER SURFACE FOR FORAGING; TALL GRASSES, TULE PATCHES, WILLOWS FOR NESTING.

Occurrence No. 7 — Map Index: 09540 — Dates Last Seen
Occ Rank: Unknown — Element: 1976-XX-XX
Origin: Natural/Native occurrence — Site: 1976-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: FOSTER, M. 1977 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh
Location: ALAMEDA CREEK, BETWEEN HESPERIAN BOULEVARD & THE LESLIE SALT PONDS IN UNION CITY.
Lat/Long: 37ø36'18" / 122ø05'19" — Township: 04S
UTM: Zone-10 N4162203 E580427 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: 09 Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 54.6 ac — Elevation:

Comments
Distribution: YELLOWTHROAT HABITAT OCCURS ALONG A 0.5 MI SECTION OF THE CREEK BETWEEN HESPERIAN BLVD & THE SALT PONDS.
Ecological:
Threat:
General: 8 YELLOWTHROAT TERRITORIES FOUND ALONG CREEK TRANSECT.
Owner/Manager: PVT

Source Codes
FOS77R01

GEOTHLYPIS TRICHAS SINUOSA (cont.)
SALTMARSH COMMON YELLOWTHROAT — Element Code: ABPBX1201A

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5T2 — CDFG Status: SC
State: None — State: S2

Habitat Associations
General: RESIDENT OF THE SAN FRANCISCO BAY REGION, IN FRESH AND SALT WATER MARSHES.
Micro: REQUIRES THICK, CONTINUOUS COVER DOWN TO WATER SURFACE FOR FORAGING; TALL GRASSES, TULE PATCHES, WILLOWS FOR NESTING.

Occurrence No. 15 — Map Index: 09590 — Dates Last Seen
Occ Rank: Unknown — Element: 1986-06-XX
Origin: Natural/Native occurrence — Site: 1986-06-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: WESCO 1987 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Coyote Hills North Marsh
Location: 1.5 MI S OF UNION CITY IN N SIDE OF COYOTE HILLS SLOUGH
Lat/Long: 37ø34'11" / 122ø04'55" — Township: 04S
UTM: Zone-10 N4158267 E581073 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 3 ft

Comments
Distribution: OBSERVATION OF SINGING MALE/NESTING TERRITORY MADE DURING A SALT MARSH HARVEST MOUSE TRAPPING SURVEY.
Ecological:
Threat:
General:
Owner/Manager: ALA COUNTY

Source Codes
WES87R01

GEOTHLYPIS TRICHAS SINUOSA (cont.)
SALTMARSH COMMON YELLOWTHROAT Element Code: ABPBX1201A

Status NDDB Element Ranks Other Lists
Federal: None Global: G5T2 CDFG Status: SC
State: None State: S2

Habitat Associations
General: RESIDENT OF THE SAN FRANCISCO BAY REGION, IN FRESH AND SALT WATER MARSHES.
Micro: REQUIRES THICK, CONTINUOUS COVER DOWN TO WATER SURFACE FOR FORAGING; TALL GRASSES, TULE PATCHES, WILLOWS FOR NESTING.

Occurrence No. 16 Map Index: 09615 Dates Last Seen
Occ Rank: Unknown Element: 1986-06-XX
Origin: Natural/Native occurrence Site: 1986-06-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: WESCO 1987 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Coyote Hills North Marsh
Location: 2 MI S OF UNION CITY, 0.3 MI SW OF NEWARK BLVD AND JUST N OFCOYOTE HILLS SLOUGH.
Lat/Long: 37ø33'53" / 122ø04'30" Township: 04S
UTM: Zone-10 N4157719 E581693 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1/5 mile Elevation: 3 ft
Comments
Distribution: OBSERVATION OF SINGING MALE/NESTING TERRITORY MADE DURING A SALT MARSH HARVEST MOUSE TRAPPING SURVEY.
Ecological: HABITAT CONSISTS OF DIKED WETLANDS.
Threat:
General:
Owner/Manager: ALA COUNTY

Source Codes
WES87R01

GEOTHLYPIS TRICHAS SINUOSA (cont.)
SALTMARSH COMMON YELLOWTHROAT Element Code: ABPBX1201A

Status NDDB Element Ranks Other Lists
Federal: None Global: G5T2 CDFG Status: SC
State: None State: S2

Habitat Associations
General: RESIDENT OF THE SAN FRANCISCO BAY REGION, IN FRESH AND SALT WATER MARSHES.
Micro: REQUIRES THICK, CONTINUOUS COVER DOWN TO WATER SURFACE FOR FORAGING; TALL GRASSES, TULE PATCHES, WILLOWS FOR NESTING.

Occurrence No. 44 Map Index: 09553 Dates Last Seen
Occ Rank: Unknown Element: 1985-XX-XX
Origin: Natural/Native occurrence Site: 1985-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: U.S. FISH & WILDLIFE SERVICE 1986 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Coyote Hills North Marsh
Location: PATTERSON CREEK, N OF JCT WITH FLOOD CONTROL CHANNEL, N OF COYOTE REGIONAL PARK.
Lat/Long: 37ø33'54" / 122ø05'36" Township: 04S
UTM: Zone-10 N4157720 E580080 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1/5 mile Elevation:
Comments
Distribution: 2 BREEDING PAIRS OBS DURING 1985 SUSRVEY IN FRESHWATER MARSH AND UPLAND VEG IN WEEDY FIELDS.
Ecological:
Threat:
General:
Owner/Manager: ALA COUNTY

Source Codes
FWS86R03

GEOTHLYPIS TRICHAS SINUOSA (cont.)
SALTMARSH COMMON YELLOWTHROAT — Element Code: ABPBX1201A

Status	NDDB Element Ranks	Other Lists
Federal: None	Global: G5T2	CDFG Status: SC
State: None	State: S2	

Habitat Associations

General: RESIDENT OF THE SAN FRANCISCO BAY REGION, IN FRESH AND SALT WATER MARSHES.

Micro: REQUIRES THICK, CONTINUOUS COVER DOWN TO WATER SURFACE FOR FORAGING; TALL GRASSES, TULE PATCHES, WILLOWS FOR NESTING.

Occurrence No. 67 — Map Index: 09348 — Dates Last Seen
Occ Rank: Excellent — Element: 1995-12-20
Origin: Natural/Native occurrence — Site: 1995-12-20
Presence: Presumed Extant
Trend: Unknown
Main Source: BOBZIEN, S. 1995 (OBS)

Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary: Oakland Airport Shoreline

Location: ARROWHEAD MARSH, AT MARTIN LUTHER KING SHORELINE, IN SAN LEANDRO BAY.

Lat/Long: 37ø44'40" / 122ø12'45" — Township: 02S
UTM: Zone-10 N4177538 E569390 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 45.9 ac — Elevation: 1 ft

Comments

Distribution: DURING THE DECEMBER 1995 SURVEY, THE MARSH WAS ALMOST ENTIRELY SUBMERGED BY A 7.0 FT HIGH TIDE.

Ecological: HABITAT CONSISTS OF SALT WATER EMERGENT WETLANDS DOMINATED BY PICKLEWEED AND TWO SPECIES OF CORDGRASS (ONE NATVIE, ONE NON-NATIVE).

Threat: NON-NATIVE RED FOXES.

General: TWO SALTMARSH COMMON YELLOWTHROATS WERE OBSERVED DURING A CLAPPER RAIL SURVEY ON 12/20/95.

Owner/Manager: EBRPD

Source Codes

BOB95F05

AGELAIUS TRICOLOR (NESTING COLONY)
TRICOLORED BLACKBIRD — Element Code: ABPBXB0020

Status	NDDB Element Ranks	Other Lists
Federal: None	Global: G3	CDFG Status: SC
State: None	State: S3	

Habitat Associations

General: HIGHLY COLONIAL SPECIES, MOST NUMBEROUS IN THE CENTRAL VALLEY & VICINITY. LARGELY ENDEMIC TO CALIFORNIA.

Micro: REQUIRES OPEN WATER, PROTECTED NESTING SUBSTRATE, & FORAGING AREA WITH INSECT PREY WITHIN A FEW KM OF THE COLONY.

* SENSITIVE *
Occurrence No. 25 — Map Index: 09599 — Dates Last Seen
Occ Rank: Unknown — Element: 1971-05-11
Origin: Natural/Native occurrence — Site: 1971-05-11
Presence: Presumed Extant
Trend: Unknown
Main Source: HOSEA, R. 1986 (OBS)

Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Coyote Hills North Marsh

Location: *SENSITIVE* Location information suppressed.

* SENSITIVE * Lat/Long: / — Township:
UTM: — Range:
Mapping Precision: — Section: Qtr
Symbol Type: — Meridian:
Radius: — Elevation:

Comments

Distribution: Please contact the Calfornia Natural Diversity Database, California Department of Fish and Game, for more information: (916) 324-3812.

Ecological: TULES; WATER 1-2 FEET DEEP.

Threat:

General:

Owner/Manager:

Source Codes

HOS86U02, BEE91R01

ONCORHYNCHUS MYKISS IRIDEUS
STEELHEAD-CENTRAL CALIFORNIA COAST ESU — Element Code: AFCHA0209G

Status — NDDB Element Ranks — Other Lists
Federal: Threatened — Global: G5T2 — CDFG Status:
State: None — State: S2

Habitat Associations
General: FROM RUSSIAN RIVER, SOUTH TO SOQUEL CR & TO, BUT NOT INCLUDING, PAJARO RIVER. ALSO SAN FRANCISCO & SAN PABLO BAY BASINS.
Micro:

Occurrence No. 2 — Map Index: 41531 — Dates Last Seen
Occ Rank: Unknown — Element: 1999-03-XX
Origin: Natural/Native occurrence — Site: 1999-03-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: MILLER, J. 1999 (OBS)

Quad Summary: NILES (3712158/446C)*, CALAVERAS RESERVOIR (3712147/427A), LA COSTA VALLEY (3712157/446D), NEWARK (3712251/447D), REDWOOD POINT (3712252/447C)
County Summary: ALAMEDA
SNA Summary:

Location: ALAMEDA CREEK (& STORYBOOK CR), FROM SUNOL VALLEY TO THE MOUTH AT SAN FRANCISCO BAY, NILES CANYON, FREMONT.

Lat/Long: 37ø35'50" / 121ø56'56" — Township: 04S
UTM: Zone-10 N4161456 E592781 — Range: 01W
Mapping Precision: SPECIFIC — Section: 11 Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 2,161.4 ac — Elevation: 200 ft

Comments
Distribution: LOWER SECTION FROM THE FISH BARRIER (SUNOL DAM) TO THE MOUTH. UPPER SECTION SURVEYED MOST OF ALAMEDA CREEK AND LOWER REACHES OF BELOW LISTED TRIBS, AND AT LEAST 0.5 MILE UP CALAVERAS CREEK. SUNOL DAM THOUGHT TO BE AN IMPASSABLE BARRIER.
Ecological: STEELHEAD/RAINBOW TROUT CAPTURED IN ALAMEDA, STONYBROOK, PIRATE, WELCH, INDIAN JOE, W-TREE, ARROYO MOCHO CREEKS, GENETICALLY TESTS AS MOST LIKELY BELONGING TO THE CENTRAL CALIFORNIA COAST ESU (NIELSEN 1999).
Threat: GRAZING, EROSION. MIGRATION BARRIERS: DAMS, DROP STRUCTURE, UNSCREENED WATER DIVERSION. PROPOSED GRAVEL QUARY EXPANSION.
General: 40-100 ADULTS OBSERVED BELOW SUNOL DAM; EGGS RESCUED BELOW DAM, RAISED TO FRY AND 155 RELEASED, ~1 RIVER MILE DOWNSTREAM OF CONFLUENCE WITH LEYLEN CREEK. STEELHEAD/RAINBOW SURVEYS IN UPPER ALAMEDA AND TRIBS WITH SITES AND NUMBERS CAPTURED.
Owner/Manager: ALAMEDA CO FLOOD CONTROL DIST

Source Codes
MIL99F04, MIL99F05, MIL99F06, ALE99U01, TAY99U01, NIE99R01, GUN00U01

SOREX VAGRANS HALICOETES
SALT-MARSH WANDERING SHREW — Element Code: AMABA01071

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5T1 — CDFG Status: SC
State: None — State: S1

Habitat Associations
General: SALT MARSHES OF THE SOUTH ARM OF SAN FRANCISCO BAY.
Micro: MEDIUM HIGH MARSH 6-8 FT ABOVE SEA LEVEL WHERE ABUNDANT DRIFTWOOD IS SCATTERED AMONG SALICORNIA.

Occurrence No. 3 — Map Index: 09358 — Dates Last Seen
Occ Rank: Unknown — Element: 1985-12-XX
Origin: Natural/Native occurrence — Site: 1985-12-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: U.S. FISH & WILDLIFE SERVICE 1986 (LIT)

Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary: Bair and Greco Islands

Location: BAIR ISLAND, NEAR REDWOOD POINT

Lat/Long: 37ø32'01" / 122ø13'04" — Township: 05S
UTM: Zone-10 N4154149 E569107 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 2 ft

Comments
Distribution:
Ecological: TIDAL SALICORNIA AND UPLAND HABITAT.
Threat:
General: 300 TRAP-NIGHTS: NO S. V. HALICOETES CAPTURED IN TRAPS, 3 OBSERVED IN COVER ADJACENT TO TRAPLINE.
Owner/Manager: USFWS-SAN FRANCISCO BAY NWR

Source Codes
WES86R01

SOREX VAGRANS HALICOETES (cont.)
SALT-MARSH WANDERING SHREW Element Code: AMABA01071

Status
Federal: None Global: G5T1 CDFG Status: SC
State: None State: S1

Habitat Associations
General: SALT MARSHES OF THE SOUTH ARM OF SAN FRANCISCO BAY.
Micro: MEDIUM HIGH MARSH 6-8 FT ABOVE SEA LEVEL WHERE ABUNDANT DRIFTWOOD IS SCATTERED AMONG SALICORNIA.

NDDB Element Ranks
Other Lists

Occurrence No. 5 Map Index: 09477 Dates Last Seen
Occ Rank: Unknown Element: 1985-12-XX
Origin: Natural/Native occurrence Site: 1985-12-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: U.S. FISH & WILDLIFE SERVICE 1986 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh
Location: ALAMEDA CREEK, JUST NORTH OF MOUTH OF FLOOD CONTROL CHANNEL.
Lat/Long: 37ø35'56" / 122ø08'28" Township: 04S
UTM: Zone-10 N4161455 E575814 Range: 03W
Mapping Precision: NON-SPECIFIC Section: 12 Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1/10 mile Elevation: 2 ft

Comments
Distribution:
Ecological: TIDAL SALICORNIA HABITAT.
Threat:
General: 300 TRAP-NIGHTS. NONE CAPTURED IN TRAPS, ONE OBSERVED IN COVER ADJACENT TO TRAPLINE. AREA TRAPPED BY GILROY & SHELLHAMMER IN 1980, TWO SHREWS CAPTURED BUT RECORDED ONLY AS S. VAGRANS.
Owner/Manager: PVT-LESLIE SALT CO

Source Codes
WES86R01

SOREX VAGRANS HALICOETES (cont.)
SALT-MARSH WANDERING SHREW Element Code: AMABA01071

Status
Federal: None Global: G5T1 CDFG Status: SC
State: None State: S1

Habitat Associations
General: SALT MARSHES OF THE SOUTH ARM OF SAN FRANCISCO BAY.
Micro: MEDIUM HIGH MARSH 6-8 FT ABOVE SEA LEVEL WHERE ABUNDANT DRIFTWOOD IS SCATTERED AMONG SALICORNIA.

NDDB Element Ranks
Other Lists

Occurrence No. 7 Map Index: 09562 Dates Last Seen
Occ Rank: Unknown Element: 1985-12-XX
Origin: Natural/Native occurrence Site: 1985-12-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: U.S. FISH & WILDLIFE SERVICE 1986 (LIT)
Quad Summary: NEWARK (3712251/447D)*, MOUNTAIN VIEW (3712241/428A)
County Summary: ALAMEDA
SNA Summary: Dumbarton Point
Location: DUMBARTON POINT/NEWARK SLOUGH MARSHES, SOUTH OF HWY 84, WEST OF NEWARK.
Lat/Long: 37ø30'59" / 122ø04'51" Township: 05S
UTM: Zone-10 N4152352 E581223 Range: 02W
Mapping Precision: SPECIFIC Section: XX Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 888.1 ac Elevation: 3 ft

Comments
Distribution: CAPTURES IN BOTH THE DUMBARTON POINT AND NEWARK SLOUGH MARSHES.
Ecological: TIDAL SALICORNIA SALT MARSH AND DIKED SALT MARSH.
Threat:
General: NEWARK SLOUGH AREA: 1950: MVZ #114162. 1980: 1 TRAPPED BY GILROY & SHELLHAMMER RECORDED ONLY AS SOREX VAGRANS; 1982: 2 TAKEN & RECORDED ONLY AS SOREX SP. DUMBARTON AREA: 1985: NO SHREWS IN 300 TRAP-NIGHTS, 3 OBS ADJACENT TO TRAPLINE.
Owner/Manager: USFWS-SAN FRANCISCO BAY NWR

Source Codes
WES86R01, MVZ81S01

SOREX VAGRANS HALICOETES (cont.)
SALT-MARSH WANDERING SHREW — Element Code: AMABA01071

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5T1 — CDFG Status: SC
State: None — State: S1

Habitat Associations
General: SALT MARSHES OF THE SOUTH ARM OF SAN FRANCISCO BAY.
Micro: MEDIUM HIGH MARSH 6-8 FT ABOVE SEA LEVEL WHERE ABUNDANT DRIFTWOOD IS SCATTERED AMONG SALICORNIA.

Occurrence No. 11 — Map Index: 09348 — Dates Last Seen
Occ Rank: Unknown — Element: 1938-02-25
Origin: Natural/Native occurrence — Site: 1938-02-25
Presence: Presumed Extant
Trend: Unknown
Main Source: U.S. FISH & WILDLIFE SERVICE 1986 (LIT)

Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary: Oakland Airport Shoreline

Location: ARROWHEAD (MELROSE) MARSH, JUST NORTH OF OAKLAND AIRPORT, SAN LEANDRO BAY.

Lat/Long: 37ø44'40" / 122ø12'45" — Township: 02S
UTM: Zone-10 N4177538 E569390 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 45.9 ac — Elevation: 1 ft

Comments
Distribution:
Ecological: FORMERLY KNOWN AS MELROSE MARSH; NAME CHANGE REFLECTS CURRENT CONDITION-ONLY ARROWHEAD-SHAPED TIP OF TIDAL SALT MARSH REMAINS. SE PORTION OF ORIGINAL MARSH HAS BEEN FILLED. REMAINING HABITAT EXCELLENT.
Threat:
General: MVZ SPECIMENS FROM 1910, 1937, & 1938: #12728, 77513, 81286, 87900. NO RECENT SHREW RECORDS.
Owner/Manager: PORT OF OAKLAND/EBRPD

Source Codes
WES86R01, KEL87U02, MVZ81S01

SOREX VAGRANS HALICOETES (cont.)
SALT-MARSH WANDERING SHREW — Element Code: AMABA01071

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5T1 — CDFG Status: SC
State: None — State: S1

Habitat Associations
General: SALT MARSHES OF THE SOUTH ARM OF SAN FRANCISCO BAY.
Micro: MEDIUM HIGH MARSH 6-8 FT ABOVE SEA LEVEL WHERE ABUNDANT DRIFTWOOD IS SCATTERED AMONG SALICORNIA.

Occurrence No. 12 — Map Index: 09327 — Dates Last Seen
Occ Rank: Unknown — Element: 1950-09-27
Origin: Natural/Native occurrence — Site: 1985-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: U.S. FISH & WILDLIFE SERVICE 1986 (LIT)

Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary: Oakland Airport Shoreline

Location: OAKLAND AIRPORT

Lat/Long: 37ø42'54" / 122ø13'14" — Township: 02S
UTM: Zone-10 N4174275 E568699 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 2 ft

Comments
Distribution:
Ecological: APPROX 334 ACRES OF DIKED SALT MARSH.
Threat:
General: MVZ SPECIMENS #112145 FROM 1947 AND #114163-114174 FROM 1950. TRAPPING BY SHELLHAMMER IN 1985 BUT NO SHREWS CAPTURED.
Owner/Manager: PORT OF OAKLAND

Source Codes
WES86R01, MVZ81S01

SOREX VAGRANS HALICOETES (cont.)
SALT-MARSH WANDERING SHREW Element Code: AMABA01071

Status NDDB Element Ranks Other Lists
Federal: None Global: G5T1 CDFG Status: SC
State: None State: S1

Habitat Associations
General: SALT MARSHES OF THE SOUTH ARM OF SAN FRANCISCO BAY.
Micro: MEDIUM HIGH MARSH 6-8 FT ABOVE SEA LEVEL WHERE ABUNDANT DRIFTWOOD IS SCATTERED AMONG SALICORNIA.

Occurrence No. 13 Map Index: 09471 Dates Last Seen
Occ Rank: Unknown Element: 1961-XX-XX
Origin: Natural/Native occurrence Site: 1975-XX-XX
Presence: Presumed Extant
Trend: Decreasing
Main Source: U.S. FISH & WILDLIFE SERVICE 1986 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)*, PALO ALTO (3712242/428B)
County Summary: SAN MATEO
SNA Summary: Dumbarton Point
Location: SALT MARSH FROM RAVENSWOOD POINT TO THE WEST APPROACH TO THE DUMBARTON BRIDGE.
Lat/Long: 37ø30'20" / 122ø07'57" Township: 05S
UTM: Zone-10 N4151128 E576658 Range: 02W
Mapping Precision: NON-SPECIFIC Section: 18 Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 99.1 ac Elevation: 2 ft

Comments
Distribution:
Ecological: AT RAVENSWOOD POINT THERE ARE ABOUT 50 ACRES OF DIKED SALT MARSH AND 35 ACRES OF TIDAL SALT MARSH. MOST OUTWARD SECTIONS OF TIDAL MARSH ARE TOTALLY INUNDATED DAILY BY HIGH TIDES.
Threat:
General: MVZ RECORDS FROM 1950 & 1951 FROM RAVENSWOOD POINT. TRAPPING DONE IN 1975 AT RAVENSWOOD POINT (CUMMINGS), BUT NO SHREWS CAPTURED. MVZ SPECIMENS #115056-115058 FROM 1951 & MVZ SPECIMEN #134461 FROM 1961 FROM DUMBARTON BRIDGE AREA.
Owner/Manager: USFWS-SAN FRANCISCO BAY NWR

Source Codes
WES86R01, MVZ81S01

California Department of Fish and Game
Natural Diversity Data Base
Full Expanded Report Ä One Record Per Page

SOREX VAGRANS HALICOETES (cont.)
SALT-MARSH WANDERING SHREW Element Code: AMABA01071

Status NDDB Element Ranks Other Lists
Federal: None Global: G5T1 CDFG Status: SC
State: None State: S1

Habitat Associations
General: SALT MARSHES OF THE SOUTH ARM OF SAN FRANCISCO BAY.
Micro: MEDIUM HIGH MARSH 6-8 FT ABOVE SEA LEVEL WHERE ABUNDANT DRIFTWOOD IS SCATTERED AMONG SALICORNIA.

Occurrence No. 14 Map Index: 09464 Dates Last Seen
Occ Rank: Unknown Element: 1951-05-21
Origin: Natural/Native occurrence Site: 1983-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: U.S. FISH & WILDLIFE SERVICE 1986 (LIT)
Quad Summary: SAN LEANDRO (3712262/447B)*, REDWOOD POINT (3712252/447C)
County Summary: ALAMEDA
SNA Summary: Johnson Landing
Location: JOHNSON AND HAYWARD LANDINGS.
Lat/Long: 37ø38'17" / 122ø08'52" Township: 03S
UTM: Zone-10 N4165794 E575191 Range: 03W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1 mile Elevation: 5 ft

Comments
Distribution:
Ecological: APPROX 120 ACRES OF DIKED SALT MARSH AND 30 ACRES OF TIDAL SALT MARSH.
Threat:
General: MVZ SPECIMENS #115059-115063, 115196, FROM 1951. TRAPPING IN 1983 BY SHELLHAMMER, BUT NO SHREWS CAPTURED.
Owner/Manager: EBRPD

Source Codes
WES86R01, MVZ81S01

REITHRODONTOMYS RAVIVENTRIS
SALT-MARSH HARVEST MOUSE Element Code: AMAFF02040

Status NDDB Element Ranks Other Lists
Federal: Endangered Global: G1G2 CDFG Status:
State: Endangered State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 1 Map Index: 15937 Dates Last Seen
Occ Rank: Unknown Element: 1971-XX-XX
Origin: Natural/Native occurrence Site: 1971-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: SCHAUB, D. 1971 (LIT)

Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Dumbarton Point

Location: DUMBARTON POINT (MARSH), 2 MILES NORTH OF THE EASTERN END OF DUMBARTON BRIDGE.

Lat/Long: 37ø32'18" / 122ø06'47" Township: 04S
UTM: Zone-10 N4154752 E578350 Range: 02W
Mapping Precision: SPECIFIC Section: 31 Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 172.5 ac Elevation: 2 ft

Comments

Distribution:
Ecological: HABITAT CONSISTS OF NORTHERN COASTAL SALTMARSH, VEGETATED BY MIXED SPARTINA-SALICORNIA COVER IN A BAYSIDE, FULLY-TIDAL MARSH OF APPROXIMATELY 200 ACRES.
Threat: HABITAT DISAPPEARING ON BAYSIDE DUE TO WIND/WATER EROSION.
General: 3 SMHM CAPTURED DURING 25 TRAPNIGHTS DURING A 1971 SURVEY.
Owner/Manager: PVT-IDEAL CEMENT COMPANY

Source Codes
KEL87U01, SCH71R01

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE Element Code: AMAFF02040

Status NDDB Element Ranks Other Lists
Federal: Endangered Global: G1G2 CDFG Status:
State: Endangered State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 8 Map Index: 09369 Dates Last Seen
Occ Rank: Unknown Element: 1971-08-06
Origin: Natural/Native occurrence Site: 1971-08-06
Presence: Presumed Extant
Trend: Unknown
Main Source: SCHAUB, D. 1971 (LIT)

Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary:

Location: GRECO ISLAND, 2.5 MI NE OF REDWOOD CITY.

Lat/Long: 37ø30'55" / 122ø11'19" Township: 05S
UTM: Zone-10 N4152140 E571706 Range: 03W
Mapping Precision: NON-SPECIFIC Section: 03 Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1/5 mile Elevation: 2 ft

Comments

Distribution: TWO CAPTURES (PLUS ONE RECAPTURE) DURING 100 TRAPNIGHTS, ON AUG 5-6, 1971.
Ecological:
Threat:
General:
Owner/Manager: USFWS, NAS (LEASE)

Source Codes
SCH71R01

REITHRODONTOMYS RAVIVENTRIS (cont.)

SALT-MARSH HARVEST MOUSE — Element Code: AMAFF02040

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G1G2	CDFG Status:
State: Endangered	State: S1S2	

Habitat Associations

General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.

Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 25 — Map Index: 09557 — Dates Last Seen

Occ Rank: Unknown — Element: 1984-08-XX
Origin: Natural/Native occurrence — Site: 1984-08-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: ZETTERQUIST, D. 1977 (LIT)

Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Coyote Hills North Marsh

Location: NORTH MARSH, ON NE EDGE OF COYOTE HILLS REGIONAL PARK, W OF FREMONT.

Lat/Long: 37ø33'37" / 122ø05'17" — Township: 04S
UTM: Zone-10 N4157204 E580541 — Range: 02W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 108.3 ac — Elevation:

Comments

Distribution: 8 SMHM CAPTURED IN 1975, INCLUDING ONE NEAR EBRPD HEADQUARTERS. ONE CAPTURED DURING 200 TRAPNIGHTS (8/19-20/1984).

Ecological: HABITAT CONSISTS OF AN UPLAND BORDER OF MIXED GRASSES, BRASSICA, AND RUMEX, SURROUNDING A STAND OF NEARLY PURE SALICORNIA.

Threat:

General:

Owner/Manager: EBRPD-COYOTE HILLS RP

Source Codes

SHE85R01, ZET77A01

REITHRODONTOMYS RAVIVENTRIS (cont.)

SALT-MARSH HARVEST MOUSE — Element Code: AMAFF02040

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G1G2	CDFG Status:
State: Endangered	State: S1S2	

Habitat Associations

General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.

Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 54 — Map Index: 09486 — Dates Last Seen

Occ Rank: Excellent — Element: 1999-10-07
Origin: Natural/Native occurrence — Site: 1999-10-07
Presence: Presumed Extant
Trend: Increasing
Main Source: LINDENMEYER, T. 1992 (OBS)

Quad Summary: SAN LEANDRO (3712262/447B)*, REDWOOD POINT (3712252/447C)
County Summary: ALAMEDA
SNA Summary: Johnson Landing

Location: SALT MARSH HARVEST MOUSE PRESERVE, HAYWARD MARSH REGIONAL SHORELINE, NORTH OF HIGHWAY 92, HAYWARD.

Lat/Long: 37ø37'37" / 122ø08'03" — Township: 03S
UTM: Zone-10 N4164596 E576393 — Range: 03W
Mapping Precision: SPECIFIC — Section: 36 Qtr SW
Symbol Type: POLYGON — Meridian: M
Area: 99.5 ac — Elevation: 2 ft

Comments

Distribution: MVZ #87903 COLLECTED IN 1939 FROM 2 MILES WSW MT EDEN (CRK). EBRPD PROPERTY TRAPPED YEARLY FROM 1982-1992; CITY OF HAYWARD PROPERTY TRAPPED IN 1985.

Ecological: VEGETATED PRIMARILY BY SALICORNIA VIRGINICA (10-35CM DEEP). FORMER TIDAL CHANNELS NOW HAVE YEAR-ROUND WATER. AREA MANAGED AS SMHM REFUGE.

Threat: THREATENED BY NON-NATIVE PREDATORS (HOUSE CATS AND RED FOXES) AND OIL SPILLS.

General: 1 CAPTURE IN 1985, 28 CAPTURES 1987, 8 CAPTURES 1988, 6 CAPTURES 1989, 40 CAPTURES 1990, 29 CAPTURES IN 1991, 19 CAPTURES IN 1992, AND 4 CAPTURES IN 1999.

Owner/Manager: EBRPD, CITY OF HAYWARD

Source Codes

LIN91F01, DID99F02, LIN88F04, LIN90F01, JEN85R01, SIM39S02, LIN88R01, LIN87F01, HAR82R01, VOU89F04, LIN92F01

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE — Element Code: AMAFF02040

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G1G2	CDFG Status:
State: Endangered	State: S1S2	

Habitat Associations

General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.

Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 59 — Map Index: 09348 — Dates Last Seen
Occ Rank: Unknown — Element: 1938-07-01
Origin: Natural/Native occurrence — Site: 1938-07-01
Presence: Presumed Extant
Trend: Unknown
Main Source: KELLY, P. 1987 (PERS COM)
Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary: Oakland Airport Shoreline
Location: ARROWHEAD MARSH, JUST N OF OAKLAND AIRPORT, SAN LEANDRO BAY.
Lat/Long: 37ø44'40" / 122ø12'45" — Township: 02S
UTM: Zone-10 N4177538 E569390 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 45.9 ac — Elevation: 1 ft

Comments

Distribution: NUMEROUS MVZ SPECIMENS COLLECTED FROM 1910-1938. NO RECENT TRAPPING HAS BEEN DONE.
Ecological: FORMERLY KNOWN AS MELROSE MARSH; NAME CHANGE REFLECTS CURRENT CONDITION-ONLY ARROWHEAD-SHAPED TIP OF MARSH REMAINS. SE PORTION OF ORIGINAL MARSH HAS BEEN FILLED. REMAINING MARSH IS EXCELLENT HABITAT.
Threat:
General:
Owner/Manager: PORT OF OAKLAND/EBRPD

Source Codes

KEL87U02, MVZ81S01

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE — Element Code: AMAFF02040

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G1G2	CDFG Status:
State: Endangered	State: S1S2	

Habitat Associations

General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.

Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 74 — Map Index: 09309 — Dates Last Seen
Occ Rank: Good — Element: 1992-11-25
Origin: Natural/Native occurrence — Site: 1992-11-25
Presence: Presumed Extant
Trend: Increasing
Main Source: U.S. FISH & WILDLIFE SERVICE 1986 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary: Bair and Greco Islands
Location: BAIR ISLAND, BETWEEN STEINBERGER SLOUGH AND REDWOOD CREEK, REDWOOD CITY.
Lat/Long: 37ø31'23" / 122ø13'05" — Township: 05S
UTM: Zone-10 N4152981 E569106 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 1,386.0 ac — Elevation: 2 ft

Comments

Distribution: NEST FOUND 04/25/78 ABOUT 0.35 MI NW, PORT OF REDWOOD CITY, FEB 22, 1 WAS CAUGHT DURING 75 TRAPNIGHTS.
Ecological: HABITAT CONSISTS OF BOTH TIDAL AND NON-TIDAL SALICORNIA, AND SOME UPLAND.
Threat:
General: NUMEROUS CAPTURES/OBSERVATIONS FROM 1971-1992. OBSERVED 1 WHILE TURNING OVER COVER, 0.2 MI W, PORT OF REDWOOD CITY
Owner/Manager: USFWS, DFG

Source Codes

BOT88F01, MIC78U01, WES85R02, WES86R01, FOR92F05, SCH71R01, FOR92F03

REITHRODONTOMYS RAVIVENTRIS (cont.)

SALT-MARSH HARVEST MOUSE — Element Code: AMAFF02040

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G1G2	CDFG Status:
State: Endangered	State: S1S2	

Habitat Associations

General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.

Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 77 — Map Index: 09476 — Dates Last Seen

Occ Rank: Unknown — Element: 1985-12-XX
Origin: Natural/Native occurrence — Site: 1985-12-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: U.S. FISH & WILDLIFE SERVICE 1986 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh
Location: ALAMEDA CREEK MARSH. JUST NORTH OF MOUTH OF FLOOD CONTROL CHANNEL.

Lat/Long: 37ø36'00" / 122ø08'34" — Township: 04S
UTM: Zone-10 N4161584 E575661 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: 12 Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 129.1 ac — Elevation: 1 ft

Comments

Distribution: 2 R. RAVIVENTRIS CAPTURED IN 300 TRAPNIGHTS.
Ecological: HABITAT CONSISTS OF TIDAL SALICORNIA.
Threat:
General:
Owner/Manager: PVT-LESLIE SALT CO

Source Codes

WES86R01

REITHRODONTOMYS RAVIVENTRIS (cont.)

SALT-MARSH HARVEST MOUSE — Element Code: AMAFF02040

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G1G2	CDFG Status:
State: Endangered	State: S1S2	

Habitat Associations

General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.

Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 78 — Map Index: 09562 — Dates Last Seen

Occ Rank: Excellent — Element: 1991-01-17
Origin: Natural/Native occurrence — Site: 1991-01-17
Presence: Presumed Extant
Trend: Unknown
Main Source: U.S. FISH & WILDLIFE SERVICE 1986 (LIT)
Quad Summary: NEWARK (3712251/447D)*, MOUNTAIN VIEW (3712241/428A)
County Summary: ALAMEDA
SNA Summary: Dumbarton Point
Location: SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE, DUMBARTON POINT/ NEWARK SLOUGH MARSHES, ON SE SIDE OF HIGHWAY 84, NEWARK.

Lat/Long: 37ø30'59" / 122ø04'51" — Township: 05S
UTM: Zone-10 N4152352 E581223 — Range: 02W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 888.1 ac — Elevation: 3 ft

Comments

Distribution: SMHM CAPTURES AT DUMBARTON PT IN 12/85; 3 CAPTURE LOCATIONS ALONG NEWARK SLOUGH IN SUMMER OF 1984. 36 SMHM CAPTURED DURING 650 TRAPNIGHTS AT A TRAP SITE JUST W OF DUMBARTON BRIDGE TOLL PLAZA IN 1982.
Ecological: HABITAT CONSISTS OF NORTHERN COASTAL SALT MARSH, DOMINATED BY PICKLEWEED (SALICORNIA VIRGINICA).
Threat:
General: 12 ADULTS CAPTURED 1991. 6 CAPTURED 1990, 5 ADULTS, 1 JUVENILE.
Owner/Manager: USFWS-SAN FRANCISCO BAY NWR

Source Codes

WES85R02, KUC90F02, KUC91F02, WES86R01, NEW82R01, SHE84R02

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE Element Code: AMAFF02040

Status — NDDB Element Ranks — Other Lists
Federal: Endangered Global: G1G2 CDFG Status:
State: Endangered State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 79 Map Index: 09647 Dates Last Seen
Occ Rank: Unknown Element: 1985-10-28
Origin: Natural/Native occurrence Site: 1985-10-28
Presence: Presumed Extant
Trend: Unknown
Main Source: JENNINGS, V. 1985 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Dumbarton Point
Location: CALTRANS CORRIDOR BTWN OLD JARVIS AND NEW JARVIS AVES, NEWARK.
Lat/Long: 37ø31'47" / 122ø03'48" Township: 05S
UTM: Zone-10 N4153846 E582762 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1/5 mile Elevation: 10 ft

Comments
Distribution: ONE SMHM CAPTURED DURING 200 TRAPNIGHTS.
Ecological: SMALL AREA AT FAR EAST END OF SITE, SUBJECT TO TIDAL ACTION VIA A FLOOD GATE; PROBABLY FLOODS DURING HEAVY RAINS.
Threat:
General:
Owner/Manager: CALTRANS

Source Codes
JEN85R01

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE Element Code: AMAFF02040

Status — NDDB Element Ranks — Other Lists
Federal: Endangered Global: G1G2 CDFG Status:
State: Endangered State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 84 Map Index: 09510 Dates Last Seen
Occ Rank: Unknown Element: 1985-06-XX
Origin: Natural/Native occurrence Site: 1985-07-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: SHELLHAMMER, H. 1984 (LIT)
Quad Summary: NEWARK (3712251/447D)*, REDWOOD POINT (3712252/447C)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh
Location: MARSH BETWEEN ALAMEDA CRK AND COYOTE HILLS SLOUGH, APPROX 2 MI SW OF UNION CITY.
Lat/Long: 37ø34'32" / 122ø06'32" Township: 04S
UTM: Zone-10 N4158890 E578684 Range: 02W
Mapping Precision: SPECIFIC Section: XX Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 213.7 ac Elevation: 4 ft

Comments
Distribution: NUMEROUS TRAPPING EFFORTS FROM 1983 THRU 1985 WHICH YIELDED SMHM.
Ecological: HABITAT CONSISTS OF DIKED MARSH, ONLY PART OF WHICH RECEIVES TIDAL ACTION. VEG VARIES FROM DENSE SALICORNIA TO DENSE STANDS OF MIXED GRASSES AND MARSH PLANTS.
Threat: PARTS OF AREA DISCED FOR MOSQUITO CONTROL AT VARIOUS TIMES.
General:
Owner/Manager: UNKNOWN

Source Codes
SHE85R01, SHE84R02

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE — Element Code: AMAFF02040

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G1G2 — CDFG Status:
State: Endangered — State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 85 — Map Index: 09513 — Dates Last Seen
Occ Rank: Unknown — Element: 1985-07-XX
Origin: Natural/Native occurrence — Site: 1985-07-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: WESCO 1985 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh
Location: JUST S OF PT WHERE NORTH CRK AND MT EDEN CRK INTERSECT, 1.25MI ENE OF UNION CITY.
Lat/Long: 37ø36'06" / 122ø06'51" — Township: 04S
UTM: Zone-10 N4161791 E578184 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 3 ft

Comments
Distribution: TRAPLINE SET IN PICKLEWEED (SALICORNIA VIRGINICA) HABITAT ALONG THE MT EDEN CRK CHANNEL. 50 TRAPNIGHTS YEILDED 3 SMHM CAPTURES.
Ecological:
Threat: LOCATED JUST OUTSIDE PROPOSED SHORELANDS DEVELOPMENT PROJECT.
General:
Owner/Manager: UNKNOWN

Source Codes
WES85R01

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE — Element Code: AMAFF02040

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G1G2 — CDFG Status:
State: Endangered — State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 86 — Map Index: 09492 — Dates Last Seen
Occ Rank: Unknown — Element: 1985-07-XX
Origin: Natural/Native occurrence — Site: 1985-07-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: WESCO 1985 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)*, NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh
Location: MT EDEN CRK, FROM ONE MI E OF MOUTH, E FOR APPROX 2 MI.
Lat/Long: 37ø36'45" / 122ø08'03" — Township: 04S
UTM: Zone-10 N4162968 E576409 — Range: 02W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 121.3 ac — Elevation: 4 ft

Comments
Distribution: FOUR TRAPLINES SET ALONG A TWO-MILE STRETCH OF MT EDEN CRK CONTAINING PICKLEWEED (SALICORNIA VIRGINICA) HABITAT. SIX SMHM CAPTURES DURING 266 TRAPNIGHTS OF EFFORT.
Ecological:
Threat: MAJORITY OF THIS AREA LIES W/IN THE PROPOSED SHORELANDS DEVELOPMENT.
General:
Owner/Manager: PVT

Source Codes
WES85R01, SHE85R02

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE — Element Code: AMAFF02040

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G1G2 — CDFG Status:
State: Endangered — State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 87 — Map Index: 09463 — Dates Last Seen
Occ Rank: Unknown — Element: 1985-07-XX
Origin: Natural/Native occurrence — Site: 1985-07-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: WESCO 1986 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh
Location: MARSH JUST S OF SAN MATEO BRIDGE EASTERN TOLL PLAZA.
Lat/Long: 37ø36'57" / 122ø08'48" — Township: 04S
UTM: Zone-10 N4163340 E575300 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 3 ft

Comments
Distribution: 50 TRAPNIGHTS OF EFFORT YIELDED ONE SMHM CAPTURE.
Ecological: OUTBOARD TIDAL MARSH.
Threat:
General:
Owner/Manager: UNKNOWN

Source Codes
WES85R01

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE — Element Code: AMAFF02040

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G1G2 — CDFG Status:
State: Endangered — State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 88 — Map Index: 09787 — Dates Last Seen
Occ Rank: Unknown — Element: 1985-06-12
Origin: Natural/Native occurrence — Site: 1985-06-12
Presence: Presumed Extant
Trend: Unknown
Main Source: JENNINGS, V. & P. KELLY 1985 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Dumbarton Point
Location: WHISTLING WINGS DUCK CLUB, APPROX 0.6 MI ENE OF MOWRY LANDING, NEWARK.
Lat/Long: 37ø30'20" / 122ø00'24" — Township: 05S
UTM: Zone-10 N4151221 E587806 — Range: 01W
Mapping Precision: SPECIFIC — Section: 07 Qtr SE
Symbol Type: POLYGON — Meridian: M
Area: 111.5 ac — Elevation: 4 ft

Comments
Distribution: TRAPLINE LOCATED AT EDGE OF DISCED FIELD. 2 SMHM CAPTURES IN 200 TRAPNIGHTS.
Ecological: HABITAT CONSISTS OF MODERATE TO DENSE SALICORNIA W/INTERMIXED PATCHES OF DISTICHLIS AND SPARTINA IN WETTER AREAS.
Threat:
General:
Owner/Manager: PVT

Source Codes
SHE85R01, JEN85R02

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE — Element Code: AMAFF02040

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G1G2 — CDFG Status:
State: Endangered — State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 89 — Map Index: 09539 — Dates Last Seen
Occ Rank: Unknown — Element: 1985-06-26
Origin: Natural/Native occurrence — Site: 1985-06-26
Presence: Presumed Extant
Trend: Unknown
Main Source: JENNINGS, V. 1985 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh
Location: MEADOW GUN CLUB, ADJ TO SPRR TRACKS, JUST S OF BAUMBERG AND 1.5 MI NNW OF UNION CITY.
Lat/Long: 37ø36'51" / 122ø05'57" — Township: 04S
UTM: Zone-10 N4163184 E579506 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 2 ft

Comments
Distribution: 3 TRAPLINES SET, ALL IN SOMEWHAT MARGINAL HABITATS, ADJACENT TO DRAINAGE CANALS, SLOUGHS, ETC. 200 TRAPNIGHTS OF EFFORT YIELDED TWO SMHM CAPTURES.
Ecological:
Threat:
General:
Owner/Manager: PVT

Source Codes
SHE85R01, JEN85R04

California Department of Fish and Game
Natural Diversity Data Base
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REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE — Element Code: AMAFF02040

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G1G2 — CDFG Status:
State: Endangered — State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 90 — Map Index: 09542 — Dates Last Seen
Occ Rank: Unknown — Element: 1985-06-19
Origin: Natural/Native occurrence — Site: 1985-06-19
Presence: Presumed Extant
Trend: Unknown
Main Source: JENNINGS, V. & P. KELLY 1985 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh
Location: PERRY DUCK CLUB; DIKED WETLAND LOCATED APPROX ONE MI NW OF UNION CITY.
Lat/Long: 37ø36'27" / 122ø05'54" — Township: 04S
UTM: Zone-10 N4162445 E579586 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 5 ft

Comments
Distribution: TWO SMHM CAPTURES (ONE RECAPTURE) DURING 200 TRAPNIGHTS.
Ecological: SITE CONSISTS OF A FLAT FIELD DIVIDED BY LOW BERM AND DRAINAGE CANAL RUNNING N-S THRU CENTER. VEGETATION IS PRIMARILY MODERATE TO VERY DENSE SALICORNIA. AREA HAS NO DITAL ACTION BUT SHOWS SIGNS OF FLOODING DURING RAINS.
Threat: SOME CATTLE GRAZING.
General:
Owner/Manager: PVT

Source Codes
SHE85R01, JEN85R03

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE Element Code: AMAFF02040

Status NDDB Element Ranks Other Lists
Federal: Endangered Global: G1G2 CDFG Status:
State: Endangered State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 94 Map Index: 09659 Dates Last Seen
Occ Rank: Good Element: 1989-03-08
Origin: Natural/Native occurrence Site: 1989-03-08
Presence: Presumed Extant
Trend: Unknown
Main Source: HARVEY & STANLEY ASSOC. 1985 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Dumbarton Point
Location: MAYHEWS LANDING SITE, JUST E OF JCT JARVIS RD & THORNTON AVE IN NEWARK.
Lat/Long: 37ø31'50" / 122ø03'27" Township: 05S
UTM: Zone-10 N4153943 E583277 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1/5 mile Elevation: 5 ft

Comments
Distribution: ABANDONED GOLF COURSE.
Ecological: VEGETATION, INCLUDING PICKLEWEED (SALICORNIA VIRGINICA 36%), ASSORTED GRASSES (59%), OR A MIXTURE OF THE TWO (5%) IN TRAPPING GRIDS.
Threat: LAND FILL AND HOUSING. CONTINUED NEGOTIATIONS BETWEEN DEVELOPER AND USFWS.
General: 34 TOTAL INDIVIDUALS CAPTURED, 9 JUVENILES, 25 ADULTS (3 PREGNANT FEMALES) 1989. 22 CAPTURED, 19 ADULTS, 3 JUVENILES 1988. 41 CAPTURED (PLUS 21 RECAPTURES 1985).
Owner/Manager: PVT

Source Codes
SHE88F06, HAR85R01, SHE89F06, SHE85R02

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE Element Code: AMAFF02040

Status NDDB Element Ranks Other Lists
Federal: Endangered Global: G1G2 CDFG Status:
State: Endangered State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 96 Map Index: 09349 Dates Last Seen
Occ Rank: Unknown Element: 1985-10-22
Origin: Natural/Native occurrence Site: 1989-09-30
Presence: Presumed Extant
Trend: Decreasing
Main Source: HARVEY & STANLEY ASSOC. 1985 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary: Bair and Greco Islands
Location: MARSHLAND (OWNED BY IDEAL CEMENT MARSH) BORDERED ON N BY WESTPORT SLOUGH & ON W BY SEAPORT BLVD, PORT OF REDWOOD CITY.
Lat/Long: 37ø30'45" / 122ø12'01" Township: 05S
UTM: Zone-10 N4151835 E570678 Range: 03W
Mapping Precision: NON-SPECIFIC Section: 09 Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 106.4 ac Elevation: 3 ft

Comments
Distribution: ONE SMHM CAPTURE IN 800 TRAPNIGHTS (1985). NO CAPTURES IN 978 TRAPNIGHTS (1989).
Ecological: DIKED WETLAND W/LIMITED TIDAL EXCHANGE. AREAS TRAPPED WERE ON SOUTH EDGE OF PROPERTY, IN STRIP OF SALICORNIA BORDERED ON NORTH BY UPLAND VEG. SALICORNIA WAS MODERATE TO DENSE, INTERSPERSED W/PATCHES OF GRASS, FRANKENIA, GRINDELIA, & THISTLE
Threat:
General:
Owner/Manager: PVT-IDEAL CEMENT COMPANY

Source Codes
HAR85R02, VOU89F03, SHE85R02

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE Element Code: AMAFF02040

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G1G2	CDFG Status:
State: Endangered	State: S1S2	

Habitat Associations

General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.

Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 100 Map Index: 09439 Dates Last Seen
Occ Rank: Good Element: 2000-08-30
Origin: Natural/Native occurrence Site: 2000-08-30
Presence: Presumed Extant
Trend: Unknown
Main Source: HARVEY & STANLEY ASSOC. 1983 (LIT)
Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary: Roberts Landing
Location: DIKED WETLAND ADJACENT TO ROBERTS LANDING, SAN LORENZO, APPROX 4.5 MILES NORTH OF EAST END SAN MATEO BRIDGE (HIGHWAY 92)
Lat/Long: 37ø40'51" / 122ø09'56" Township: 03S
UTM: Zone-10 N4170527 E573586 Range: 03W
Mapping Precision: NON-SPECIFIC Section: 11 Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 419.6 ac Elevation: 3 ft

Comments

Distribution: THE TRAPLINE CONTAINING THE POOREST COVER (75% PICKLEWEED, 25% BARE GROUND) PRODUCED THE 2 SMHM CAPTURED.

Ecological: DIKED SALT MARSH AND ADJACENT UPLANDS (NON-NATIVE GRASSLAND). HABITAT DOMINATED BY PICKLEWEED. (SALICORNIA PACIFICA) WITH 75% TO 100% COVER.

Threat: THREATENED BY PREDATION FROM FERAL/DOMESTIC CATS.

General: 28 TRAPPED IN 1990 IN 1240 TRAPNIGHTS (2.25/100 TRAPNIGHTS). 17 CAPTURED DURING 1800 TRAPNIGHTS (0.94/100 TRAPNIGHTS) FROM 28-30 AUG 2000.

Owner/Manager: CITY OF SAN LEANDRO

Source Codes

VOU90F01, WES91R01, LAC00F04, SHE83R01

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE Element Code: AMAFF02040

Status	NDDB Element Ranks	Other Lists
Federal: Endangered	Global: G1G2	CDFG Status:
State: Endangered	State: S1S2	

Habitat Associations

General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.

Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 101 Map Index: 09570 Dates Last Seen
Occ Rank: Unknown Element: 1986-06-XX
Origin: Natural/Native occurrence Site: 1986-06-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: HARVEY & STANLEY ASSOC. 1986 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Alameda Creek Marsh
Location: MUNSTER SITE - MARSH 0.5 MI SW UNION CITY.
Lat/Long: 37ø35'10" / 122ø05'21" Township: 04S
UTM: Zone-10 N4160078 E580408 Range: 02W
Mapping Precision: SPECIFIC Section: XX Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 133.8 ac Elevation: 3 ft

Comments

Distribution: 34 SMHM CAPTURED (PLUS 9 RECAPTURES) IN 1350 TRAPNIGHTS.

Ecological: HABITAT DOMINATED BY PICKLEWEED (SALICORNIA VIRGINICA).

Threat: PVT LAND HAS BEEN DISCED, HAYED AND PASTURED.

General: SOME LAND MANAGED BY THE FLOOD CONTROL DISTRICT, SOME PVT.

Owner/Manager: ALA COUNTY, PVT

Source Codes

HAR86R02, WES87R01, SHE85R02

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE Element Code: AMAFF02040

Status — NDDB Element Ranks — Other Lists

Federal: Endangered Global: G1G2 CDFG Status:
State: Endangered State: S1S2

Habitat Associations

General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 103 Map Index: 09576 Dates Last Seen
Occ Rank: Unknown Element: 1986-06-XX
Origin: Natural/Native occurrence Site: 1986-06-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: SHELLHAMMER, H. 1984 (LIT)

Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Coyote Hills North Marsh

Location: 1.5 MI S OF UNION CITY, ON THE N SIDE OF COYOTE HILLS SLOUGH

Lat/Long: 37ø34'07" / 122ø04'55" Township: 04S
UTM: Zone-10 N4158152 E581069 Range: 02W
Mapping Precision: SPECIFIC Section: XX Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 78.7 ac Elevation: 3 ft

Comments

Distribution: 17 SMHM WERE CAPTURED DURING 1020 TRAPNIGHTS FROM SEVEN DIFFERENT LOCATIONS.
Ecological: HABITAT CONSISTS OF DIKED SALT MARSH, FRESHWATER MARSH, AND SEASONAL WETLANDS/DUCK CLUBS.
Threat:
General: SOME LAND MANAGED BY COUNTY FLOOD CONTROL DISTRICT.
Owner/Manager: ALA COUNTY, PVT

Source Codes

ZET77A01, WES87R01, SHE84R02

California Department of Fish and Game
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REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE Element Code: AMAFF02040

Status — NDDB Element Ranks — Other Lists

Federal: Endangered Global: G1G2 CDFG Status:
State: Endangered State: S1S2

Habitat Associations

General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 117 Map Index: 09469 Dates Last Seen
Occ Rank: Unknown Element: 1985-07-22
Origin: Natural/Native occurrence Site: 1985-07-22
Presence: Presumed Extant
Trend: Unknown
Main Source: SHELLHAMMER, H. ET AL 1985 (LIT)

Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary: Sulfur Creek North

Location: MARATHON SITE, JUST NORTH OF SULPHUR CREEK AND JUST WEST OF HAYWARD MUNICIPAL AIRPORT.

Lat/Long: 37ø39'32" / 122ø08'49" Township: 03S
UTM: Zone-10 N4168106 E575244 Range: 03W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1/5 mile Elevation: 2 ft

Comments

Distribution:
Ecological: HABITAT VARIES FROM SPARSE TO DENSE SALICORNIA, INTERMIXED W/POLYPOGON SP, COTULA CORONOPIFOLIA, ATRIPLEX PATULA, AND FRANKENIA GRANDIFOLIA.
Threat:
General: ONE SMHM CAPTURED DURING 200 TRAP-NIGHTS (TRAPPED ON 21-22 JULY 1985).
Owner/Manager: EBRPD

Source Codes

SHE85R01

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE Element Code: AMAFF02040

Status NDDB Element Ranks Other Lists
Federal: Endangered Global: G1G2 CDFG Status:
State: Endangered State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 118 Map Index: 09624 Dates Last Seen
Occ Rank: Unknown Element: 1985-08-03
Origin: Natural/Native occurrence Site: 1985-08-03
Presence: Presumed Extant
Trend: Unknown
Main Source: SHELLHAMMER, H. ET AL 1985 (LIT)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Coyote Hills North Marsh
Location: LESLIE QUARRY SITE, 0.6 MI N OF SOUTHERN TOP OF COYOTE HILLS
Lat/Long: 37ø32'33" / 122ø04'14" Township: 04S
UTM: Zone-10 N4155257 E582110 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1/5 mile Elevation: 4 ft

Comments
Distribution: TRAPPING OCCURRED 8/1 TO 8/3, 1985 (300 TRAPNIGHTS) WITH 2 SMHM CAPTURES.
Ecological: TRAPPING AREA CONSISTS OF A SERIES OF SHALLOW PONDS ONCE MAINTAINED AS A DUCK CLUB, IN WHICH BERMS DIVIDING PONDS HAVE BEEN BREACHED. VEGETATION CONSISTS MAINLY OF SALICONRIA AND DISTICHLIS ALONG CHANNELS BISECTING THE SITE.
Threat:
General:
Owner/Manager: PVT-LESLIE SALT CO

Source Codes
SHE85R01

REITHRODONTOMYS RAVIVENTRIS (cont.)
SALT-MARSH HARVEST MOUSE Element Code: AMAFF02040

Status NDDB Element Ranks Other Lists
Federal: Endangered Global: G1G2 CDFG Status:
State: Endangered State: S1S2

Habitat Associations
General: ONLY IN THE SALINE EMERGENT WETLANDS OF SAN FRANCISCO BAY AND ITS TRIBUTARIES.
Micro: PICKLEWEED IS PRIMARY HABITAT. DO NOT BURROW, BUILD LOOSELY ORGANIZED NESTS. REQUIRE HIGHER AREAS FOR FLOOD ESCAPE.

Occurrence No. 126 Map Index: 09598 Dates Last Seen
Occ Rank: Unknown Element: 1988-06-XX
Origin: Natural/Native occurrence Site: 1988-06-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: LINDENMEYER, T. 1988 (OBS)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary: Coyote Hills North Marsh
Location: E OF COYOTE HILLS AND N OF PARK ENTRANCE RD, IN VIC OF "P" LINE FLOOD CHANNEL, FREMONT.
Lat/Long: 37ø33'17" / 122ø04'42" Township: 04S
UTM: Zone-10 N4156606 E581409 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1/5 mile Elevation: 5 ft

Comments
Distribution: 8 SMHM WERE TRAPPED (2 ADULTS, 6 JUVENILES) IN 400 TRAPNIGHTS.
Ecological: HABITAT CONSISTS OF BOTH WETLAND AND UPLAND VEG, INCLUDING PICKLEWEED, ITALIAN RYE GRASS, BRISTLY ON TONGUE, SLOUGH SEDGE, ALKALI HEATH, AND NARROW-LEAVED CATTAIL.
Threat: PLANS FOR "WETLAND ENHANCEMENT" MAY ALTER HABITAT VALUE FOR SMHM.
General: 8 TRAPPED IN 1988.
Owner/Manager: EBRPD-COYOTE HILLS RP

Source Codes
LIN88F03, LIN88R01, LIN88F02

MASTICOPHIS LATERALIS EURYXANTHUS
ALAMEDA WHIPSNAKE Element Code: ARADB21031

Status NDDB Element Ranks Other Lists
Federal: Threatened Global: G4T2 CDFG Status:
State: Threatened State: S2

Habitat Associations
General: RESTRICTED TO VALLEY-FOOTHILL HARDWOOD HABITAT OF THE COAST RANGES BETWEEN VIC OF MONTEREY AND N SAN FRANCISCO BAY.
Micro: INHABITS SOUTH-FACING SLOPES AND RAVINES WHERE SHRUBS FORM A VEGETATIVE MOSAIC WITH OAK TREES AND GRASSES.

* SENSITIVE *
Occurrence No. 41 Map Index: 33500 Dates Last Seen
Occ Rank: Fair Element: 1991-05-23
Origin: Natural/Native occurrence Site: 1991-06-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: SWAIM, K. 1991 (OBS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:
Location: *SENSITIVE* Location information suppressed.
* SENSITIVE * Lat/Long: / Township:
UTM: Range:
Mapping Precision: Section: Qtr
Symbol Type: Meridian:
Radius: Elevation:

Comments
Distribution: Please contact the Calfornia Natural Diversity Database, California Department of Fish and Game, for more information: (916) 324-3812.
Ecological: HABITAT CONSISTS A MOSAIC OF COYOTE BRUSH SCRUB/OAK WOODLAND. AN ADJACENT PORTION OF THIS SITE IS NOW DEVELOPED.
Threat: DEVELOPMENT - LOSS OF MOST OF THE GRASSLAND/SCRUB ECOTONE AREAS
General:
Owner/Manager:

Source Codes
MCG91R02, SWA91F02

MASTICOPHIS LATERALIS EURYXANTHUS (cont.)
ALAMEDA WHIPSNAKE Element Code: ARADB21031

Status NDDB Element Ranks Other Lists
Federal: Threatened Global: G4T2 CDFG Status:
State: Threatened State: S2

Habitat Associations
General: RESTRICTED TO VALLEY-FOOTHILL HARDWOOD HABITAT OF THE COAST RANGES BETWEEN VIC OF MONTEREY AND N SAN FRANCISCO BAY.
Micro: INHABITS SOUTH-FACING SLOPES AND RAVINES WHERE SHRUBS FORM A VEGETATIVE MOSAIC WITH OAK TREES AND GRASSES.

* SENSITIVE *
Occurrence No. 42 Map Index: 33501 Dates Last Seen
Occ Rank: Good Element: 1999-XX-XX
Origin: Natural/Native occurrence Site: 1999-XX-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: SWAIM, K. 1999 (OBS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:
Location: *SENSITIVE* Location information suppressed.
* SENSITIVE * Lat/Long: / Township:
UTM: Range:
Mapping Precision: Section: Qtr
Symbol Type: Meridian:
Radius: Elevation:

Comments
Distribution: Please contact the Calfornia Natural Diversity Database, California Department of Fish and Game, for more information: (916) 324-3812.
Ecological: HABITAT CONSISTS OF A MOSAIC OF COYOTE BRUSH SCRUB, GRASSLAND, AND COAST LIVE OAK/BAY WOODLAND.
Threat: THREATENED BY PROPOSED DEVELOPMENT (PORTION TO BE DEDICATED TO EBRPD AS OPEN SPACE).
General:
Owner/Manager:

Source Codes
SWA00F01, SWA90F04, SWA99F04

MASTICOPHIS LATERALIS EURYXANTHUS (cont.)
ALAMEDA WHIPSNAKE — Element Code: ARADB21031

Status — NDDB Element Ranks — Other Lists
Federal: Threatened — Global: G4T2 — CDFG Status:
State: Threatened — State: S2

Habitat Associations
General: RESTRICTED TO VALLEY-FOOTHILL HARDWOOD HABITAT OF THE COAST RANGES BETWEEN VIC OF MONTEREY AND N SAN FRANCISCO BAY.
Micro: INHABITS SOUTH-FACING SLOPES AND RAVINES WHERE SHRUBS FORM A VEGETATIVE MOSAIC WITH OAK TREES AND GRASSES.

* SENSITIVE *
Occurrence No. 50 — Map Index: 41593 — Dates Last Seen
Occ Rank: Good — Element: 1999-05-26
Origin: Natural/Native occurrence — Site: 1999-05-26
Presence: Presumed Extant
Trend: Unknown
Main Source: SWAIM, K. 1999 (OBS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:
Location: *SENSITIVE* Location information suppressed.
* SENSITIVE * Lat/Long: / — Township:
UTM: — Range:
Mapping Precision: — Section: Qtr
Symbol Type: — Meridian:
Radius: — Elevation:

Comments
Distribution: Please contact the Calfornia Natural Diversity Database, California Department of Fish and Game, for more information: (916) 324-3812.
Ecological: ROAD IS ADJACENT TO A MOSAIC OF GRASSLAND, SCRUB, AND OAK WOODLAND. SURROUNDING AREA INCLUDES EBMUD WATESHED AND WILLOW PARK GOLF COURSE.
Threat:
General:
Owner/Manager:

Source Codes
SWA99F01

VALLEY NEEDLEGRASS GRASSLAND
Element Code: CTT42110CA

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G1
State: None — State: S3.1

Habitat Associations
General:
Micro:

Occurrence No. 52 — Map Index: 20269 — Dates Last Seen
Occ Rank: Fair — Element: 1991-06-16
Origin: Natural/Native occurrence — Site: 1991-06-16
Presence: Presumed Extant
Trend: Unknown
Main Source: OLSON, B. 1991 (OBS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary: Lake Chabot South
Location: OAKLAND, FAIRMONT RIDGE. AREA BOUNDED BY FAIRMONT DRIVE TO THE SOUTH AND SAN LEANDRO TO THE WEST.
Lat/Long: 37ø43'07" / 122ø06'59" — Township: 99X
UTM: Zone-10 N4174756 E577879 — Range: 99X
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 160.0 ac — Elevation: 500 ft

Comments
Distribution: GRASSLAND IS ON A SW FACING SLOPE.
Ecological: 90% OF SPECIES ARE GRAMINOIDS. UNDER THE TOP LAYER OF AVENA BARBATA IS DENSE LAYER OF NASSELLA PULCHRA. ALSO STIPA LEPIDA, BROMUS CARINATUS, B. DIANDRUS, B. HORDEACEUS, B. MADRITENSIS RUBENS, ELYMUS GLAUCUS, HORDEUM MURINUM LEPORINUM,
Threat: GRAZING AND INVASION OF EXOTICS.
General: KOELERIA MICRANTHA, LOLIUM MULTIFLORUM. THIS WAS OCC #052 OF CTT42110CA.
Owner/Manager: CITY OF ALAMEDA

Source Codes
OLS91F04

NORTHERN COASTAL SALT MARSH

Element Code: CTT52110CA

Status — NDDB Element Ranks — Other Lists

Federal: None | Global: G3
State: None | State: S3.2

Habitat Associations

General:
Micro:

Occurrence No. 11 | Map Index: 09331 | Dates Last Seen
Occ Rank: Unknown | Element: 1977-06-XX
Origin: Natural/Native occurrence | Site: 1977-06-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: JONES & STOKES ASSOC. 1979 (LIT)

Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary: Bair and Greco Islands

Location: BAIR ISL, SAN CARLOS SW SAN FRANCISCO BAY.

Lat/Long: 37ø31'46" / 122ø11'49" | Township: 05S
UTM: Zone-10 N4153716 E570962 | Range: 03W
Mapping Precision: SPECIFIC | Section: XX Qtr XX
Symbol Type: POLYGON | Meridian: M
Area: 819.3 ac | Elevation:

Comments

Distribution: FRINGE OF ISLAND.
Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO
Threat: NEXT TO SALT PONDS.
General:
Owner/Manager: UNKNOWN

Source Codes

JON79R02

NORTHERN COASTAL SALT MARSH (cont.)

Element Code: CTT52110CA

Status — NDDB Element Ranks — Other Lists

Federal: None | Global: G3
State: None | State: S3.2

Habitat Associations

General:
Micro:

Occurrence No. 12 | Map Index: 09374 | Dates Last Seen
Occ Rank: Unknown | Element: 1977-06-XX
Origin: Natural/Native occurrence | Site: 1977-06-XX
Presence: Presumed Extant
Trend: Unknown
Main Source: JONES & STOKES ASSOC. 1979 (LIT)

Quad Summary: REDWOOD POINT (3712252/447C)*, PALO ALTO (3712242/428B)
County Summary: SAN MATEO
SNA Summary: Bair and Greco Islands

Location: GRECO ISL, SAN CARLOS SW SAN FRANCISCO BAY.

Lat/Long: 37ø30'21" / 122ø11'02" | Township: 05S
UTM: Zone-10 N4151095 E572139 | Range: 03W
Mapping Precision: SPECIFIC | Section: XX Qtr XX
Symbol Type: POLYGON | Meridian: M
Area: 1,073.1 ac | Elevation: 1 ft

Comments

Distribution: ALL OF ISL & FRINGE OF ADJACENT ISL.
Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO
Threat: NEXT TO SALT PONDS.
General:
Owner/Manager: UNKNOWN

Source Codes

JON79R02

NORTHERN COASTAL SALT MARSH (cont.)

Element Code: CTT52110CA

Status	NDDB Element Ranks	Other Lists
Federal: None	Global: G3	
State: None	State: S3.2	

Habitat Associations
General:
Micro:

Occurrence No. 13 Map Index: 09280

Dates Last Seen
Element: 1977-06-XX
Site: 1985-11-XX

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown
Main Source: JONES & STOKES ASSOC. 1979 (LIT)
Quad Summary: REDWOOD POINT (3712252/447C)*, SAN MATEO (3712253/448D)
County Summary: SAN MATEO
SNA Summary: Belmont Slough
Location: BELMONT SLOUGH, SW SAN FRANCISCO BAY.
Lat/Long: 37ø32'31" / 122ø14'59"
UTM: Zone-10 N4155039 E566282
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 514.5 ac
Township: 04S
Range: 03W
Section: XX Qtr XX
Meridian: M
Elevation: 15 ft

Comments
Distribution: ON BIRD ISLAND AND ALONG THE FRINGES OF THE SHORE.
Ecological: 30% OF COVER IS SALICORNIA VIRGINICA, 20% IS DISTICHLIS SPICATA, 10% IS JAUMEA CARNOSA.
Threat: NEXT TO SALT PONDS, INDUSTRY, HOUSE DEVELOPMENT.
General: WITHIN CDFG ECOLOGICAL RESERVE. THIS WAS OCC #013 OF CTT52110CA.
Owner/Manager: DFG

Source Codes
CUN87R01, JON79R02

NORTHERN COASTAL SALT MARSH (cont.)

Element Code: CTT52110CA

Status	NDDB Element Ranks	Other Lists
Federal: None	Global: G3	
State: None	State: S3.2	

Habitat Associations
General:
Micro:

Occurrence No. 15 Map Index: 09495

Dates Last Seen
Element: 1977-06-XX
Site: 1987-05-29

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown
Main Source: JONES & STOKES ASSOC. 1979 (LIT)
Quad Summary: MOUNTAIN VIEW (3712241/428A)*, MILPITAS (3712148/427B), PALO ALTO (3712242/428B), REDWOOD POINT (3712252/447C)
County Summary: SANTA CLARA, SAN MATEO
SNA Summary: Dumbarton Point
Location: NE PALO ALTO S SAN FRANCISCO BAY.
Lat/Long: 37ø28'02" / 122ø07'14"
UTM: Zone-10 N4146865 E577760
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 1,280.8 ac
Township: 05S
Range: 02W
Section: XX Qtr XX
Meridian: M
Elevation: 10 ft

Comments
Distribution: FRINGE OF BAY.
Ecological: PARTS OF THE MARSH CONTAIN POCKETS OF FRESH WATER, BUT MAJORITY OF AREA IS SALT. DOMINANTS INCLUDE SALICORNIA. VIRGINICA, SPROTINA FOLIOSA, DISTICHLIS SPICATA, AND FRANKENIA GRANDIFLORA.
Threat: NEXT TO SALT PONDS, GOLF COURSE, INDUSTRY AND HOUSING.
General: UNDISTURBED PORTIONS ARE IN EXCELLENT CONDITION. OTHER PARTS ARE OF VARIABLE QUALITY. THIS WAS OCC #015 OF CTT52110CA.
Owner/Manager: UNKNOWN

Source Codes
CUN87R01, JON79R02, SCH87F40

NORTHERN COASTAL SALT MARSH (cont.)

Element Code: CTT52110CA

Status — NDDB Element Ranks — Other Lists

Federal: None | Global: G3 | State: None | State: S3.2

Habitat Associations

General:

Micro:

Occurrence No. 16 | Map Index: 09551 | Dates Last Seen

Occ Rank: Unknown | Element: 1985-10-24

Origin: Natural/Native occurrence | Site: 1985-11-XX

Presence: Presumed Extant

Trend: Unknown

Main Source: JONES & STOKES ASSOC. 1979 (LIT)

Quad Summary: NEWARK (3712251/447D)*, MILPITAS (3712148/427B), MOUNTAIN VIEW (3712241/428A)

County Summary: ALAMEDA, SANTA CLARA

SNA Summary: Dumbarton Point

Location: DUMBARTON PT, SE SAN FRANCISCO BAY.

Lat/Long: 37ø29'36" / 122ø01'21" | Township: 05S

UTM: Zone-10 N4149853 E586421 | Range: 02W

Mapping Precision: SPECIFIC | Section: XX Qtr XX

Symbol Type: POLYGON | Meridian: M

Area: 4,056.6 ac | Elevation: 15 ft

Comments

Distribution: FRINGE OF ISLANDS. PORTION OF AREA IMMEDIATELY SOUTH OF THORNTON AVE DOMINATED BY SALICORNIA.

Ecological: 25% OF COVER IS SALICORNIA VIRGINICA, 20% IS DISTICHLIS SPICATA, 10% IS JAUMEA CARNOSA.

Threat: DEVELOPMENT A THREAT PER HOCH, SEEN 1985. NEXT TO SALT PONDS.

General: THIS WAS OCC #016 OF CTT52110CA.

Owner/Manager: PVT-LESLIE SALT CO

Source Codes

HOC85F01, CUN87R01, JON79R02

NORTHERN COASTAL SALT MARSH (cont.)

Element Code: CTT52110CA

Status — NDDB Element Ranks — Other Lists

Federal: None | Global: G3 | State: None | State: S3.2

Habitat Associations

General:

Micro:

Occurrence No. 17 | Map Index: 15937 | Dates Last Seen

Occ Rank: Unknown | Element: 1977-06-XX

Origin: Natural/Native occurrence | Site: 1977-06-XX

Presence: Presumed Extant

Trend: Unknown

Main Source: JONES & STOKES ASSOC. 1979 (LIT)

Quad Summary: NEWARK (3712251/447D)

County Summary: ALAMEDA

SNA Summary: Dumbarton Point

Location: W OF COYOTE HILLS SE SAN FRANCISCO BAY.

Lat/Long: 37ø32'18" / 122ø06'47" | Township: 04S

UTM: Zone-10 N4154752 E578350 | Range: 02W

Mapping Precision: SPECIFIC | Section: 31 Qtr XX

Symbol Type: POLYGON | Meridian: M

Area: 172.5 ac | Elevation: 2 ft

Comments

Distribution:

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

Threat: NEXT TO SALT PONDS.

General:

Owner/Manager: UNKNOWN

Source Codes

JON79R02

NORTHERN COASTAL SALT MARSH (cont.)

Element Code: CTT52110CA

Status	NDDB Element Ranks	Other Lists
Federal: None	Global: G3	
State: None	State: S3.2	

Habitat Associations

General:

Micro:

Occurrence No. 18 Map Index: 09560

Dates Last Seen

Occ Rank: Unknown — Element: 1977-06-XX

Origin: Natural/Native occurrence — Site: 1977-06-XX

Presence: Presumed Extant

Trend: Unknown

Main Source: JONES & STOKES ASSOC. 1979 (LIT)

Quad Summary: NEWARK (3712251/447D)*, REDWOOD POINT (3712252/447C)

County Summary: ALAMEDA

SNA Summary: Alameda Creek Marsh

Location: UNION CITY SE SAN FRANCISCO BAY.

Lat/Long: 37ø35'11" / 122ø08'35" — Township: 04S

UTM: Zone-10 N4160054 E575659 — Range: 02W

Mapping Precision: SPECIFIC — Section: XX Qtr XX

Symbol Type: POLYGON — Meridian: M

Area: 969.6 ac — Elevation:

Comments

Distribution: ISL & CHANNEL FRINGE.

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO

Threat: NEXT TO SALT PONDS & ALONG FLOOD CONTROL CHANNEL.

General:

Owner/Manager: UNKNOWN

Source Codes

JON79R02

NORTHERN COASTAL SALT MARSH (cont.)

Element Code: CTT52110CA

Status	NDDB Element Ranks	Other Lists
Federal: None	Global: G3	
State: None	State: S3.2	

Habitat Associations

General:

Micro:

Occurrence No. 51 Map Index: 09348

Dates Last Seen

Occ Rank: Unknown — Element: 1985-11-XX

Origin: Natural/Native occurrence — Site: 1985-11-XX

Presence: Presumed Extant

Trend: Unknown

Main Source: CUNEO, K. 1985 (LIT)

Quad Summary: SAN LEANDRO (3712262/447B)

County Summary: ALAMEDA

SNA Summary: Oakland Airport Shoreline

Location: ARROWHEAD MARSH IN SAN LEANDRO BAY.

Lat/Long: 37ø44'40" / 122ø12'45" — Township: 02S

UTM: Zone-10 N4177538 E569390 — Range: 03W

Mapping Precision: SPECIFIC — Section: XX Qtr XX

Symbol Type: POLYGON — Meridian: M

Area: 45.9 ac — Elevation: 1 ft

Comments

Distribution:

Ecological: SALT MARSH; 23% OF COVER IS SALICORNIA VIRGINICA, 10% IS DISTICHLIS SPICATA AND 10% IS JAUMEA CARNOSA. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO

Threat:

General:

Owner/Manager: EBRPD

Source Codes

CUN87R01

DANAUS PLEXIPPUS
MONARCH BUTTERFLY Element Code: IILEPP2010

Status NDDB Element Ranks Other Lists
Federal: None Global: G5 CDFG Status:
State: None State: S3

Habitat Associations
General: WINTER ROOST SITES EXTEND ALONG THE COAST FROM NORTHERN MENDOCINO TO BAJA CALIFORNIA, MEXICO.
Micro: ROOSTS LOCATED IN WIND-PROTECTED TREE GROVES (EUCALYPTUS, MONTEREY PINE, CYPRESS), WITH NECTAR AND WATER SOURCES NEARBY.

Occurrence No. 244 Map Index: 26295 Dates Last Seen
Occ Rank: Good Element: 1998-01-04
Origin: Natural/Native occurrence Site: 1998-01-04
Presence: Presumed Extant
Trend: Unknown
Main Source: SAKAI, W. 1991 (OBS)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:

Location: ARDENWOOD FARMS REGIONAL PRESERVE, 0.5 MILE NORTH OF THE INTERSECTION OF NEWARK BLVD AND JARVIS ROAD, NEWARK.

Lat/Long: 37ø33'27" / 122ø02'48" Township: 04S
UTM: Zone-10 N4156956 E584197 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1/5 mile Elevation: 10 ft

Comments

Distribution: SITE IS REFERRED TO AS THE "NORTH WOOD," LOCATED BETWEEN THE RAILROAD TRACK AND THE NORTH BOUNDARY.
Ecological: AUTUMNAL SITE. HABITAT CONSISTS OF A WIDE EUCALYPTUS WINDROW WITHIN A "WORKING FARM" PRESERVE. PARK PERSONNEL ARE AWARE OF THE SITE AND HAVE DEVELOPED A TRAIL TO OBSERVE THE MONARCHS.
Threat:
General: SITE WAS REPORTEDLY USED IN 1988-89, 1989-90, AND 1990-91. NO MONARCHS OBSERVED IN 1992-93 AND ONLY 10 DEAD MONARCHS WERE OBSERVED IN 1993-94. 6000 ON 7 JAN 1996. 4000 ON 19 OCT 97, 25K ON 30 NOV 97, AND 10K ON 4 JAN 98.
Owner/Manager: EBRPD-ARDENWOOD FARMS RP

Source Codes
SAK94F01, SAK96F01, SAK98F01, SAK91F02, SAK93F01

DANAUS PLEXIPPUS (cont.)
MONARCH BUTTERFLY Element Code: IILEPP2010

Status NDDB Element Ranks Other Lists
Federal: None Global: G5 CDFG Status:
State: None State: S3

Habitat Associations
General: WINTER ROOST SITES EXTEND ALONG THE COAST FROM NORTHERN MENDOCINO TO BAJA CALIFORNIA, MEXICO.
Micro: ROOSTS LOCATED IN WIND-PROTECTED TREE GROVES (EUCALYPTUS, MONTEREY PINE, CYPRESS), WITH NECTAR AND WATER SOURCES NEARBY.

Occurrence No. 322 Map Index: 33524 Dates Last Seen
Occ Rank: Fair Element: 1998-01-04
Origin: Natural/Native occurrence Site: 1998-01-04
Presence: Presumed Extant
Trend: Unknown
Main Source: SAKAI, W. 1996 (OBS)
Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary:

Location: JACK CLARK GOLF COURSE (AKA, "SOUTH 18"), ON CHUCK CORICA GOLF COMPLEX, NORTH END OF OAKLAND INTERNATIONAL AIRPORT.

Lat/Long: 37ø44'34" / 122ø13'37" Township: 02S
UTM: Zone-10 N4177355 E568108 Range: 03W
Mapping Precision: SPECIFIC Section: XX Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 13.0 ac Elevation: 5 ft

Comments

Distribution: SITE IS LOCATED BETWEEN THE 12TH AND 13TH FAIRWAYS.
Ecological: HABITAT CONSISTS OF A LOOSE WINDROW OF EUCALYPTUS; TREES ARE IN A PARK-LIKE SETTING, WITH NO UNDERSTORY.
Threat: POSSIBLY THREATENED BY PESTICIDES.
General: 1200 OBSERVED ON 7 JAN 1996. 2K OBSERVED ON 28 SEP 1997; 2K OBSERVED ON 4 JAN 98.
Owner/Manager: CITY OF SAN LEANDRO

Source Codes
SAK96F01, SAK98F01

DANAUS PLEXIPPUS (cont.)
MONARCH BUTTERFLY — Element Code: IILEPP2010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5 — CDFG Status:
State: None — State: S3

Habitat Associations
General: WINTER ROOST SITES EXTEND ALONG THE COAST FROM NORTHERN MENDOCINO TO BAJA CALIFORNIA, MEXICO.
Micro: ROOSTS LOCATED IN WIND-PROTECTED TREE GROVES (EUCALYPTUS, MONTEREY PINE, CYPRESS), WITH NECTAR AND WATER SOURCES NEARBY.

Occurrence No. 323 — Map Index: 33525 — Dates Last Seen
Occ Rank: Good — Element: 1998-01-04
Origin: Natural/Native occurrence — Site: 1998-01-04
Presence: Presumed Extant
Trend: Unknown
Main Source: SAKAI, W. 1996 (OBS)
Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary:
Location: SAN LEANDRO GOLF COURSE, ADJACENT TO SAN FRANCISCO BAY, SAN LEANDRO.
Lat/Long: 37ø41'51" / 122ø11'01" — Township: 03S
UTM: Zone-10 N4172375 E571964 — Range: 03W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 9.1 ac — Elevation: 5 ft

Comments
Distribution: SITE IS LOCATED ON THE MARINA GOLF COURSE PORTION, NORTH OF THE 8TH FAIRWAY, ON THE NE SIDE OF THE "PRO AREA." POSSIBLY THIS IS THE "SAN LEANDRO SITE" REFERRED TO BY CHERUBINI (1983).
Ecological: HABITAT CONSISTS OF A WINDROW OF EUCALYPTUS ON THE EAST SIDE OF THE 8TH FAIRWAY; SURROUNDED BY RESIDENTIAL HOUSING AND PARKLAND.
Threat:
General: SEVERAL THOUSAND REPORTED IN FALL 1995; 850 OBSERVED ON 7 JAN 1996. 20K OBSERVED ON 17 OCT 97; 25K OBSERVED ON 27 NOV 97; 31K OBSERVED ON 4 JAN 98.
Owner/Manager: CITY OF SAN LEANDRO

Source Codes
SAK96F01, SAK98F01

California Department of Fish and Game
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DANAUS PLEXIPPUS (cont.)
MONARCH BUTTERFLY — Element Code: IILEPP2010

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G5 — CDFG Status:
State: None — State: S3

Habitat Associations
General: WINTER ROOST SITES EXTEND ALONG THE COAST FROM NORTHERN MENDOCINO TO BAJA CALIFORNIA, MEXICO.
Micro: ROOSTS LOCATED IN WIND-PROTECTED TREE GROVES (EUCALYPTUS, MONTEREY PINE, CYPRESS), WITH NECTAR AND WATER SOURCES NEARBY.

Occurrence No. 324 — Map Index: 33526 — Dates Last Seen
Occ Rank: Fair — Element: 1998-01-04
Origin: Natural/Native occurrence — Site: 1998-01-04
Presence: Presumed Extant
Trend: Unknown
Main Source: SAKAI, W. 1996 (OBS)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:
Location: COYOTE HILLS REGIONAL PARK, SOUTH OF HWY 92 AND NORTH OF HWY 84, AND EAST OF I-880, FREMONT
Lat/Long: 37ø32'31" / 122ø04'49" — Township: 04S
UTM: Zone-10 N4155188 E581241 — Range: 02W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 14.6 ac — Elevation: 150 ft

Comments
Distribution: SITE IS LOCATED AT THE SOUTH END OF MEADOWLARK TRAIL, ON AN EAST-FACING HILL, AT THE SOUTH END OF THE PARK.
Ecological: HABITAT CONSISTS OF A WINDROW OF EUCALYPTUS, RUNNING WEST-TO-EAST, ON A SOUTH-FACING SLOPE.
Threat:
General: SITE REPORTED TO CONTAIN SEVERAL HUNDRED MONARCHS IN FALL 1995. 15 OBSERVED ON 7 JAN 1996. 700 OBSERVED ON 30 NOV 1997; 450 OBSERVED ON 4 JAN 1998.
Owner/Manager: EBRPD-COYOTE HILLS RP

Source Codes
SAK96F01, SAK98F01

BALSAMORHIZA MACROLEPIS VAR MACROLEPIS
BIG-SCALE BALSAMROOT Element Code: PDAST11061

Status NDDB Element Ranks Other Lists
Federal: None Global: G3T2 CNPS List: 1B
State: None State: S2.2 R-E-D Code: 2-2-3

Habitat Associations
General: VALLEY AND FOOTHILL GRASSLAND, CISMONTANE WOODLAND.
Micro: SOMETIMES ON SERPENTINE. 35-1000M.

Occurrence No. 2 Map Index: 30913 Dates Last Seen
Occ Rank: Excellent Element: 1991-06-16
Origin: Natural/Native occurrence Site: 1991-06-16
Presence: Presumed Extant
Trend: Unknown
Main Source: OLSON, B. 1991 (OBS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:
Location: NORTHWEST OF FAIRMONT DRIVE AND EAST OF SAN LEANDRO BOUNDARY. 1.9 MILES NORTH OF ASHLAND.
Lat/Long: 37ø43'04" / 122ø06'49" Township: 02S
UTM: Zone-10 N4174656 E578122 Range: 02W
Mapping Precision: SPECIFIC Section: XX Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 7.4 ac Elevation: 360 ft

Comments
Distribution: 0.3 MILE NORTH ON WEST SIDE OF INTERSECTION OF INTERMITTENT STREAM AND FAIRMONT DRIVE. DENSE PATCHES ON TOP OF KNOLL ON BOTH NORTHEAST AND SOUTHWEST FACING SLOPES.
Ecological: VALLEY NEEDLEGRASS GRASSLAND COMMUNITY SUPPORTING SPARSE COVER OF ANNUAL AND PERRENIAL GRASSES. ASSOCIATED WITH WYETHIA ANGUSTIFOLIA GROWING AMONG B. MACROLEPIS. SOIL DESCRIBED AS SERPENTINE/GABBRO IN GEOLOGIC MAPS.
Threat: SITE IS GRAZED BY CATTLE ON A SEASONAL BASIS. A HOUSING DEVELOPMENT HAS BEEN PROPOSED FOR THIS SITE. EXOTIC INVASION.
General: DENSE PATCHES ON TOP OF KNOLL ON BOTH NORTHEAST AND SOUTHWEST FACING SLOPES. MORE THAN 10,000 PLANTS OBSERVED WITH 800 X 400 FT SITE BY COPPE IN 1989. APPX. 100,000 PLANTS OBSERVED WITHIN 2000 BY 300 FT SITE BY OLSON IN 1991.
Owner/Manager: ALA COUNTY

Source Codes
OLS91F04, COP89F04, KEL71S01

BALSAMORHIZA MACROLEPIS VAR MACROLEPIS (cont.)
BIG-SCALE BALSAMROOT Element Code: PDAST11061

Status NDDB Element Ranks Other Lists
Federal: None Global: G3T2 CNPS List: 1B
State: None State: S2.2 R-E-D Code: 2-2-3

Habitat Associations
General: VALLEY AND FOOTHILL GRASSLAND, CISMONTANE WOODLAND.
Micro: SOMETIMES ON SERPENTINE. 35-1000M.

Occurrence No. 3 Map Index: 30912 Dates Last Seen
Occ Rank: Good Element: 1991-06-16
Origin: Natural/Native occurrence Site: 1991-06-16
Presence: Presumed Extant
Trend: Unknown
Main Source: OLSON, B. 1991 (OBS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:
Location: FAIRMONT RIDGE, OAKLAND. 0.3 MILE EAST OF CHABOT BOYS RANCH. 1.6 MILES NORTH OF ASHLAND.
Lat/Long: 37ø43'21" / 122ø07'23" Township: 02S
UTM: Zone-10 N4175172 E577293 Range: 02W
Mapping Precision: SPECIFIC Section: XX Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 16.0 ac Elevation: 620 ft

Comments
Distribution: NORTH OF ANIMAL SHELTER AND SOUTH OF RADIO TOWER, BISECTED BY POWERLINE.
Ecological: VALLEY NEEDLEGRASS GRASSLAND. AVENA BARBATA/NASSELLA PULCHRA, WYETHIA ANGUSTIFOLIA, CENTAUREA MELITENSIS, HYPOCHAERIS GLABRA, LOMATIUM UTRICULATUM, SITANION JUBATUM, ACAENA CALIFORNICA, CALOCHORTUS SUPERBUS, C. LUTEUS.
Threat: GRAZING PASTURE, EXOTIC INVASION, AND DEVELOPMENT.
General: SUBSTRATE IS SERPENTINIZED GABBRO. OVER 10,000 ESTIMATED IN 1989, ABOUT 100,000 IN 1991. PLANTS DESCRIBED AS GROWING IN LARGE, DENSE PATCHES ON TOP OF KNOLL & ON SLOPES.
Owner/Manager: ALA COUNTY

Source Codes
OLS91F04, OLS91F49, COP89F04

HELIANTHELLA CASTANEA
DIABLO HELIANTHELLA — Element Code: PDAST4M020

Status — NDDB Element Ranks — Other Lists

Federal: None — Global: G3 — CNPS List: 1B
State: None — State: S3.2 — R-E-D Code: 2-2-3

Habitat Associations

General: BROADLEAVED UPLAND FOREST, CHAPARRAL, CISMONTANE WDLND, COASTAL SCRUB, RIPARIAN WOODLAND, VALLEY & FOOTHILL GRASSLAND.

Micro: USUALLY IN CHAPARRAL/OAK WOODLAND INTERFACE IN ROCKY, AZONAL SOILS. OFTEN IN PARTIAL SHADE. 25-1150M.

Occurrence No. 35 — Map Index: 27827 — Dates Last Seen

Occ Rank: Good — Element: 1989-07-13
Origin: Natural/Native occurrence — Site: 1989-07-13
Presence: Presumed Extant
Trend: Unknown
Main Source: DOLAN, M. 1989 (OBS)

Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:

Location: RIDGE BETWEEN CULL CREEK AND CROW CREEK, ABOUT 0.7 MILE WEST OF CROW CANYON ROAD AT NORRIS CANYON ROAD.

Lat/Long: 37ø44'01" / 122ø02'35" — Township: 02S
UTM: Zone-10 N4176498 E584331 — Range: 02W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POLYGON — Meridian: M
Area: 8.6 ac — Elevation: 900 ft

Comments

Distribution: TWO COLONIES ON WEST SIDE OF RIDGE-TOP ROAD; 1.99 MILES AND 2.13 MILES NNE OF CULL CANYON RESERVOIR DAM.

Ecological: CHAPARRAL AT EDGE OF GRASSLAND. ASSOCIATED WITH BACCHARIS PILULARIS, PTERIDIUM AQUILINUM, AVENA FATUA, ARTEMISA CALIFORNICA, GNAPHALIUM, BROMUS MOLLIS, AND B. RUBENS.

Threat: SITE IS GRAZED. WILDFIRES AND URBANIZATION ALSO THREATEN.

General: 210 PLANTS OBSERVED IN 1989.

Owner/Manager: PVT

Source Codes

DOL89F02

HELIANTHELLA CASTANEA (cont.)
DIABLO HELIANTHELLA — Element Code: PDAST4M020

Status — NDDB Element Ranks — Other Lists

Federal: None — Global: G3 — CNPS List: 1B
State: None — State: S3.2 — R-E-D Code: 2-2-3

Habitat Associations

General: BROADLEAVED UPLAND FOREST, CHAPARRAL, CISMONTANE WDLND, COASTAL SCRUB, RIPARIAN WOODLAND, VALLEY & FOOTHILL GRASSLAND.

Micro: USUALLY IN CHAPARRAL/OAK WOODLAND INTERFACE IN ROCKY, AZONAL SOILS. OFTEN IN PARTIAL SHADE. 25-1150M.

Occurrence No. 36 — Map Index: 27828 — Dates Last Seen

Occ Rank: Unknown — Element: 1991-06-16
Origin: Natural/Native occurrence — Site: 1991-06-16
Presence: Presumed Extant
Trend: Unknown
Main Source: OLSON, B. 1991 (OBS)

Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:

Location: FAIRMONT RIDGE SOUTHWEST OF LAKE CHABOT, ADJACENT TO RADIO TOWER AND NORTHEAST OF CHABOT BOYS RANCH.

Lat/Long: 37ø43'03" / 122ø06'48" — Township: 02S
UTM: Zone-10 N4174642 E578136 — Range: 02W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 80 meters — Elevation: 660 ft

Comments

Distribution: IN GRASSLAND BELOW ARTIFICIAL KNOS.

Ecological: VALLEY NEEDLEGRASS GRASSLAND WITH AVENA BARBATA, NASSELLA PULCHRA, BROMUS SPP, KOELERIA CRISTATA, BRASSICA GENICULATA, ACAENA CALIFORNICA, CORETHROGYNE CALIFORNICUM, CHRYSOPSIS VILLOSA ECHIOIDES, ERODIUM CICUTARIUM, AND ERIOPHYLLUM LANATUM.

Threat: GRAZING AND DEVELOPMENT.

General: 58 PLANTS OBSERVED IN 1991. OVERALL SITE QUALITY IS LOW BUT AREA ALSO SUPPORTS BALSAMORHIZA MACROLEPIS MACROLEPIS, FRITILLARIA LILIACEA, HESPEROLINON CALIFORNICUM, AND CALOCHORTUS SUPERBUS.

Owner/Manager: ALA COUNTY

Source Codes

OLS91F04, OLS91F51

CENTROMADIA PARRYI SSP CONGDONII
CONGDON'S TARPLANT Element Code: PDAST4R0P1

Status NDDB Element Ranks Other Lists
Federal: None Global: G5T1 CNPS List: 1B
State: None State: S1.1 R-E-D Code: 3-3-3

Habitat Associations
General: VALLEY AND FOOTHILL GRASSLAND.
Micro: ALKALINE SOILS, SOMETIMES DESCRIBED AS HEAVY WHITE CLAY. 1-230M.

Occurrence No. 12 Map Index: 24691 Dates Last Seen
Occ Rank: None Element: 1926-06-11
Origin: Natural/Native occurrence Site: 1998-10-04
Presence: Extirpated
Trend: Unknown
Main Source: EASTWOOD #13921 CAS (HERB)

Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:

Location: MT. EDEN.

Lat/Long: 37ø38'23" / 122ø06'27" Township: 03S
UTM: Zone-10 N4166013 E578732 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 4/5 mile Elevation: 20 ft

Comments
Distribution:
Ecological:
Threat: COMMERCIAL AND RESIDENTIAL DEVELOPMENT.
General: MAIN SOURCE OF INFORMATION FOR THIS SITE IS 1926 COLLECTION BY EASTWOOD. AREA SEARCHED IN 1998 BY R. PRESTON; ALL NATURAL HABITAT IN 1 MILE RADIUS AROUND MT. EDEN TRAIN STATION HAS BEEN ELIMINATED. OCCURRENCE IS EXTIRPATED.
Owner/Manager: UNKNOWN

Source Codes
EAS26S02, PRE98F25, PRE99R01

CENTROMADIA PARRYI SSP CONGDONII (cont.)
CONGDON'S TARPLANT Element Code: PDAST4R0P1

Status NDDB Element Ranks Other Lists
Federal: None Global: G5T1 CNPS List: 1B
State: None State: S1.1 R-E-D Code: 3-3-3

Habitat Associations
General: VALLEY AND FOOTHILL GRASSLAND.
Micro: ALKALINE SOILS, SOMETIMES DESCRIBED AS HEAVY WHITE CLAY. 1-230M.

Occurrence No. 22 Map Index: 25572 Dates Last Seen
Occ Rank: None Element: 1909-09-24
Origin: Natural/Native occurrence Site: 1998-10-04
Presence: Extirpated
Trend: Unknown
Main Source: MCMURPHY, J. SN #990560 UC (HERB)

Quad Summary: SAN LEANDRO (3712262/447B)*, HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:

Location: EAST 14TH STREET, SOUTH OF SAN LEANDRO.

Lat/Long: 37ø42'12" / 122ø07'28" Township: 03S
UTM: Zone-10 N4173063 E577179 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 188.1 ac Elevation: 40 ft

Comments
Distribution: MAPPED AS NON-SPECIFIC BOUNDED AREA ALONG EAST 14TH FROM NEAR FULLER SCHOOL SOUTH TO HWY 238.
Ecological:
Threat: COMMERCIAL AND RESIDENTIAL DEVELOPMENT.
General: MAIN SOURCE OF INFORMATION FOR THIS SITE IS 1909 COLLECTION BY MCMURPHY (SN UC, CAS). AREA SEARCHED IN 1998 BY R. PRESTON; ALL NATURAL HABITAT IN 1 MILE RADIUS AROUND THIS SITE HAS BEEN ELIMINATED. OCCURRENCE IS EXTIRPATED.
Owner/Manager: UNKNOWN

Source Codes
MCM09S07, PRE98F26, PRE99R01

LASTHENIA CONJUGENS
CONTRA COSTA GOLDFIELDS — Element Code: PDAST5L040

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G1 — CNPS List: 1B
State: None — State: S1.1 — R-E-D Code: 3-3-3

Habitat Associations
General: VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS, CISMONTANE WOODLAND. EXTIRPATED FROM MOST OF ITS RANGE; EXTREM. ENDANGERED.
Micro: VERNAL POOLS, SWALES, LOW DEPRESSIONS, IN OPEN GRASSY AREAS. 1-445M.

Occurrence No. 13 — Map Index: 09693 — Dates Last Seen
Occ Rank: None — Element: 1895-05-06
Origin: Natural/Native occurrence — Site: 1895-05-06
Presence: Extirpated
Trend: Unknown
Main Source: DAVY, J. #1107 UC (HERB)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:
Location: NEWARK.
Lat/Long: 37ø31'51" / 122ø02'38" — Township: 05S
UTM: Zone-10 N4153986 E584478 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 10 ft

Comments
Distribution:
Ecological:
Threat:
General: OLD HERBARIUM COLLECTION IS THE ONLY AVAILABLE INFORMATION; FIELDWORK NEEDED.
Owner/Manager: PVT

Source Codes
GUR90U01, ORN79U01, DAV95S02

PLAGIOBOTHRYS GLABER
HAIRLESS POPCORN-FLOWER — Element Code: PDBOR0V0B0

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: GH — CNPS List: 1A
State: None — State: SH — R-E-D Code: *

Habitat Associations
General: MEADOWS AND SEEPS, MARSHES AND SWAMPS.
Micro: COASTAL SALT MARSHES AND ALKALINE MEADOWS. 5-180M.

Occurrence No. 6 — Map Index: 28600 — Dates Last Seen
Occ Rank: Unknown — Element: 1896-06-07
Origin: Natural/Native occurrence — Site: 1896-06-07
Presence: Presumed Extant
Trend: Unknown
Main Source: JEPSON, W. #2723 JEPS #21215 (HERB)
Quad Summary: NEWARK (3712251/447D)
County Summary: ALAMEDA
SNA Summary:
Location: HALL'S STATION, NEAR ALVARADO.
Lat/Long: 37ø35'12" / 122ø03'47" — Township: 04S
UTM: Zone-10 N4160169 E582726 — Range: 02W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 15 ft

Comments
Distribution: MAPPED JUST NORTHEAST OF JUNCTION OF ALVARADO BLVD AND NIMITZ FREEWAY.
Ecological:
Threat:
General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1896 COLLECTION BY JEPSON.
Owner/Manager: UNKNOWN

Source Codes
JEP96S08

PLAGIOBOTHRYS GLABER (cont.)
HAIRLESS POPCORN-FLOWER Element Code: PDBOR0V0B0

Status NDDB Element Ranks Other Lists
Federal: None Global: GH CNPS List: 1A
State: None State: SH R-E-D Code: *

Habitat Associations
General: MEADOWS AND SEEPS, MARSHES AND SWAMPS.
Micro: COASTAL SALT MARSHES AND ALKALINE MEADOWS. 5-180M.

Occurrence No. 7 Map Index: 24691 Dates Last Seen
Occ Rank: Unknown Element: 1890-04-27
Origin: Natural/Native occurrence Site: 1890-04-27
Presence: Presumed Extant
Trend: Unknown
Main Source: BRANDEGEE, K. SN RSA (HERB)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:
Location: MT. EDEN.
Lat/Long: 37ø38'23" / 122ø06'27" Township: 03S
UTM: Zone-10 N4166013 E578732 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 4/5 mile Elevation: 20 ft

Comments
Distribution:
Ecological: SALT MARSHES.
Threat:
General: SITE REPORTED IN 1890 AND 1893 COLLECTION BY K. BRANDEGEE.
Owner/Manager: UNKNOWN

Source Codes
BRA90S16, BRA93S07

SUAEDA CALIFORNICA
CALIFORNIA SEABLITE Element Code: PDCHE0P020

Status NDDB Element Ranks Other Lists
Federal: Endangered Global: G1 CNPS List: 1B
State: None State: S1.1 R-E-D Code: 3-3-3

Habitat Associations
General: MARSHES AND SWAMPS.
Micro: MARGINS OF COASTAL SALT MARSHES. 0-5M.

Occurrence No. 9 Map Index: 24694 Dates Last Seen
Occ Rank: None Element: 1906-09-28
Origin: Natural/Native occurrence Site: 1906-09-28
Presence: Extirpated
Trend: Unknown
Main Source: WALKER, H. #473 UC #126852 (HERB)
Quad Summary: SAN LEANDRO (3712262/447B)*, HUNTERS POINT (3712263/448A)
County Summary: ALAMEDA
SNA Summary:
Location: BAY FARM ISLAND.
Lat/Long: 37ø43'26" / 122ø12'28" Township: 99X
UTM: Zone-10 N4175269 E569816 Range: 03W
Mapping Precision: SPECIFIC Section: XX Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 2,630.6 ac Elevation: 5 ft

Comments
Distribution: MAPPED ACCORDING TO 1959 TOPO MAP OF THE ISLAND (THE ISLAND HAS "GROWN" SIGNIFICANTLY SINCE 1906).
Ecological: GROWING ON MUD BANKS AND ON LOW SALINE GROUND.
Threat:
General: PLANTS COLLECTED TWICE IN THIS VICINITY; A. KELLOGG IN 1866 (SN UC #7246) AND THE 1906 COLLECTION BY WALKER (#473, UC). THE SPECIES IS APPARENTLY EXTIRPATED FROM THIS ISLAND.
Owner/Manager: UNKNOWN

Source Codes
WAL06S01, KEL66S01

ASTRAGALUS TENER VAR TENER
ALKALI MILK-VETCH Element Code: PDFAB0F8R1

Status NDDB Element Ranks Other Lists
Federal: None Global: G1T1 CNPS List: 1B
State: None State: S1.1 R-E-D Code: 3-2-3

Habitat Associations
General: ALKALI PLAYA, VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS.
Micro: LOW GROUND, ALKALI FLATS, AND FLOODED LANDS; IN ANNUAL GRASSLAND OR IN PLAYAS OR VERNAL POOLS. 1-170M.

Occurrence No. 12 Map Index: 24689 Dates Last Seen
Occ Rank: None Element: 1936-04-12
Origin: Natural/Native occurrence Site: 1936-04-12
Presence: Possibly Extirpated
Trend: Unknown
Main Source: LISTON, A. 1988 (PERS)

Quad Summary: NEWARK (3712251/447D)*, HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:

Location: BETWEEN ALVARADO (NOW = UNION CITY) AND MT. EDEN.

Lat/Long: 37ø36'59" / 122ø05'12" Township: 04S
UTM: Zone-10 N4163426 E580606 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1 mile Elevation: 5 ft

Comments

Distribution: MAPPED NORTH OF ALAMEDA CREEK.
Ecological: GROWING IN FIELDS.
Threat:
General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1936 COLLECTION BY P.F. COVEL (#213, HERBARIUM UNKNOWN). AREA SHOULD BE FIELD CHECKED FOR PRESENCE OF SUITABLE HABITAT.
Owner/Manager: UNKNOWN

Source Codes
LIS88R01, COV36S01

ASTRAGALUS TENER VAR TENER (cont.)
ALKALI MILK-VETCH Element Code: PDFAB0F8R1

Status NDDB Element Ranks Other Lists
Federal: None Global: G1T1 CNPS List: 1B
State: None State: S1.1 R-E-D Code: 3-2-3

Habitat Associations
General: ALKALI PLAYA, VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS.
Micro: LOW GROUND, ALKALI FLATS, AND FLOODED LANDS; IN ANNUAL GRASSLAND OR IN PLAYAS OR VERNAL POOLS. 1-170M.

Occurrence No. 13 Map Index: 24690 Dates Last Seen
Occ Rank: None Element: 1891-05-XX
Origin: Natural/Native occurrence Site: 1891-05-XX
Presence: Possibly Extirpated
Trend: Unknown
Main Source: LISTON, A. 1988 (PERS)

Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:

Location: HAYWARD, B ST. RR STATION.

Lat/Long: 37ø39'59" / 122ø05'52" Township: 99X
UTM: Zone-10 N4168973 E579569 Range: 99X
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1/5 mile Elevation: 70 ft

Comments

Distribution: MAPPED NEAR WEST "A" STREET AND THE SOUTHERN PACIFIC RR TRACKS.
Ecological:
Threat:
General: ONLY SOURCE OF INFORMATION IS 1891 COLLECTION BY MICHNER (COLLECION # AND HERBARIUM UNKNOWN). ASSUMED TO BE PROBABLY EXTIRPATED.
Owner/Manager: UNKNOWN

Source Codes
LIS88R01, MIC91S02, BIO91S01, BLA91S01

ASTRAGALUS TENER VAR TENER (cont.)
ALKALI MILK-VETCH Element Code: PDFAB0F8R1

Status NDDB Element Ranks Other Lists
Federal: None Global: G1T1 CNPS List: 1B
State: None State: S1.1 R-E-D Code: 3-2-3

Habitat Associations
General: ALKALI PLAYA, VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS.
Micro: LOW GROUND, ALKALI FLATS, AND FLOODED LANDS; IN ANNUAL GRASSLAND OR IN PLAYAS OR VERNAL POOLS. 1-170M.

Occurrence No. 14 Map Index: 24691 Dates Last Seen
Occ Rank: None Element: 1890-04-27
Origin: Natural/Native occurrence Site: 1890-04-27
Presence: Possibly Extirpated
Trend: Unknown
Main Source: LISTON, A. 1988 (PERS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:
Location: MT. EDEN.
Lat/Long: 37ø38'23" / 122ø06'27" Township: 03S
UTM: Zone-10 N4166013 E578732 Range: 02W
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: M
Radius: 4/5 mile Elevation: 20 ft

Comments
Distribution:
Ecological:
Threat:
General: ONLY SOURCE OF INFORMATION IS 1890 COLLECTION BY T.S. BRANDEGEE (COLLECTION # AND HERBARIUM UNKNOWN).
Owner/Manager: UNKNOWN

Source Codes
LIS88R01, BRA90S18

ASTRAGALUS TENER VAR TENER (cont.)
ALKALI MILK-VETCH Element Code: PDFAB0F8R1

Status NDDB Element Ranks Other Lists
Federal: None Global: G1T1 CNPS List: 1B
State: None State: S1.1 R-E-D Code: 3-2-3

Habitat Associations
General: ALKALI PLAYA, VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS.
Micro: LOW GROUND, ALKALI FLATS, AND FLOODED LANDS; IN ANNUAL GRASSLAND OR IN PLAYAS OR VERNAL POOLS. 1-170M.

Occurrence No. 15 Map Index: 24694 Dates Last Seen
Occ Rank: None Element: 1937-04-37
Origin: Natural/Native occurrence Site: 1937-04-17
Presence: Possibly Extirpated
Trend: Unknown
Main Source: HOOVER, R. #1885 UC 764633 (HERB)
Quad Summary: SAN LEANDRO (3712262/447B)*, HUNTERS POINT (3712263/448A)
County Summary: ALAMEDA
SNA Summary:
Location: BAY FARM ISLAND.
Lat/Long: 37ø43'26" / 122ø12'28" Township: 99X
UTM: Zone-10 N4175269 E569816 Range: 03W
Mapping Precision: SPECIFIC Section: XX Qtr XX
Symbol Type: POLYGON Meridian: M
Area: 2,630.6 ac Elevation: 5 ft

Comments
Distribution: MAPPED ACCORDING TO 1959 TOPO MAP OF THE ISLAND (THE ISLAND HAS "GROWN" SIGNIFICANTLY SINCE 1937).
Ecological:
Threat:
General: PLANTS COLLECTED TWICE ON BAY FARM ISLAND; S.E. KELLEY IN 1923 (COLLECTION # AND HERBARIUM UNKNOWN) AND THE 1937 COLLECTION BY HOOVER. ISLAND SHOULD BE FIELD CHECKED FOR PRESENCE OF APPROPRIATE HABITAT.
Owner/Manager: UNKNOWN

Source Codes
LIS88R01, HOO37S34, KEL23S01

ASTRAGALUS TENER VAR TENER (cont.)
ALKALI MILK-VETCH — Element Code: PDFAB0F8R1

Status	NDDB Element Ranks	Other Lists
Federal: None	Global: G1T1	CNPS List: 1B
State: None	State: S1.1	R-E-D Code: 3-2-3

Habitat Associations
General: ALKALI PLAYA, VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS.
Micro: LOW GROUND, ALKALI FLATS, AND FLOODED LANDS; IN ANNUAL GRASSLAND OR IN PLAYAS OR VERNAL POOLS. 1-170M.

Occurrence No. 16 — Map Index: 24692 — Dates Last Seen
Occ Rank: None — Element: 1959-04-11
Origin: Natural/Native occurrence — Site: 1959-04-11
Presence: Possibly Extirpated
Trend: Unknown
Main Source: ROBBINS, G. #3977 JEPS 24302 (HERB)
Quad Summary: SAN LEANDRO (3712262/447B)
County Summary: ALAMEDA
SNA Summary:
Location: SAN LORENZO, 1/4 MILE NORTH OF THE WEST END OF DEPOT ROAD.
Lat/Long: 37ø38'32" / 122ø08'04" — Township: 99X
UTM: Zone-10 N4166281 E576355 — Range: 99X
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1/5 mile — Elevation: 10 ft

Comments
Distribution: IN FIELD JUST EAST OF THE AMERICAN SALT COMPANY EVAPORATING PONDS. ABOUT 3/4 MI NORTHWEST OF MT. EDEN AND 3/4 MI SOUTH OF RUSSELL.
Ecological: GROWING IN UNCULTIVATED ALKALINE FIELD.
Threat:
General: ONLY SOURCE OF INFORMATION IS 1959 COLLECTION BY ROBBINS. AREA SHOULD BE FIELD CHECKED FOR PRESENCE OF SUITABLE HABITAT.
Owner/Manager: UNKNOWN

Source Codes
LIS88R01, ROB59S05

ASTRAGALUS TENER VAR TENER (cont.)
ALKALI MILK-VETCH — Element Code: PDFAB0F8R1

Status	NDDB Element Ranks	Other Lists
Federal: None	Global: G1T1	CNPS List: 1B
State: None	State: S1.1	R-E-D Code: 3-2-3

Habitat Associations
General: ALKALI PLAYA, VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS.
Micro: LOW GROUND, ALKALI FLATS, AND FLOODED LANDS; IN ANNUAL GRASSLAND OR IN PLAYAS OR VERNAL POOLS. 1-170M.

Occurrence No. 17 — Map Index: 20604 — Dates Last Seen
Occ Rank: None — Element: 1895-05-14
Origin: Natural/Native occurrence — Site: 1895-05-14
Presence: Possibly Extirpated
Trend: Unknown
Main Source: TIDESTROM, I. #1898 UC #13469 (HERB)
Quad Summary: OAKLAND EAST (3712272/465C)*, SAN LEANDRO (3712262/447B), OAKLAND WEST (3712273/466D)
County Summary: ALAMEDA
SNA Summary:
Location: ALAMEDA.
Lat/Long: 37ø45'51" / 122ø14'26" — Township: 02S
UTM: Zone-10 N4179718 E566888 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 20 ft

Comments
Distribution: EXACT LOCATION NOT KNOWN; MAPPED IN GENERAL VICINITY OF ALAMEDA.
Ecological:
Threat:
General: TWO COLLECTIONS ATTRIBUTED TO THIS SITE; TIDESTROM #1898 (UC) IN 1895 AND E.L. GREENE SN (UNK. HERB) IN 1891.
Owner/Manager: UNKNOWN

Source Codes
GRE91S03, TID95S01, LIS88U01

CHORIZANTHE ROBUSTA VAR ROBUSTA
ROBUST SPINEFLOWER — Element Code: PDPGN040Q2

Status — NDDB Element Ranks — Other Lists
Federal: Endangered — Global: G2T1 — CNPS List: 1B
State: None — State: S1.1 — R-E-D Code: 3-3-3

Habitat Associations
General: CISMONTANE WOODLAND, COASTAL DUNES, COASTAL SCRUB.
Micro: SANDY TERRACES AND BLUFFS OR IN LOOSE SAND. 3-120M.

Occurrence No. 1 — Map Index: 20604 — Dates Last Seen
Occ Rank: None — Element: 1894-10-XX
Origin: Natural/Native occurrence — Site: 1894-10-XX
Presence: Possibly Extirpated
Trend: Unknown
Main Source: BOLANDER, H. #1939 GH, K, MO, US (HERB)
Quad Summary: OAKLAND EAST (3712272/465C)*, SAN LEANDRO (3712262/447B), OAKLAND WEST (3712273/466D)
County Summary: ALAMEDA
SNA Summary:
Location: ALAMEDA.
Lat/Long: 37ø45'51" / 122ø14'26" — Township: 02S
UTM: Zone-10 N4179718 E566888 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 20 ft

Comments
Distribution: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB IN VICINITY OF THE CITY OF ALAMEDA.
Ecological:
Threat: URBANIZATION.
General: THOUGHT TO BE EXTIRPATED. VICINITY REPORTED IN 5 HISTORIC COLLECTIONS BETWEEN 1866 AND 1894: GREENE SN (B, F, K, NDG, US), BOLANDER #1939 (GH, K, MO, US, WS), KING SN (UC), JEPSON SN (JEPS), AND PARRY #13/2 (GH, ISC, US). FIELDWORK NEEDED.
Owner/Manager: UNKNOWN

Source Codes
ANO91U01, JEP13S02, BOL66S03, REV89A01, ANO91U02, PAR88S08, KIN93S01, ERT90U03, JEP94S02, GRE91S04

HORKELIA CUNEATA SSP SERICEA
KELLOGG'S HORKELIA — Element Code: PDROS0W043

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G4T1 — CNPS List: 1B
State: None — State: S1.1 — R-E-D Code: 3-3-3

Habitat Associations
General: CLOSED-CONE CONIFEROUS FOREST, COASTAL SCRUB, CHAPARRAL.
Micro: OLD DUNES, COASTAL SANDHILLS; OPENINGS. 10-200M.

Occurrence No. 34 — Map Index: 20604 — Dates Last Seen
Occ Rank: None — Element: 1894-XX-XX
Origin: Natural/Native occurrence — Site: 198X-XX-XX
Presence: Possibly Extirpated
Trend: Unknown
Main Source: KING SN UC (HERB)
Quad Summary: OAKLAND EAST (3712272/465C)*, SAN LEANDRO (3712262/447B), OAKLAND WEST (3712273/466D)
County Summary: ALAMEDA
SNA Summary:
Location: ALAMEDA.
Lat/Long: 37ø45'51" / 122ø14'26" — Township: 02S
UTM: Zone-10 N4179718 E566888 — Range: 03W
Mapping Precision: NON-SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 20 ft

Comments
Distribution: EXACT LOCATION UNKNOWN. MAPPED AT CNDDB IN VICINITY OF THE CITY OF ALAMEDA.
Ecological:
Threat:
General: SEVERAL COLLECTIONS FROM ALAMEDA AND ALAMEDA PARK BETWEEN 1868 AND 1894. AREA SEARCHED BY ERTTER IN 1980S OR 1990S BUT NO PLANTS FOUND. SPECIES WAS NOTED TO BE DISAPPEARING IN THIS AREA BY 1887 ACCORDING TO GREENE.
Owner/Manager: UNKNOWN

Source Codes
GRE92S03, ERT93U02, KEL68S01, ERT91U07, ERT91U08, GRE87S02, GRE87S03, PAR88S02, VAS76S01, KEL69S01, KIN94S01, GRE90S08, VASNDS01

CORDYLANTHUS MARITIMUS SSP PALUSTRIS
POINT REYES BIRD'S-BEAK Element Code: PDSCR0J0C3

Status NDDB Element Ranks Other Lists
Federal: None Global: G3T2 CNPS List: 1B
State: None State: S2.2 R-E-D Code: 2-2-2

Habitat Associations
General: COASTAL SALT MARSH.
Micro: USUALLY IN COASTAL SALT MARSH WITH SALICORNIA, DISTICHLIS, JAUMEA, SPARTINA, ETC. 0-15M.

Occurrence No. 18 Map Index: 42160 Dates Last Seen
Occ Rank: None Element: 1908-10-XX
Origin: Natural/Native occurrence Site: 1908-10-XX
Presence: Possibly Extirpated
Trend: Unknown
Main Source: HALSEY, SN DS (HERB)

Quad Summary: REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary:

Location: REDWOOD CITY, SALT MARSHES.

Lat/Long: 37ø30'57" / 122ø12'32" Township: 05S
UTM: Zone-10 N4152191 E569892 Range: 03W
Mapping Precision: NON-SPECIFIC Section: 08 Qtr XX
Symbol Type: POINT Meridian: M
Radius: 1 mile Elevation:

Comments

Distribution: MAPPED AT MOUTH OF REDWOOD CREEK, NEAR REDWOOD CITY.
Ecological:
Threat:
General: ONLY INFORMATION FOR THIS SITE IS 1908 COLLECTION BY HALSEY. EXTIRPATED ACCORDING TO D. SMITH (1996).
Owner/Manager: UNKNOWN

Source Codes

SMI96U01, HAL08S02

CORDYLANTHUS MARITIMUS SSP PALUSTRIS (cont.)
POINT REYES BIRD'S-BEAK Element Code: PDSCR0J0C3

Status NDDB Element Ranks Other Lists
Federal: None Global: G3T2 CNPS List: 1B
State: None State: S2.2 R-E-D Code: 2-2-2

Habitat Associations
General: COASTAL SALT MARSH.
Micro: USUALLY IN COASTAL SALT MARSH WITH SALICORNIA, DISTICHLIS, JAUMEA, SPARTINA, ETC. 0-15M.

Occurrence No. 20 Map Index: 42153 Dates Last Seen
Occ Rank: None Element: 1917-12-10
Origin: Natural/Native occurrence Site: 1991-08-25
Presence: Possibly Extirpated
Trend: Unknown
Main Source: JEPSON #6152 JEPS (HERB)

Quad Summary: SAN LEANDRO (3712262/447B)*, OAKLAND EAST (3712272/465C)
County Summary: ALAMEDA
SNA Summary:

Location: ALAMEDA MARSH NEAR BAY FARM ISLAND.

Lat/Long: 37ø44'58" / 122ø13'24" Township: 99X
UTM: Zone-10 N4178101 E568421 Range: 99X
Mapping Precision: NON-SPECIFIC Section: XX Qtr XX
Symbol Type: POINT Meridian: X
Radius: 1 mile Elevation:

Comments

Distribution:
Ecological:
Threat: HABITAT VERY DEGRADED BY HISTORIC FILLING, RECENT BANK EROSION.
General: LAST SEEN IN 1917. OLSON (1991) SEARCHED SEVERAL MARSHES IN THIS AREA (DAMON MARSH, DAMON SLOUGH, ELMHURST CREEK, SAN LEANDRO CR, ARROHWEAD MARSH, AIRPORT CHANNEL);FOUND NO CORDYLANTHUS MARITIMUS SSP PALUSTRIS. EXTIRPATED - D. SMITH (1996).
Owner/Manager: UNKNOWN

Source Codes

SMI96U01, OLS91F05, JEP14S02

CORDYLANTHUS MARITIMUS SSP PALUSTRIS (cont.)
POINT REYES BIRD'S-BEAK — Element Code: PDSCR0J0C3

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G3T2 — CNPS List: 1B
State: None — State: S2.2 — R-E-D Code: 2-2-2

Habitat Associations
General: COASTAL SALT MARSH.
Micro: USUALLY IN COASTAL SALT MARSH WITH SALICORNIA, DISTICHLIS, JAUMEA, SPARTINA, ETC. 0-15M.

Occurrence No. 62 — Map Index: 09246 — Dates Last Seen
Occ Rank: None — Element: 1893-06-17
Origin: Natural/Native occurrence — Site: 1893-06-17
Presence: Possibly Extirpated
Trend: Unknown
Main Source: DAVY, J. #773 UC (HERB)
Quad Summary: SAN MATEO (3712253/448D)*, REDWOOD POINT (3712252/447C)
County Summary: SAN MATEO
SNA Summary: Belmont Slough
Location: BELMONT, SALT MARSH, SAN MATEO COUNTY.
Lat/Long: 37ø32'32" / 122ø15'03" — Township: 04S
UTM: Zone-10 N4155084 E566183 — Range: 04W
Mapping Precision: NON-SPECIFIC — Section: 36 Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 1 mile — Elevation: 10 ft

Comments
Distribution:
Ecological:
Threat:
General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1893 COLLECTION BY DAVY. POSSIBLY EXTINCT ACCORDING TO HECKARD; EXTIRPATED ACCORDING TO D. SMITH (1996).
Owner/Manager: UNKNOWN

Source Codes
SMI96U01, DAV93S04

FRITILLARIA LILIACEA
FRAGRANT FRITILLARY — Element Code: PMLIL0V0C0

Status — NDDB Element Ranks — Other Lists
Federal: None — Global: G2 — CNPS List: 1B
State: None — State: S2.2 — R-E-D Code: 2-2-3

Habitat Associations
General: COASTAL SCRUB, VALLEY AND FOOTHILL GRASSLAND, COASTAL PRAIRIE.
Micro: OFTEN ON SERPENTINE; VARIOUS SOILS REPORTED THOUGH USUALLY CLAY, IN GRASSLAND. 3-410M.

Occurrence No. 38 — Map Index: 25042 — Dates Last Seen
Occ Rank: Good — Element: 1990-02-19
Origin: Natural/Native occurrence — Site: 1990-02-10
Presence: Presumed Extant
Trend: Unknown
Main Source: COPPE, G. 1990 (OBS)
Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:
Location: SOUTHWEST OF LAKE CHABOT, NORTH OF THE MT. CALVARY CEMETERY.
Lat/Long: 37ø43'15" / 122ø07'20" — Township: 02S
UTM: Zone-10 N4175009 E577352 — Range: 02W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 80 meters — Elevation: 400 ft

Comments
Distribution: ON SMALL KNOLL AT HEAD OF INTERMITTENT STREAM THAT CROSSES FAIRMONT DRIVE; APPROX. 0.7 MILES FROM HWY 580.
Ecological: GRASSLAND ON SERPENTINE SOILS. SOUTH-FACING SLOPES WITH AVENA BARBATA AND NASSELLA PULCHRA DOMINANTS, ASSOCIATES INCLUDE BALSAMORHIZA MACROLEPIS, WYETHIA ANGUSTIFOLIA, AND SCABIOSA ATROPURPUREA.
Threat: SEASONALLY GRAZED BY CATTLE, SITE PROPOSED FOR DEVELOPMENT.
General: APPROX. 50 PLANTS OBSERVED IN 1990 BY COPPE. THERE HAS BEEN SOME PRELIMINARY DISCUSSION OF SELLING TO EAST BAY REGIONAL PARKS. UNDER PROPER MANAGEMENT, THIS SITE COULD RETURN TO A MORE NATIVE CONDITION.
Owner/Manager: ALA COUNTY

Source Codes
OLS91F04, LEMNDS02, MAS31S01, WAL13S01, COP90F02

FRITILLARIA LILIACEA (cont.)

FRAGRANT FRITILLARY — Element Code: PMLIL0V0C0

Status
Federal: None
State: None

NDDB Element Ranks
Global: G2
State: S2.2

Other Lists
CNPS List: 1B
R-E-D Code: 2-2-3

Habitat Associations
General: COASTAL SCRUB, VALLEY AND FOOTHILL GRASSLAND, COASTAL PRAIRIE.
Micro: OFTEN ON SERPENTINE; VARIOUS SOILS REPORTED THOUGH USUALLY CLAY, IN GRASSLAND. 3-410M.

Occurrence No. 39 — Map Index: 25043

Dates Last Seen
Occ Rank: Fair — Element: 1990-02-19
Origin: Natural/Native occurrence — Site: 1990-02-19
Presence: Presumed Extant
Trend: Unknown
Main Source: COPPE, G. 1990 (OBS)

Quad Summary: HAYWARD (3712261/447A)
County Summary: ALAMEDA
SNA Summary:

Location: SOUTH OF LAKE CHABOT, NORTH OF FAIRMONT TERRACE SCHOOL AND NEXT TO FAIRMONT DRIVE.

Lat/Long: 37ø42'46" / 122ø06'42" — Township: 02S
UTM: Zone-10 N4174128 E578302 — Range: 02W
Mapping Precision: SPECIFIC — Section: XX Qtr XX
Symbol Type: POINT — Meridian: M
Radius: 80 meters — Elevation: 400 ft

Comments
Distribution: APPROX. 1.5 MILES WEST OF HWY 580 ON FAIRMONT DRIVE, COLONY IS AT TOP OF FIRST LARGE ROAD CUT. ON LEVEL SURFACE BETW/ROAD CUT AND FENCE.
Ecological: GRASSLAND.
Threat:
General: ONE PLANT OBSERVED IN 1990 BY COPPE.
Owner/Manager: UNKNOWN

Source Codes
COP90F02

Russell City Energy Center

Appendix 8.2-B
U.S. Fish and Wildlife Service (USFWS) Letter re Special Status Species in the Project Vicinity

May 2001

Russell City Energy Center AFC

May 2001

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-01-SP-1179

February 26, 2001

Mr. Brad Wheeler
Assistant Environmental Scientist
Foster Wheeler Environmental Corporation
3947 Lennane Drive, Suite 200
Sacramento, California 95834

Subject: Species List for Russel City Energy Center Project, Alameda County, California

Dear Mr. Wheeler:

We are sending the enclosed list in response to your February 26, 2001, request for information about endangered and threatened species (Enclosure A). The list covers the following U.S. Geological Survey 7½ minute quad or quads: Hayward, San Leandro, Redwood Point and Newark Quads.

Please read *Important Information About Your Species List* (enclosed). It explains how we made the list and describes your responsibilities under the Endangered Species Act. Please contact Harry Mossman, Biological Technician, at (916) 414-6674, if you have any questions about the attached list or your responsibilities under the Endangered Species Act. For the fastest response to species list requests, address them to the attention of Mr. Mossman at this address. You may fax requests to him at 414-6712 or 6713.

Sincerely,

for Jan C. Knight
Chief, Endangered Species Division

Enclosures

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute *quads*. The United States is divided into these quads, which are about the size of San Francisco. If you requested your list by quad name or number, that is what we used. Otherwise, we used the information you sent us to determine which quad or quads to use.

Animals

The animals on your species list are ones that occur within, *or may be affected by projects within*, the quads covered by the list. Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.

Plants

Any plants on your list are ones *that have actually been observed* in the quad or quads covered by the list. We have also included either a county species list or a list of species in nearby quads. We recommend that you check your project area for these plants. Plants may exist in an area without ever having been detected there.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. For plant surveys, we recommend using the enclosed *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species*. The results of your surveys should be published in any environmental documents prepared for your project.

State-Listed Species

If a species has been listed as threatened or endangered by the State of California, but not by us nor by the National Marine Fisheries Service, it will appear on your list as a Species of Concern. *However you should contact the California Department of Fish and Game for official information about these species.* Call (916) 322-2493 or write Marketing Manager, California Department of Fish and Game, Natural Diversity Data Base, 1416 Ninth Street, Sacramento, California 95814.

Your Responsibilities Under the Endangered Species Act

All plants and animals identified as *listed* on Enclosure A are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the *take* of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal. Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a *formal consultation* with the Service. Such consultation would result in a *biological opinion* addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an *incidental take permit*. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project. Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that mitigates for the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the mitigation plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as *critical habitat*. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Maps and boundary descriptions of the critical habitat may be found in the *Federal Register*. The information is also reprinted in the *Code of Federal Regulations* (50 **CFR** 17.95).

Candidate Species

We recommend that you address impacts to *candidate* species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Your list may contain a section called *Species of Concern*. This term includes former *category 2 candidate species* and other plants and animals of concern to the Service and other Federal, State and private conservation agencies and organizations. Some of these species may become candidate species in the future.

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed, candidate and special concern species in your planning, this should not be a problem. We also continually strive to make our information as accurate as possible. Sometimes we learn that a particular species has a different range than we thought. This should not be a problem if you consider the species on the county or surrounding-quad lists that we have enclosed. If you have a long-term project or if your project is delayed, please feel free to contact us about getting a current list. You can also find out the current status of a species by going to the Service's Internet page: *www.fws.gov*

GUIDELINES FOR CONDUCTING AND REPORTING BOTANICAL INVENTORIES FOR FEDERALLY LISTED, PROPOSED AND CANDIDATE PLANTS

(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

   a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species.

   b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name.

   c. survey dates and survey methodology(ies).

   d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made.

   e. a comprehensive list of all vascular plants occurring on the project site for each habitat type.

   f. current and historic land uses of the habitat(s) and degree of site alteration.

g. presence of target species off-site on adjacent parcels, if known.

h. an assessment of the biological significance or ecological quality of the project site in a local and regional context.

5. If target species is(are) found, report results that additionally include:

a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project.

b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports.

d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than three years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

9. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

ENCLOSURE A

Endangered and Threatened Species that May Occur in or be Affected by

PROJECTS IN ALAMEDA COUNTY

Reference File No. 1-1-01-SP-1179

February 26, 2001

Listed Species

Mammals

- salt marsh harvest mouse, *Reithrodontomys raviventris* (E)
- San Joaquin kit fox, *Vulpes macrotis mutica* (E)
- riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *
- riparian brush rabbit, *Sylvilagus bachmani riparius* (E) *

Birds

- California brown pelican, *Pelecanus occidentalis californicus* (E)
- California clapper rail, *Rallus longirostris obsoletus* (E)
- California least tern, *Sterna antillarum (=albifrons) browni* (E)
- Aleutian Canada goose, *Branta canadensis leucopareia* (T)
- bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

- Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)
- Critical habitat, Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)
- giant garter snake, *Thamnophis gigas* (T)

Amphibians

- California red-legged frog, *Rana aurora draytonii* (T)

Fish

- tidewater goby, *Eucyclogobius newberryi* (E)
- Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)
- winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)
- delta smelt, *Hypomesus transpacificus* (T)
- Central California Coastal steelhead, *Oncorhynchus mykiss* (T)
- Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)
- Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T)
- Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

- longhorn fairy shrimp, *Branchinecta longiantenna* (E)
- vernal pool tadpole shrimp, *Lepidurus packardi* (E)
- callippe silverspot butterfly, *Speyeria callippe callippe* (E)
- vernal pool fairy shrimp, *Branchinecta lynchi* (T)
- bay checkerspot butterfly, *Euphydryas editha bayensis* (T)

Plants

large-flowered fiddleneck, *Amsinckia grandiflora* (E)
Presidio clarkia, *Clarkia franciscana* (E)
palmate-bracted bird's-beak, *Cordylanthus palmatus* (E)
pallid manzanita (Alameda manzanita), *Arctostaphylos pallida* (T)
robust spineflower, *Chorizanthe robusta* (E) *
Contra Costa goldfields, *Lasthenia conjugens* (E) *
California sea blite, *Suaeda californica* (E) *
showy Indian clover, *Trifolium amoenum* (E) *
Santa Cruz tarplant, *Holocarpha macradenia* (T) *

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)
greater western mastiff-bat, *Eumops perotis californicus* (SC)
small-footed myotis bat, *Myotis ciliolabrum* (SC)
long-eared myotis bat, *Myotis evotis* (SC)
fringed myotis bat, *Myotis thysanodes* (SC)
long-legged myotis bat, *Myotis volans* (SC)
Yuma myotis bat, *Myotis yumanensis* (SC)
San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)
San Joaquin pocket mouse, *Perognathus inornatus* (SC)
Alameda Island mole, *Scapanus latimanus parvus* (SC)
salt marsh vagrant shrew, *Sorex vagrans halicoetes* (SC)
Berkeley kangaroo rat, *Dipodomys heermanni berkeleyensis* (SC) *

Birds

little willow flycatcher, *Empidonax traillii brewsteri* (CA)
black rail, *Laterallus jamaicensis coturniculus* (CA)
bank swallow, *Riparia riparia* (CA)
American peregrine falcon, *Falco peregrinus anatum* (D)
Black-Crowned Night Heron, *Nycticorax nycticorax* (MB)

tricolored blackbird, *Agelaius tricolor* (SC)
grasshopper sparrow, *Ammodramus savannarum* (SC)
Bell's sage sparrow, *Amphispiza belli belli* (SC)
short-eared owl, *Asio flammeus* (SC)
western burrowing owl, *Athene cunicularia hypugea* (SC)
American bittern, *Botaurus lentiginosus* (SC)
ferruginous hawk, *Buteo regalis* (SC)
Costa's hummingbird, *Calypte costae* (SC)
Lawrence's goldfinch, *Carduelis lawrencei* (SC)
Vaux's swift, *Chaetura vauxi* (SC)
lark sparrow, *Chondestes grammacus* (SC)
olive-sided flycatcher, *Contopus cooperi* (SC)
hermit warbler, *Dendroica occidentalis* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)
Pacific-slope flycatcher, *Empidonax difficilis* (SC)
common loon, *Gavia immer* (SC)
saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)
loggerhead shrike, *Lanius ludovicianus* (SC)
Lewis' woodpecker, *Melanerpes lewis* (SC)
Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)
long-billed curlew, *Numenius americanus* (SC)
white-faced ibis, *Plegadis chihi* (SC)
rufous hummingbird, *Selasphorus rufus* (SC)
Allen's hummingbird, *Selasphorus sasin* (SC)
red-breasted sapsucker, *Sphyrapicus ruber* (SC)
Bewick's wren, *Thryomanes bewickii* (SC)
California thrasher, *Toxostoma redivivum* (SC)

Reptiles

silvery legless lizard, *Anniella pulchra pulchra* (SC)
northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)
San Joaquin coachwhip (=whipsnake), *Masticophis flagellum ruddocki* (SC)
California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)
western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)
river lamprey, *Lampetra ayresi* (SC)

Pacific lamprey, *Lampetra tridentata* (SC)
longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Opler's longhorn moth, *Adela oplerella* (SC)
Bridges' Coast Range shoulderband snail, *Helminthoglypta nickliniana bridgesi* (SC)
Ricksecker's water scavenger beetle, *Hydrochara ricksecker*i (SC)
curved-foot hygrotus diving beetle, *Hygrotus curvipes* (SC)
California linderiella fairy shrimp, *Linderiella occidentalis* (SC)
San Francisco lacewing, *Nothochrysa californica* (SC)

Plants

heartscale, *Atriplex cordulata* (SC)
brittlescale, *Atriplex depressa* (SC)
valley spearscale, *Atriplex joaquiniana* (SC)
Mt. Hamilton thistle, *Cirsium fontinale var. campylon* (SC)
South Bay clarkia, *Clarkia concinna ssp. automixa* (SC)
hispid bird's-beak, *Cordylanthus mollis ssp. hispidus* (SC)
Livermore tarplant, *Deinandra bacigalupii* (SC)
interior California larkspur, *Delphinium californicum ssp. interius* (SC)
recurved larkspur, *Delphinium recurvatum* (SC)
diamond-petaled poppy, *Eschscholzia rhombipetala* (SC)
talus fritillary, *Fritillaria falcata* (SC)
fragrant fritillary, *Fritillaria liliacea* (SC)
Diablo helianthella (=rock-rose), *Helianthella castanea* (SC)
pappose spikeweed, *Hemizonia parryi ssp. congdonii* (SC)
delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)
Mason's lilaeopsis, *Lilaeopsis masonii* (SC)
little mousetail, *Myosurus minimus ssp. apus* (SC)
most beautiful (uncommon) jewelflower, *Streptanthus albidus ssp. peramoenus* (SC)
alkali milk-vetch, *Astragalus tener var. tener* (SC) *
San Francisco Bay spineflower, *Chorizanthe cuspidata var. cuspidata* (SC) *
northcoast bird's-beak, *Cordylanthus maritimus ssp. palustris* (SC) *
Kellogg's (wedge-leaved) horkelia, *Horkelia cuneata ssp. sericea* (SC) *
adobe sanicle, *Sanicula maritima* (SC) *
caper-fruited tropidocarpum, *Tropidocarpum capparideum* (SC) **
Mt. Diablo phacelia, *Phacelia phacelioides* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	Other species of concern to the Service.
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
*	*Extirpated*	Possibly extirpated from the area.
**	*Extinct*	Possibly extinct
	Critical Habitat	Area essential to the conservation of a species.

ENCLOSURE A

Endangered and Threatened Species that May Occur in
or be Affected by Projects in the Selected Quads Listed Below
Reference File No. 1-1-01-SP-1179
February 26, 2001

QUAD : 447A HAYWARD

Listed Species

Mammals

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Birds

western snowy plover, *Charadrius alexandrinus nivosus* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

California brown pelican, *Pelecanus occidentalis californicus* (E)

California clapper rail, *Rallus longirostris obsoletus* (E)

California least tern, *Sterna antillarum (=albifrons) browni* (E)

Reptiles

Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

Central California Coastal steelhead, *Oncorhynchus mykiss* (T)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

Plants

Santa Cruz tarplant, *Holocarpha macradenia* (T) *

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

western burrowing owl, *Athene cunicularia hypugea* (SC)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)

black rail, *Laterallus jamaicensis coturniculus* (CA)

Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

Fish

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Ricksecker's water scavenger beetle, *Hydrochara ricksecker*i (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

alkali milk-vetch, *Astragalus tener var. tener* (SC) *

fragrant fritillary, *Fritillaria liliacea* (SC)

Diablo helianthella (=rock-rose), *Helianthella castanea* (SC)

pappose spikeweed, *Hemizonia parryi ssp. congdonii* (SC) *

QUAD : 447B SAN LEANDRO

Listed Species

Mammals

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Birds

western snowy plover, *Charadrius alexandrinus nivosus* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

California brown pelican, *Pelecanus occidentalis californicus* (E)

California clapper rail, *Rallus longirostris obsoletus* (E)

California least tern, *Sterna antillarum (=albifrons) browni* (E)

Reptiles

Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

tidewater goby, *Eucyclogobius newberryi* (E)

delta smelt, *Hypomesus transpacificus* (T)

coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

Central California Coastal steelhead, *Oncorhynchus mykiss* (T)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

Plants

California sea blite, *Suaeda californica* (E) *

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

salt marsh vagrant shrew, *Sorex vagrans halicoetes* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

western burrowing owl, *Athene cunicularia hypugea* (SC)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)

black rail, *Laterallus jamaicensis coturniculus* (CA)

Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

Fish

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

alkali milk-vetch, *Astragalus tener var. tener* (SC) *

northcoast bird's-beak, *Cordylanthus maritimus ssp. palustris* (SC) *

pappose spikeweed, *Hemizonia parryi ssp. congdonii* (SC) *

QUAD : 447C REDWOOD POINT

Listed Species

Mammals

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Birds

western snowy plover, *Charadrius alexandrinus nivosus* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

California brown pelican, *Pelecanus occidentalis californicus* (E)

California clapper rail, *Rallus longirostris obsoletus* (E)

California least tern, *Sterna antillarum (=albifrons) browni* (E)

Reptiles

Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

Central California Coastal steelhead, *Oncorhynchus mykiss* (T)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

San Bruno elfin butterfly, *Incisalia mossii bayensis* (E)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

salt marsh vagrant shrew, *Sorex vagrans halicoetes* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

western burrowing owl, *Athene cunicularia hypugea* (SC)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)

black rail, *Laterallus jamaicensis coturniculus* (CA)

Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)

Reptiles

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

Fish

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Ricksecker's water scavenger beetle, *Hydrochara ricksecker*i (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

northcoast bird's-beak, *Cordylanthus maritimus ssp. palustris* (SC) *

QUAD : 447D NEWARK

Listed Species

Mammals

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Birds

western snowy plover, *Charadrius alexandrinus nivosus* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

California brown pelican, *Pelecanus occidentalis californicus* (E)

California clapper rail, *Rallus longirostris obsoletus* (E)

California least tern, *Sterna antillarum (=albifrons) browni* (E)

Reptiles

Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

Central California Coastal steelhead, *Oncorhynchus mykiss* (T)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

Plants

Contra Costa goldfields, *Lasthenia conjugens* (E) *

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

salt marsh vagrant shrew, *Sorex vagrans halicoetes* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

western burrowing owl, *Athene cunicularia hypugea* (SC)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)

black rail, *Laterallus jamaicensis coturniculus* (CA)

Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

Fish

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

alkali milk-vetch, *Astragalus tener var. tener* (SC) *

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(MB)	*Migratory Bird*	Migratory bird
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
(*)	*Extirpated*	Possibly extirpated from this quad.
(**)	*Extinct*	Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.

Russell City Energy Center

Appendix 8.2-C
Resumes of Brett D. Hartman and Dean Carrier

May 2001

Russell City Energy Center AFC

May 2001

W. Dean Carrier	Foster Wheeler Environmental Corporation
Assignment: Biology Lead	**Education:**
Years of Experience: 38	BS, Humboldt State University

Kern County Waste Management Facility Habitat Conservation Planning—Project manager for the development of endangered species regulatory compliance program for 15 county sanitary landfill operations in Kern County, California. Managed the design and implementation of biological and cultural resource field analyses. The resulting data was used as baseline information for the development of Biological Assessments as required by state and federal endangered species acts. This data was then used in developing a unique programmatic Habitat Conservation Plan to provide clearance for continued operation of all county sanitary landfill operations.

Kern/Delta Water Recharge Project—Coordinated and conducted terrestrial wildlife surveys and developed avoidance, mitigation and monitoring procedures for proposed water recharge basins and water pipelines in Kern County, California. Reviewed alternatives for project implementation and recommended mitigation projects.

California-Oregon Transmission Project, Transmission Agency of Northern California—Coordinated biological surveys, monitoring and mitigation requirements for construction of 500 kV power line from Oregon to central California. Developed processes for compliance with state and federal Endangered Species Acts, Migratory Bird Treaty Acts and compliance with California Fish and Game Department requirements.

Tracy-Tesla 238 kV Transmission Line. Cities of Modesto and Turlock, CA—Acting as advisor to project proponents, reviewed and approved biological assessment techniques and data collection for the 17 mile long Tracy-Tesla electric transmission line. Developed construction monitoring procedures and processes to comply with State and federal endangered species requirements. Directed the biological construction monitoring of the project.

California Endangered Species Recovery Programs. U.S. Forest Service. California Statewide—Developed and authored statewide Forest Service plans for recovery of the peregrine falcon, bald eagle, spotted owl, California condor, and small forest carnivores. Developed Regional processes for implementing requirements of the Endangered Species Act and the Sensitive Species Regulations of the Forest Service. Conducted over 20 Section 7 consultations with the U. S. Fish and Wildlife Service regarding Endangered Species Act compliance.

High Desert Power Generation Project. Diamond Energy. Victorville, CA—Conducted preliminary site analysis for construction of a electrical power generation project and associated transmission lines in the California desert. Assessed potential conflicts with federal and State endangered species regulations. Developed survey processes to determine species occupancy and directed survey activities. Represented Diamond Energy at meetings with State and federal regulatory agencies.

El Paso-Cyprus Natural Gas Pipeline. El Paso Natural Gas. Northwest AZ—Served as project manager for environmental compliance activities associated with a proposed natural gas pipeline in western Arizona. Conducted a land ownership analysis as the pipeline crossed federal, state, and private lands. Managed the collection of biological and cultural information and surveys for sensitive, threatened, and endangered plant and animals species. Data was used for development of a Biological Assessment to meet Federal Endangered Species Act requirements and for completion of an Environmental Assessment to meet National Environmental Policy Act requirements.

Experience Relevant to Project:

- Project management of habitat conservation planning efforts
- Coordination of surveys and assessments of listed and sensitive species
- Experience with powerline and other linear projects
- Technical expertise and experience with listed species in the project area

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Russell City Energy Center AFC

May 2001

Brett D. Hartman	Foster Wheeler Environmental Corporation
Assignment: Sr. Associated Ecologist **Years of Experience:** 10	**Education:** MFS, Restoration Ecology, Yale University School of Forestry & Environmental Studies, 1996 BS, Environmental Science, University of New Hampshire, 1992

Storrie Post-Fire Restoration Project—Prepared restoration plan for 6,000+ acre Storrie Fire project area in the Almanor Ranger District, Lassen National Forest. Plan included, salvage harvest, fuels treatments, reforestation/revegetation, and integrated design features for riparian restoration, slope stabilization, and late successional snag and large woody debris retention. Coordinated with logging system and transportation, fuels management, watershed, and various resource specialists. Analyzed successional trends and effects of No action, Proposed Action, and one Alternative Action in timber – vegetation report. Assisted in report preparation/editing of EA Chapters II & III.

Calpine c*Power AB970 Projects/Application for Certification—Contributed to field surveys, AFC document preparation, and subsequent data requests associated with licensing three mobile peaking plant sites in the Central Valley and San Francisco Bay area, CA. Responsible for floristic surveys, vegetation mapping, wetland delineation, and development of mitigation measures in compliance with applicable county, state and federal laws, ordinances, regulations and standards, and California Energy Commission procedures.

Florida Power and Light/Rio Linda Power Project Application for Certification—Contributed to field surveys, AFC document preparation, and subsequent data requests associated with licensing a co-generation plant in Sacramento and Yolo County, CA. Contributed to floristic surveys, vegetation mapping, vernal pool delineation and mitigation planning. Developed mitigation measures in compliance with applicable county, state and federal laws, ordinances, regulations and standards, and California Energy Commission procedures.

360 Networks/Oregon to Sacramento Fiber Optic Conduit Installation Project—Biological resource specialist for SAC II construction pair. Responsible for pre-construction field surveys. Coordinated with California Department of Fish & Game, California Public Utilities Commission, and Environmental Inspectors to ensure construction complied with all applicable state and federal regulations.

Kern/Delta Water Recharge Project—Coordinated and conducted terrestrial wildlife surveys and developed avoidance, mitigation and monitoring procedures for proposed water recharge basins and water pipelines in Kern County, California. Reviewed alternatives for project implementation and recommended mitigation projects.

California-Oregon Transmission Project, Transmission Agency of Northern California—Coordinated biological surveys, monitoring and mitigation requirements for construction of 500 kV power line from Oregon to central California. Developed processes for compliance with state and federal Endangered Species Acts, Migratory Bird Treaty Acts and compliance with California Fish and Game Department requirements.

Experience Relevant to Project:

- Project management of habitat conservation planning efforts
- Coordination of surveys and assessments of listed and sensitive species
- Experience with powerline and other linear projects
- Technical expertise and experience with listed species in the project area

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Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 8.2-D
Wetland Data Forms

May 2001

Russell City Energy Center AFC

May 2001

WETLAND DETERMINATION DATA FORM

Applicant Name:	CALPINE – BECHTEL Joint Venture			**Project Number:**	2449.1000		
Project Name:	Russell City Energy Center			**Date:**	February 28, 2001		
Location:	3636 Enterprise Avenue			**Township:**		**Range:**	
City:	Hayward	**County:**	Alameda	**Section:**		**Plot #:**	01
Field Investigator(s):	Brett D. Hartman						

VEGETATION

Plant Species	**Indicator Status**	**Habit**	**% Cover**
Juncus sp.	OBL, FACW, FACW-	Graminoid	80%
Frankenia grandiflora	FACW+	Subshrub	10%
Distichlis spicata	FACW	Grass	10%

Percent of species that are OBL, FACW, and/or FAC:	100%		
Other indicators:			
Hydrophytic vegetation?	YES	**Basis:**	Greater than 50% dominance of wetland species

SOILS

Series and Phase:	Willows Clay, Drained, 0 to 2 percent slopes			**Drainage:**	Poorly drained
On hydric soils list?:	PEMAh on NWI map				
Texture:	Silt clay			**Matrix color:**	7.5 YR 2/1
Mottled?	Yes	**Mottle color:**	5Y 4/1		
Gleyed?	No	**Other indicators:**	Sulfidic material		
Are the soils hydric?	Hydric inclusion	**Basis:**	Low chroma, reducing environment (mottles & sulfidic material)		

HYDROLOGY

Is the surface inundated?:	No	**Surface water depth:**	--
Is the soil saturated?:	Yes	**Depth to saturation:**	14"
Other evidence of soil saturation/inundation:			
Wetland hydrology?:	Yes	**Basis:**	
Atypical situation?:	No		
Normal circumstances?	Yes		
Is this site a wetland or a nonwetland?	Wetland		

Comments:
Area mapped as transitional between Reyes Clay and Willows Clay, with an elevation ranging from 5- 10 feet. Water table lowered by levees and flood control. Ponded areas remain due to topography and fill.

WETLAND DETERMINATION DATA FORM

Applicant Name:	CALPINE – BECHTEL Joint Venture			**Project Number:**	2449.1000		
Project Name:	Russell City Energy Center			**Date:**	February 28, 2001		
Location:	3636 Enterprise Avenue			**Township:**		**Range:**	
City:	Hayward	**County:**	Alameda	**Section:**		**Plot #:**	02
Field Investigator(s):	Brett D. Hartman						

VEGETATION

Plant Species	Indicator Status	Stratum	% Cover
Distichlis spicata	FACW	Grass	50%
Frankenia grandiflora	FACW+	Subshrub	20%
Elymus sp.	FAC, FAC+, FACU	Grass	10%
Rumex crispus	FACW-	Perennial herb	10%

Percent of species that are OBL, FACW, and/or FAC:		90%	
Other indicators:			
Hydrophytic vegetation?	YES	**Basis:**	Greater than 50% dominance of wetland species

SOILS

Series and Phase:	Reyes Clay, Drained, 0 to 2 percent slopes			**Drainage:**	Very Poorly drained
On hydric soils list?:	PEMAh on NWI map				
Mottled?	No	**Mottle color:**	--	**Matrix color:**	5 YR 4/1
Gleyed?	Yes	**Other indicators:**			
Are the soils hydric?	Yes	**Basis:**	Low chroma, Gleying		

HYDROLOGY

Is the surface inundated?:	Yes	**Surface water depth:**	2 – 3"
Is the soil saturated?:	N/A	**Depth to saturation:**	N/A
Other evidence of soil saturation/inundation:			
Wetland hydrology?:	Yes	**Basis:**	Water ponding for fourteen consecutive days during growing season
Atypical situation?:	No		
Normal circumstances?	No		
Is this site a wetland or a nonwetland?	Wetland		

Comments:
Area mapped as transitional between Reyes Clay and Willows clay. Water table lowered by levees and flood control. Ponded, saline areas with salt tolerant wetland species remain.

WETLAND DETERMINATION DATA FORM

Applicant Name:	CALPINE – BECHTEL Joint Venture			**Project Number:**	2449.1000		
Project Name:	Russell City Energy Center			**Date:**	February 28, 2001		
Location:	3636 Enterprise Avenue			**Township:**		**Range:**	
City:	Hayward	**County:**	Alameda	**Section:**		**Plot #:**	03
Field Investigator(s):	Brett D. Hartman						

VEGETATION

Plant Species	**Indicator Status**	**Habit**	**% Cover**
Avena fatua	Not listed	Grass	50%
Elymus sp.	FAC, FAC+, FACU	Grass	20%
Erodium cicutarium	Not listed	Herb	10%
Percent of species that are OBL, FACW, and/or FAC:		20%	
Other indicators:			
Hydrophytic vegetation?	No	**Basis:**	Less than 50% dominance of wetland species

SOILS

Series and Phase:	Willows Clay, Drained, 0 to 2 percent slopes			**Drainage:**	Poorly drained
On hydric soils list?:					
Texture:	Silt clay			**Matrix color:**	10 YR 3/2
Mottled?	No	**Mottle color:**	N/A		
Gleyed?	No	**Other indicators:**			
Are the soils hydric?	No	**Basis:**			

HYDROLOGY

Is the surface inundated?:	No	**Surface water depth:**	--
Is the soil saturated?:	No	**Depth to saturation:**	--
Other evidence of soil saturation/inundation:			
Wetland hydrology?:	No	**Basis:**	
Atypical situation?:	No		
Normal circumstances?	Yes		
Is this site a wetland or a nonwetland?	Non-wetland		

Comments:
Area mapped as transitional between Reyes Clay and Willows Clay, with an elevation ranging from 5- 10 feet. Water table lowered by levees and flood control. Ponded areas remain due to topography and fill.

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 8.3-A
Resume of Andrew O. Gorman

May 2001

Russell City Energy Center AFC

May 2001

Andrew O. Gorman.
Assistant Cultural Resources Scientist

EXPERIENCE SUMMARY

Mr. Gorman is an archaeologist with 15 years of professional and field experience in resource management and environmental remediation. Mr. Gorman is experienced with the California Environmental Quality Act (CEQA) process and is familiar with state and federal regulations (NEPA, NAGPRA, NHPA) pertaining to cultural resource management. He has conducted cultural resources management analyses for a number of proposed development projects in California and Washington, including the construction of a 400-mile fiber optic line, various off-right of way fiber optic facilities, and a number of proposed and approved power plant sites.

EDUCATION

BA, Grinnell College, Anthropology/Archaeology 1985

SELECTED PROJECT EXPERIENCE

360 Networks Northern California Backbone Build.
Worked on a daily basis with construction crews, state, local and federal regulators and project management to ensure compliance with all regulations and project negative impact declaration from Oregon to Sacramento California. Conducted archaeological surveys for reroutes.

360 Networks Arlington, Washington Optical Amplifying Facility
Conducted archaeological field investigation at proposed fiber optical amplifying site, and coordinated contacts with the local Stillaguamish Tribe of Indians.

360 Networks Off-ROW facilities at Stockton, Modesto, Hayward and Pleasanton
Prepared Cultural resource sections for Proponents Environmental Assessment for California Public Utilities Commission and responded to PUC data requests. Conducted field and archive investigations for sites at Modesto and Stockton.

360 Networks Phase II Fiber Installation
Environmental Inspector and Archaeology Monitor as fiber installation passed through the San Bernardino National Forest. Coordinated communications between construction and USFS personnel and worked with crew to ensure compliance with all permits and regulations.

360 Networks Off-ROW facilities, Sacramento to Reno Route
Worked with local governments to obtain special use, building, and encroachment permits for three fiber optic amp facilities.

Florida Power and Light Greenfields Projects
Conducted basic cultural resource research to determine "fatal flaws" for 14 proposed power plant sites in northern California.

Andrew O. Gorman.
Assistant Cultural Resources Scientist

Cold and Lower Slate Defensible Fuel Profile Zones Environmental Assessments
USFS, Lassen National Forest. Coordinated with Forest Service Heritage Resource Specialists to develop heritage resource sections of environmental assessments of a Defensible Fuel Profile Zone Environmental Assessment.

Storrie Post-Fire Restoration Project. USFS Lassen National Forest. Developed Heritage Resources section for Environmental Assessment for a restoration project involving a large forest fire area.

Calpine Russell City Energy Center.
Prepared cultural resources section for Application for Certification before the California Energy Commission for a 600 MW natural gas-fired combined cycle merchant power plant. Conducted archaeological field investigations for the proposed site, gas pipeline, transmission line, and the site proposed to relocate radio transmitter towers currently occupying the site. Prepared cultural resources inventory and historical background for all project sites.

Florida Power and Light Midway Energy Center
Prepared cultural resources section for Application for Certification before the California Energy Commission for a natural gas-fired combined cycle merchant power plant. Conducted archaeological field investigations for the proposed site, gas pipeline, transmission line and water line. Prepared cultural resources inventory and historical background for all project sites

Calpine Inland Empire Energy Center
Prepared cultural resources section for Proponents Environmental Assessment and responded to CEC comments. Conducted archaeological field investigations for the proposed site, gas pipeline, transmission line and water line. Prepared cultural resources inventory and historical background for all project sites

OnFiber Bay Area Build
Prepared cultural resources inventory for urban fiber optic installation project located in Santa Clara County, California. Conducted literature search, field reconnaissance, and cultural resources sensitivity assessment.

Russell City Energy Center

Appendix 8.3-B
Native American Consultation Letters

May 2001

Russell City Energy Center AFC

May 2001

STATE OF CALIFORNIA — Gray Davis, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
Fax (916) 657-5390

April 6, 2001

Andrew Gorman
Foster Wheeler Environmental Corporation
3947 Lennane Drive, Suite 200
Sacramento, CA 95834-1957

RE: Russell City Energy Center and Associated Gas Pipeline and Power Transmission Line, Alameda County.

Sent By Fax: (916) 928-0594
Pages Sent: 3

Dear Mr. Gorman:

A record search of the sacred lands file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend other with specific knowledge. A minimum of two weeks must be allowed for responses after notification.

If you receive notification of change of addresses and phone numbers from any these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 653-4038.

Sincerely,

Debbie Pilas-Treadway
Associate Governmental Program Analyst

NATIVE AMERICAN CONTACTS
Alameda County
April 5, 2001

Marjorie Ann Reid
4869 Englewood Drive
San Jose, C A 95129
(408) 253-4202
Ohlone/Coastanoan

Linda G. Yamane
1195 B Rousch Ave
Seaside, C A 93955
(831) 394-5915
Ohlone/Costanoan

Ella Rodriguez
PO Box 1411
Salinas, C A 93902
(831) 632-0490
Ohlone/Costanoan

Michelle Zimmer
4952 McCoy Avenue
San Jose, C A 95130
(408) 364-1391 - Home
(408) 364-1393 - Fax
(408) 210-8061 - Cell
Ohlone/Costanoan

Irene Zwierlein
789 Canada Road
Woodside, C A 94062
(650) 851-7747 - Home
(650) 851-7489 - Fax
(408) 364-1393 - Cell
Ohlone/Costanoan

Thomas P. Soto
PO Box 269
Foresthill, C A 95631
(530) 367-4402
(530) 367-5083
Ohlone/Costanoan

Jakki Kehl
5461 Beaver Lane
Byron, C A 94514
(925) 516-1670
Ohlone/Costanoan

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayer, Chairperson
P.O. Box 28
Hollister, C A 95024-0
(510) 637-4238
Ohlone/Costanoan

Katherine Erolinda Perez
1234 Luna Lane
Stockton, C A 95206
(209) 941-1900 work
Ohlone/Costanoan
Northern Valley Yokut
Bay Miwok

The Ohlone Indian Tribe
Andrew Galvan
PO Box 3152
Mission San Jose, C A 94539
(510) 656-0787 - Voice
(510) 882-0527 - Cell
(510) 656-0780 - Fax
chochenyo@AOL.com
Ohlone/Costanoan

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regards to the cultural assessment for the proposed Russell City Energy Center and Associated Gas Pipeline and Power Transmission line, Alameda County.

NATIVE AMERICAN CONTACTS
Alameda County
April 5, 2001

Trina Marine Ruano Family
Ramona Garibay, Representative
37974 Canyon Hts. Drive Ohlone/Costanoan
Fremont, CA 94536
(510) 792-1642
(510) 673-5029 - Cell

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regards to the cultural assessment for the proposed Russell City Energy Center and Associated Gas Pipeline and Power Transmission line, Alameda County.

Russell City Energy Center AFC

May 2001

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

May 8, 2001

Linda G. Yamane
1195 B Rousch Ave.
Seaside, CA 93955

SUBJECT: RUSSELL CITY ENERGY CENTER PROJECT

Dear Mrs. Yamane:

The Calpine/Bechtel Joint Development has proposed construction of the Russell City Energy Center, a 600 MW natural gas-fired electrical generation project to be located in Hayward, Alameda County, California. Foster Wheeler Environmental Corporation is assisting Calpine/Bechtel in preparing environmental licenses and permits for the project. The attached map shows the location of the project and associated natural gas pipeline and electric transmission line upgrade and substation expansion. The project is located on Enterprise Avenue just north of State Route 92 (the Hayward-San Mateo Bridge approach) in the Hayward Industrial Corridor.

The Native American Heritage Commission provided Foster Wheeler Environmental with your name and address as someone who may have knowledge of heritage lands or other resources of interest that may be located in the project area. Please notify us if there are any sites or locations of specific concern within the project vicinity.

Please reference the "Russell City Energy Center" in your correspondence, and send the information to the fax number or address at the bottom of this page. You can contact me at (916) 928-4805 if you have any questions. We greatly appreciate your attention to this matter.

Sincerely,

Andrew Gorman
Cultural Resource Specialist

Attachment

cc: D. Davy

3927 LENNANE DRIVE, SUITE 200, SACRAMENTO, CALIFORNIA 95834-1957
TEL: 916-928-0202 FAX: 916-928-0594

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

May 8, 2001

Ella Rodriguez
PO BOx 1411
Salinas, CA 93902

SUBJECT: RUSSELL CITY ENERGY CENTER PROJECT

Dear Mrs. Rodriguez:

The Calpine/Bechtel Joint Development has proposed construction of the Russell City Energy Center, a 600 MW natural gas-fired electrical generation project to be located in Hayward, Alameda County, California. Foster Wheeler Environmental Corporation is assisting Calpine/Bechtel in preparing environmental licenses and permits for the project. The attached map shows the location of the project and associated natural gas pipeline and electric transmission line upgrade and substation expansion. The project is located on Enterprise Avenue just north of State Route 92 (the Hayward-San Mateo Bridge approach) in the Hayward Industrial Corridor.

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Sincerely,

Andrew Gorman

Andrew Gorman
Cultural Resource Specialist

Attachment

cc: D. Davy

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TEL: 916-928-0202 FAX: 916-928-0594

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

May 8, 2001

Michelle Zimmer
4952 McCoy Avenue
San Jose, CA 95130

SUBJECT: RUSSELL CITY ENERGY CENTER PROJECT

Dear Mrs. Zimmer:

The Calpine/Bechtel Joint Development has proposed construction of the Russell City Energy Center, a 600 MW natural gas-fired electrical generation project to be located in Hayward, Alameda County, California. Foster Wheeler Environmental Corporation is assisting Calpine/Bechtel in preparing environmental licenses and permits for the project. The attached map shows the location of the project and associated natural gas pipeline and electric transmission line upgrade and substation expansion. The project is located on Enterprise Avenue just north of State Route 92 (the Hayward-San Mateo Bridge approach) in the Hayward Industrial Corridor.

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cc: D. Davy

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TEL: 916-928-0202 FAX: 916-928-0594

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

May 8, 2001

Irene Zwieden
789 Canady Road
Woodside, CA 94062

SUBJECT: RUSSELL CITY ENERGY CENTER PROJECT

Dear Mrs. Zwieden:

The Calpine/Bechtel Joint Development has proposed construction of the Russell City Energy Center, a 600 MW natural gas-fired electrical generation project to be located in Hayward, Alameda County, California. Foster Wheeler Environmental Corporation is assisting Calpine/Bechtel in preparing environmental licenses and permits for the project. The attached map shows the location of the project and associated natural gas pipeline and electric transmission line upgrade and substation expansion. The project is located on Enterprise Avenue just north of State Route 92 (the Hayward-San Mateo Bridge approach) in the Hayward Industrial Corridor.

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Cultural Resource Specialist

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cc: D. Davy

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TEL: 916-928-0202 FAX: 916-928-0594

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

May 8, 2001

Thomas P. Soto
PO BOx 269
Foresthill, CA 95631

SUBJECT: RUSSELL CITY ENERGY CENTER PROJECT

Dear Mr. Soto:

The Calpine/Bechtel Joint Development has proposed construction of the Russell City Energy Center, a 600 MW natural gas-fired electrical generation project to be located in Hayward, Alameda County, California. Foster Wheeler Environmental Corporation is assisting Calpine/Bechtel in preparing environmental licenses and permits for the project. The attached map shows the location of the project and associated natural gas pipeline and electric transmission line upgrade and substation expansion. The project is located on Enterprise Avenue just north of State Route 92 (the Hayward-San Mateo Bridge approach) in the Hayward Industrial Corridor.

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Sincerely,

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Cultural Resource Specialist

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cc: D. Davy

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TEL: 916-928-0202 FAX: 916-928-0594

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

May 8, 2001

Jakki Kehl
5461 Beaver Lane
Byron, CA 94062

SUBJECT: RUSSELL CITY ENERGY CENTER PROJECT

Dear Mrs. Kehl:

The Calpine/Bechtel Joint Development has proposed construction of the Russell City Energy Center, a 600 MW natural gas-fired electrical generation project to be located in Hayward, Alameda County, California. Foster Wheeler Environmental Corporation is assisting Calpine/Bechtel in preparing environmental licenses and permits for the project. The attached map shows the location of the project and associated natural gas pipeline and electric transmission line upgrade and substation expansion. The project is located on Enterprise Avenue just north of State Route 92 (the Hayward-San Mateo Bridge approach) in the Hayward Industrial Corridor.

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Sincerely,

Andrew Gorman
Cultural Resource Specialist

Attachment

cc: D. Davy

3927 LENNANE DRIVE, SUITE 200, SACRAMENTO, CALIFORNIA 95834-1957
TEL: 916-928-0202 FAX: 916-928-0594

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

May 8, 2001

Ann Marie Sayer
PO Box 28
Hollister, CA 95024

SUBJECT: RUSSELL CITY ENERGY CENTER PROJECT

Dear Mrs. Sayer:

The Calpine/Bechtel Joint Development has proposed construction of the Russell City Energy Center, a 600 MW natural gas-fired electrical generation project to be located in Hayward, Alameda County, California. Foster Wheeler Environmental Corporation is assisting Calpine/Bechtel in preparing environmental licenses and permits for the project. The attached map shows the location of the project and associated natural gas pipeline and electric transmission line upgrade and substation expansion. The project is located on Enterprise Avenue just north of State Route 92 (the Hayward-San Mateo Bridge approach) in the Hayward Industrial Corridor.

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Sincerely,

Andrew Gorman
Cultural Resource Specialist

Attachment

cc: D. Davy

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TEL: 916-928-0202 FAX: 916-928-0594

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

May 8, 2001

Katherine Erolinda Perez
1234 Luna Lane
Stockton, CA 95206

SUBJECT: RUSSELL CITY ENERGY CENTER PROJECT

Dear Mrs. Perez:

The Calpine/Bechtel Joint Development has proposed construction of the Russell City Energy Center, a 600 MW natural gas-fired electrical generation project to be located in Hayward, Alameda County, California. Foster Wheeler Environmental Corporation is assisting Calpine/Bechtel in preparing environmental licenses and permits for the project. The attached map shows the location of the project and associated natural gas pipeline and electric transmission line upgrade and substation expansion. The project is located on Enterprise Avenue just north of State Route 92 (the Hayward-San Mateo Bridge approach) in the Hayward Industrial Corridor.

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Sincerely,

Andrew Gorman
Cultural Resource Specialist

Attachment

cc: D. Davy

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TEL: 916-928-0202 FAX: 916-928-0594

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

May 8, 2001

Andrew Galvan
PO Box 28
Hollister, CA 95024

SUBJECT: RUSSELL CITY ENERGY CENTER PROJECT

Dear Mr. Galvan:

The Calpine/Bechtel Joint Development has proposed construction of the Russell City Energy Center, a 600 MW natural gas-fired electrical generation project to be located in Hayward, Alameda County, California. Foster Wheeler Environmental Corporation is assisting Calpine/Bechtel in preparing environmental licenses and permits for the project. The attached map shows the location of the project and associated natural gas pipeline and electric transmission line upgrade and substation expansion. The project is located on Enterprise Avenue just north of State Route 92 (the Hayward-San Mateo Bridge approach) in the Hayward Industrial Corridor.

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Sincerely,

Andrew Gorman
Cultural Resource Specialist

Attachment

cc: D. Davy

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TEL: 916-928-0202 FAX: 916-928-0594

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

May 8, 2001

Ramona Garibay
37974 Canyon Hts. Drive
Fremont, CA 94536

SUBJECT: RUSSELL CITY ENERGY CENTER PROJECT

Dear Mrs. Garibay:

The Calpine/Bechtel Joint Development has proposed construction of the Russell City Energy Center, a 600 MW natural gas-fired electrical generation project to be located in Hayward, Alameda County, California. Foster Wheeler Environmental Corporation is assisting Calpine/Bechtel in preparing environmental licenses and permits for the project. The attached map shows the location of the project and associated natural gas pipeline and electric transmission line upgrade and substation expansion. The project is located on Enterprise Avenue just north of State Route 92 (the Hayward-San Mateo Bridge approach) in the Hayward Industrial Corridor.

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Sincerely,

Andrew Gorman

Andrew Gorman
Cultural Resource Specialist

Attachment

cc: D. Davy

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TEL: 916-928-0202 FAX: 916-928-0594

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

May 8, 2001

Marjorie Ann Reid
4869 Englewood Drive
San Jose, CA 95129

SUBJECT: RUSSELL CITY ENERGY CENTER PROJECT

Dear Mrs. Reid:

The Calpine/Bechtel Joint Development has proposed construction of the Russell City Energy Center, a 600 MW natural gas-fired electrical generation project to be located in Hayward, Alameda County, California. Foster Wheeler Environmental Corporation is assisting Calpine/Bechtel in preparing environmental licenses and permits for the project. The attached map shows the location of the project and associated natural gas pipeline and electric transmission line upgrade and substation expansion. The project is located on Enterprise Avenue just north of State Route 92 (the Hayward-San Mateo Bridge approach) in the Hayward Industrial Corridor.

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Sincerely,

Andrew Gorman
Cultural Resource Specialist

Attachment

cc: D. Davy

3927 LENNANE DRIVE, SUITE 200, SACRAMENTO, CALIFORNIA 95834-1957
TEL: 916-928-0202 FAX: 916-928-0594

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 8.3-C
DPR 523 Form for the Eastshore to Grant Transmission Line

May 2001

Russell City Energy Center AFC

May 2001

PRIMARY RECORD

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Primary No. _____

Trinomial _____

Page 1 **of** 5 **NRHP Status Code** _____

Other Listings _____

Review Code _____ **Reviewer** _____ **Date** _____

P1. Property Name/Temporary No. Eastshore-Grant Transmission Line

P2. Location: County Alameda **and** (Address and/or UTM Coordinates. Attach Location Map as required)

a. Address NA

City _____ Zip _____

b. UTM: USGS Quad Hayward, San Leandro 7.5' Date 1993 Zone 10

mE/ 574,275E mN 4,169,500N

c. Other Locational Data: (Enter parcel #, legal description, directions to resource, and/or other locational data if appropriate)

Runs between the Eastshore Substation in Hayward, California, to the Grant Substation in San Lorenzo. The Eastshore Substation is located on Arden Road in Hayward. From State Route 92 at Interstate 880, take State Route 92 west (the Hayward-San Mateo Bridge approach). At the Clawiter exit, go south (becomes Eden Landing Road). Go south on Eden Landing Road to Arden Road, and turn left on Arden Road. The Eastshore Substation is located just north of Arden Road about 0.2-mile east of Eden Landing Road. The transmission line runs north from the Eastshore substation to San Lorenzo, and south towards the Newark Substation. This is a segment of a larger transmission line that serves the East Bay area.

P3. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The Eastshore to Grant transmission line is a 115-kV electrical transmission line with steel-lattice support towers. The towers are approximately 70 feet high. The tower bases are approximately 20 feet square.

P4. Resources Present: [ ] Building [x] Structure [ ] Object [ ] Site [ ] Element of District

P5. Resource Attributes: (List relevant attributes and codes) _____

P6. Photograph or Drawing (see attached) (Photograph required for buildings, structures, and objects)

P7. Date Constructed/Age: [ ] Prehistoric [x] Historic [ ] Both 1920-1939

P8. Owner and Address: Pacific Gas & Electric Company
1 Market Street, San Francisco, California

P9. Recorded by: (Name, affiliation, and address) Andrew Gorman, Foster Wheeler Environmental Corporation
3947 Lennane Drive, Suite 200, Sacramento, California 95834

P10. Date Recorded: May 3, 2001

P11. Type of Survey: [x] Intensive [ ] Reconnaissance [ ] Other
Describe: _____

P12. Report Citation: (Provide full citation or enter "none") Application for Certification for the Russell City Energy Center
Submitted to the California Energy Commission. Prepared for the Calpine/Bechtel Joint Venture.

Attachments:

[ ] NONE	[x] Location Map	[ ] Continuation Sheet
[ ] Building, Structure, and Object Record		[ ] Linear Resource Record
[ ] Archaeological Record	[ ] District Record	[ ] Milling Station Record
[ ] Rock Art Record	[ ] Artifact Record	[ ] Photograph Record
[ ] Other (List):		

BUILDING, STRUCTURE, AND OBJECT RECORD

FOSTER WHEELER
ENVIRONMENTAL CORPORATION

Primary No. _____

Trinomial _____

HRI No. _____

B1. Property Name: Eastshore to Grant transmission line

B2. Address NA

City _____ **County** _____ **Zip** _____

B3. Original Use: Transmission line **B4. Present Use:** Transmission line

B5. Zoning: Utility corridor **B6. Threats:** _____

B7. Architectural Style: Utilitarian

B8. Alterations and Date(s): Unnknown

B9. Moved? [x] No [ ] Yes [ ] Unknown Date: _____ Original Location: _____

B10. Related Features:

Eastshore Substation (construction 2000), Grant Substation

B11. Architect: _____ **Builder:** _____

B12. Significance: Period of Significance _____ Property Types _____ Applicable Criteria _____

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Significance unlikely. Though relatively old (pre-1939), there are no clear historical associations and no significant architectural or engineering features.

B13. Evaluator: _____

B14. Date of Evaluation: _____

B15. Sources:

(This space reserved for official comments)

(Sketch Map with north arrow required)

See attached map

LINEAR RESOURCE RECORD

FOSTER WHEELER
ENVIRONMENTAL CORPORATION

Primary No. _____

HRI/Trinomial No. _____

L1. Property Name/Temporary No.: Eastshore-Grant 115 kV Transmission Line

L2. Detailed Record of: [ ] Entire Resource [x] Segment

L3. Length: 3.25 miles Method of Determination: Map

L4. Width: 20 feet Method of Determination: estimate

L5. Depth/Height: 70 feet Method of Determination: Visual estimate

L6. Features: (Describe construction details, dimensions, and artifacts found with each feature. Provide plans/sections as appropriate)

No features or artifacts other than transmission towers and electrical conductors.

L7. Natural Setting: (Describe natural features, landscape characteristics, slope, etc. as appropriate)

Urban landscape in City of Hayward.

L8. Historical Information:

Built by PG&E as a major trunk line serving the East Bay between the large Newark Substation to the south, and the Oakland.

L9. Significance: Period of Significance _____ Property Type _____ Applicable Criteria _____

(Discuss importance of resource within a historic context as a defined by theme, period of significance, and geographic scope when appropriate)

Significance unlikely. No associations with major historical events or key developments in electrical distribution technology.

L10. Resource Integrity:

Integrity good - regularly maintained. Extent of repairs or replacement of conductors or tower parts unknown.

L11. Associated Resources: _____

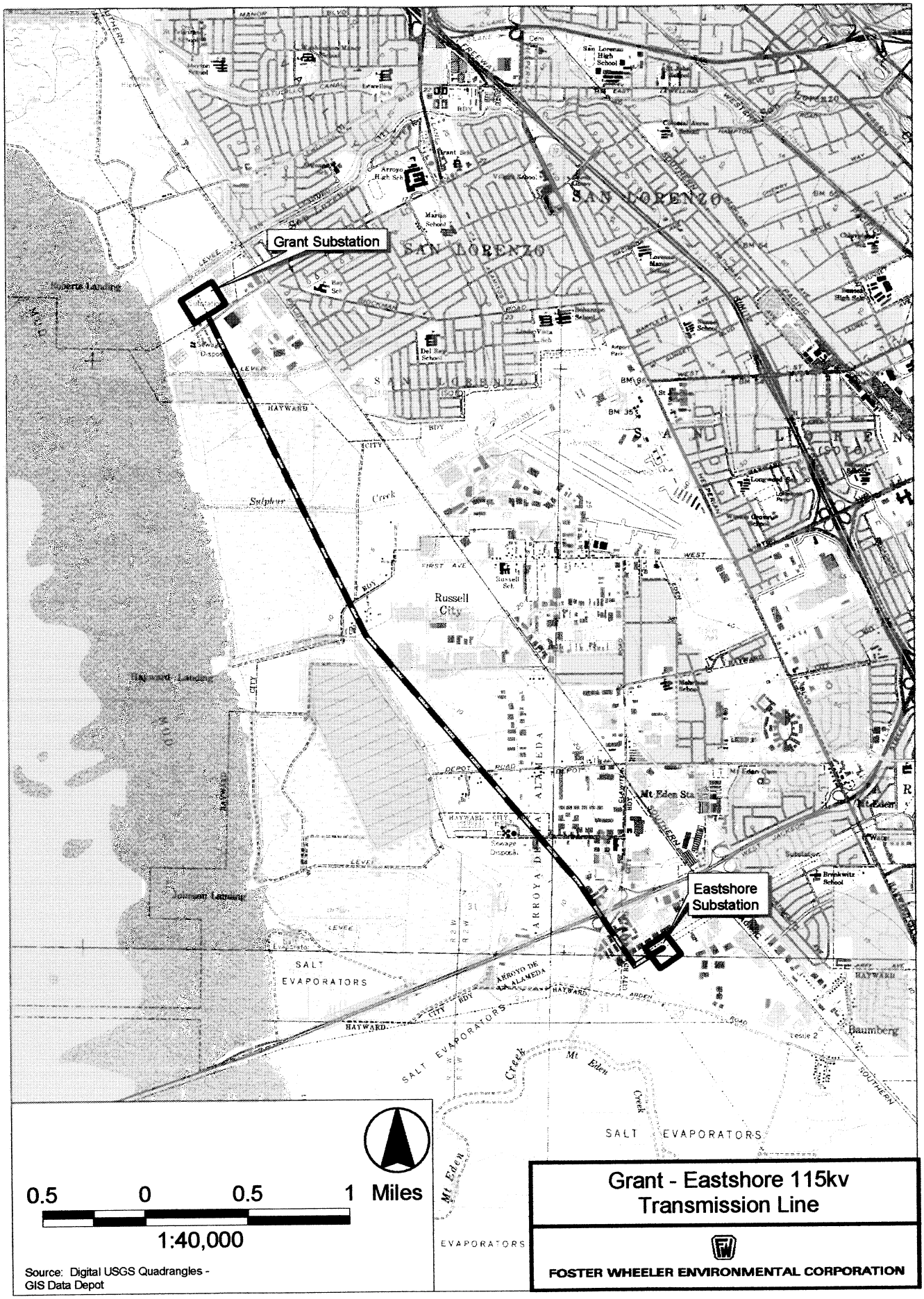
L12. References:

L13. Form Prepared By: Andrew Gorman Date: 5/3/01

Affiliation/Address: Foster Wheeler Environmental Corporation, Sacramento, CA

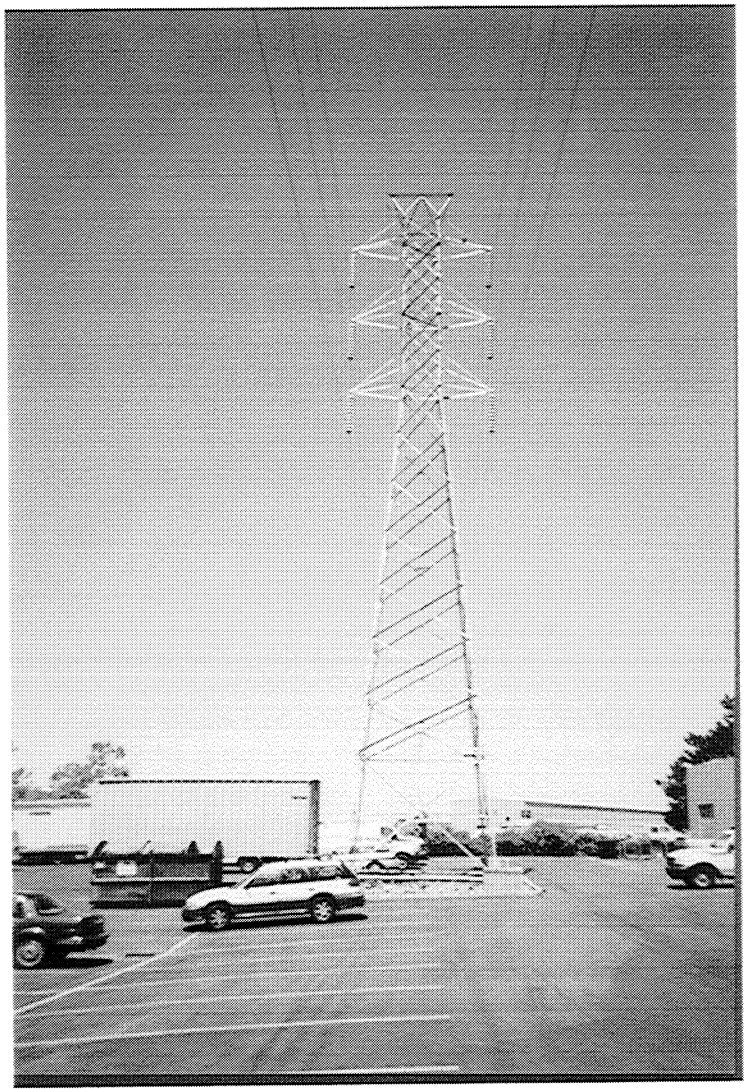
Russell City Energy Center AFC

May 2001


Grant Substation
Eastshore Substation
SAN LORENZO
Russell City
Sulphur Creek
Mt Eden Creek
ARROYO DE LA ALAMEDA
SALT EVAPORATORS
HAYWARD
Mt Eden Sta
Baumberg
0.5 0 0.5 1 Miles
1:40,000
Source: Digital USGS Quadrangles - GIS Data Depot
Grant - Eastshore 115kv Transmission Line
FOSTER WHEELER ENVIRONMENTAL CORPORATION

Russell City Energy Center AFC

May 2001



Eastshore-Grant Transmissison Line, typical conductor support tower, located in the Caltrans parking lot north of State Route 92.

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 8.6-A
City of Hayward Department of Economic and Community Development Staff Report

May 2001

CITY OF
HAYWARD
HEART OF THE BAY

May 3, 2001

William I. Toman
Development Manager
Calpine Corporation
Calpine/Bechtel Joint Development
6700 Koll Center Parkway, Suite 200
Pleasanton, California 94566

Dear Mr. Toman:

Enclosed for your information is a copy of a memorandum presented to the Board of Trustees of the Hayward Area Shoreline Planning Agency on March 15, 2001. To date, I am not aware of any facts or circumstances that would alter the preliminary findings of this memorandum.

Sincerely,

Sylvia Ehrenthal
Director of Community and
Economic Development/Planning Director

enclosure

DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT
777 B STREET, HAYWARD, CA 94541-5007
TEL: 510/583-4250 • FAX: 510/583-3650 • TDD: 510/247-3340

CITY OF HAYWARD

DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT

DATE: March 15, 2001

TO: HASPA Board of Trustees

FROM: Sylvia Ehrenthal, Director of Community and Economic Development/ Planning Director

SUBJECT: **Proposed Russell City Energy Center**

As noted in the attached report from the City Manager to the City Council, the authority to license power plants rests with the California Energy Commission. Local government, however, plays a significant role in providing input on local concerns and issues to the process. Historically, the Energy Commission has been extremely hesitant to proceed with licensing a facility in the face of opposition by a local jurisdiction. Consequently, the City of Hayward will need to evaluate the suitability of this facility and make some determinations as to its conformity with existing City ordinances and standards. These determinations will be made through a public hearing process before the Planning Commission and City Council.

From what we know about the proposal today, there appear to be two areas that require a formal determination. The first is whether the proposed Russell City Energy Center (RCEC) itself is consistent with the General Plan and the Zoning Ordinance. The RCEC is proposed for a site on Enterprise Avenue, across the street from the City's Wastewater Treatment Plant. This area is classified as Industrial Corridor in the General Plan and the site is zoned Industrial. At this point, the staff believes that the project is in conformity with the Industrial Corridor designation, however this may change subject to the availability of more detailed information associated with the operation of the plant.

With regard to the Zoning Ordinance, Calpine has indicated that it believes the RCEC fits under the primary use classification in the Industrial District zone of "Manufacturing." They suggest that the conversion of natural gas by mechanical equipment into electric power does constitute a form of manufacturing. Although a power plant is not specifically listed as a permitted use in the Industrial District, the staff believes it is similar to other permitted uses and consistent with the intent and purpose of the district. The staff can make this interpretation and, in the absence of an appeal of the staff's determination, the project would require no further review unless if fails to meet design guidelines for the Industrial District. Nevertheless, given the size and significance of this project to the City and the region, the staff will refer the matter of the interpretation of the Zoning Ordinance to the Planning Commission and to the City Council.

The second determination is more complex and involves the relocation of the four radio transmission towers currently located on the Enterprise Avenue site. Calpine and Salem Communications, the owner of the towers, are proposing to relocate the towers to a City-owned, former landfill parcel at the end of West Winton Avenue (see attached aerial). This approximately 14-acre parcel north of the City oxidation ponds is classified as Open Space on the General Plan Map. This designation does not necessarily preclude the location of uses such as towers. For example, P.G.& E. transmission lines and towers traverse many areas of the City designated as Open Space, including the Shoreline and Walpert Ridge. The Zoning Map indicates that the eastern portion of the parcel is within the Industrial District and the western portion is in the Flood Plain (FP) District. Towers have traditionally been allowed in the Industrial District. The FP district allows broadcast studios as a permitted use, but does not specifically mention radio towers. To accomplish relocation to this site, a determination must be made that radio towers are essentially an element of the broadcasting function and thus similar in character and use to a broadcast studio. Like the determination as to whether a power plant is consistent with the intent and purpose of the Industrial District, the staff will refer this interpretation to the Planning Commission.

The City staff is seeking input from HASPA regarding such determinations prior to finalizing the staff position on them.

Attachments: Aerial of Proposed Tower Relocation Site
City Council Agenda Report of 2/6/01

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 8.7-A
Modeling Parameters and Results for Noise Receptor Locations

May 2001

Russell City Energy Center AFC

May 2001

PLANT NOISE EMISSIONS MODEL - STEADY STATE BASE LOAD OPERATION

Hessler Associates, Inc.
Consultants in Engineering Acoustics

PROJECT: **RUSSELL CITY ENERGY CENTER**
LOCATION: RUSSELL CITY, CA
JOB NO: 24405-002

MODEL RUN: **1**
RUN DATE: **2/7/01**
RECEPTOR X: 1266 m
RECEPTOR Y: 822 m
RECEPTOR: **2. DEPOT AND INDUSTRIAL ROADS - 1.5 km NE OF PLANT**
DESCRIPTION: **STANDARD PLANT NOISE EMISSIONS**
SITE PLAN: DRWG. 24405-002 P1-0010-001 REV B (2/27/01)

Radial Dist., m	Angle, deg.		
1510	**33**	46.5 Ldn	**40.9** dBA

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
SOURCE NUMBER	SOURCE DESCRIPTION	SOURCE QTY	SOURCE HGT, m	SOURCE TYPE	LOCATION X, m	LOCATION Y, m	MEAS/*EST* Lw dBA re 1 pW	RECEPTOR DISTANCE, m	EST. SHIELDING ATTENUATION	ESTIMATED DIRECTIVITY	ESTIMATED GROUND ABS.	ANOMAL. ATTENUATION	NOISE ABATEMENT	DISTANCE CORRECTION	AIR ABSORP. 15°C/70% RH	QTY CORR.	**EXPECTED LEVEL AT RECEPTOR**	**Lp> 30**
1	E UNIT GT TRANSFORMER	1	3	1	54	89	102	1417	-1	0	-2.7	-4.4	0	-71.0	-3.0	0	**20**	
2	E UNIT GT AIR INLET	1	7	1	62	59	95	1426	-3	0	-2.6	-4.4	0	-71.1	-3.0	0	**11**	
3	E UNIT GT AIR INLET DUCT	1	7	1	46	57	104	1440	-2	0	-2.6	-4.5	0	-71.2	-3.0	0	**21**	
4	E UNIT GT GENERATOR	1	6	1	41	62	107	1442	-1	0	-2.6	-4.5	0	-71.2	-3.0	0	**25**	
5	E UNIT GT ENCLOSURE	1	5	1	41	50	107	1449	-5	0	-2.7	-4.5	0	-71.2	-3.1	0	**21**	
6	E UNIT EXHAUST DUCT	1	4	1	41	42	105	1453	-5	0	-2.7	-4.5	0	-71.2	-3.1	0	**19**	
7	E UNIT HRSG INLET SIDE	1	8	2	41	29	108	1460	-1	0	-2.6	-4.5	0	-68.3	-3.1	0	**29**	
8	E UNIT HRSG SIDE WALL	1	12	2	41	14	102	1468	0	0	-2.6	-4.5	0	-68.3	-3.1	0	**23**	
9	E UNIT HRSG STACK (0° DIR.)	1	53	1	41	0	110	1476	0	-6	-2.1	-4.6	0	-71.4	-3.1	0	**23**	
10	E UNIT STEAM LINES	1	15	1	41	17	102	1466	0	0	-2.5	-4.5	0	-71.3	-3.1	0	**21**	
11	E UNIT PIPE RACK STEAM LINES	1	14	1	52	17	105	1457	0	0	-2.6	-4.5	0	-71.3	-3.1	0	**24**	
12	E UNIT BURNER CONTROL SKID	1	1	1	53	22	*115*	1454	-8	0	-2.7	-4.5	0	-71.2	-3.1	0	**25**	
13	E UNIT CT ENCL. VENT FANS	2	7	1	41	54	*102*	1446	-2	0	-2.6	-4.5	0	-71.2	-3.0	3	**22**	
14	E UNIT BFP BLDG.	1	3	1	56	6	*95*	1461	0	0	-2.7	-4.5	0	-71.3	-3.1	0	**13**	
15	W UNIT GT TRANSFORMER	1	3	1	12	89	102	1453	0	0	-2.7	-4.5	0	-71.2	-3.1	0	**21**	
16	W UNIT GT AIR INLET	1	7	1	21	59	95	1461	-2	0	-2.6	-4.5	0	-71.3	-3.1	0	**11**	
17	W UNIT GT AIR INLET DUCT	1	7	1	5	57	104	1475	-4	0	-2.6	-4.6	0	-71.4	-3.1	0	**18**	
18	W UNIT GT GENERATOR	1	6	1	0	62	107	1477	-4	0	-2.6	-4.6	0	-71.4	-3.1	0	**21**	
19	W UNIT GT ENCLOSURE	1	5	1	0	50	107	1483	-5	0	-2.7	-4.6	0	-71.4	-3.1	0	**20**	
20	W UNIT EXHAUST DUCT	1	4	1	0	42	105	1487	-4	0	-2.7	-4.6	0	-71.4	-3.1	0	**19**	
21	W UNIT HRSG INLET SIDE	1	8	2	0	29	108	1495	-2	0	-2.6	-4.6	0	-68.5	-3.1	0	**27**	
22	W UNIT HRSG SIDE WALL	1	12	2	0	14	102	1502	-3	0	-2.6	-4.7	0	-68.5	-3.2	0	**20**	
23	W UNIT HRSG STACK (0° DIR.)	1	53	1	0	0	110	1510	0	-6	-2.1	-4.7	0	-71.6	-3.2	0	**22**	
24	W UNIT STEAM LINES	1	15	1	0	17	102	1501	0	0	-2.5	-4.7	0	-71.5	-3.2	0	**20**	
25	W UNIT PIPE RACK STEAM LINES	1	14	1	11	17	105	1492	-1	0	-2.6	-4.6	0	-71.5	-3.1	0	**22**	
26	W UNIT BURNER CONTROL SKID	1	1	1	11	22	*115*	1488	-13	0	-2.7	-4.6	0	-71.4	-3.1	0	**20**	
27	W UNIT CT ENCL. VENT FANS	2	7	1	0	54	*102*	1481	-2	0	-2.6	-4.6	0	-71.4	-3.1	3	**21**	
28	W UNIT BFP/CHEM FEED BLDG	1	3	1	14	6	*95*	1495	-7	0	-2.7	-4.6	0	-71.5	-3.1	0	**6**	
29	AIR COMPRESSOR SKIDS	2	2	1	20	19	89	1483	-11	0	-2.7	-4.6	0	-71.4	-3.1	3	**0**	
30	GAS COMPRESSOR BLDG	1	4	1	86	-17	*110*	1448	0	0	-2.7	-4.5	0	-71.2	-3.1	0	**29**	
31	WATER TREAT/WHSE VENT FANS	8	10	1	96	35	*85*	1411	0	0	-2.6	-4.4	0	-71.0	-3.0	9	**13**	
32	STEAM TURBINE	1	6	1	-32	48	107	1512	0	0	-2.6	-4.7	0	-71.6	-3.2	0	**25**	
33	ST GENERATOR	1	6	1	-32	62	107	1504	0	0	-2.6	-4.7	0	-71.5	-3.2	0	**25**	
34	CONDENSER AREA E FACE	1	5	2	-20	53	113	1499	-5	0	-2.7	-4.6	0	-68.5	-3.1	0	**29**	
35	CONDENSER AREA N FACE	2	5	2	-32	77	113	1497	-1	-4	-2.7	-4.6	0	-68.5	-3.1	3	**32**	32
36	CONDENSER AREA W FACE	1	7	1	-44	53	116	1520	-2	-20	-2.6	-4.7	0	-71.6	-3.2	0	**12**	
37	CONDENSER AREA S FACE	1	1	1	-32	29	111	1521	-8	-7	-2.7	-4.7	0	-71.6	-3.2	0	**14**	
38	ST TRANSFORMER	1	3	1	-23	86	102	1485	0	0	-2.7	-4.6	0	-71.4	-3.1	0	**20**	
39	CIRC. WATER PUMPS	2	5	1	-65	2	108	1564	-15	0	-2.7	-4.8	0	-71.9	-3.3	3	**13**	
40	COOLING TOWER EXHAUSTS	10	21	1	-65	93	106	1518	0	0	-2.5	-4.7	0	-71.6	-3.2	10	**34**	34
41	COOLING TOWER W. WET INLETS	10	4	2	-75	93	99	1527	0	-20	-2.7	-4.7	0	-68.6	-3.2	10	**10**	
42	COOLING TOWER W. DRY INLETS	10	14	2	-75	93	99	1527	0	-20	-2.6	-4.7	0	-68.6	-3.2	10	**10**	
43	COOLING TOWER E. WET INLETS	10	4	2	-57	93	99	1512	-3	0	-2.7	-4.7	0	-68.6	-3.2	10	**27**	
44	COOLING TOWER E. DRY INLETS	10	14	2	-57	93	99	1512	-1	0	-2.6	-4.7	0	-68.6	-3.2	10	**29**	

TOTAL EXPECTED PLANT SOUND PRESSURE LEVEL AT RECEPTOR POSITION, dBA: 41

ESTIMATED RECEPTOR ELEV. REL. TO PLANT BASELINE: 1.5 m

ESTIMATED GROUND POROSITY (0-1): 0.9 LOW BUILDINGS/INTERVENING STRUCTURES

NOTES:
SOURCE LEVELS EXPRESSED IN TERMS OF A-WTD SOUND POWER LEVEL, dBA re 1 pW
ANOMALOUS ATTENUATION BASED ON NEUTRAL WEATHER/WIND CONDITIONS PER EEI GUIDE
UNLESS NOTED ALL SOURCE LEVELS BASED DIRECTLY ON, OR EXTRAPOLOATED FROM, FIELD MEASUREMENTS OF SIMILAR EQUIPMENT

SOURCE TYPE RADIATION PATTERNS:

PLANT NOISE EMISSIONS MODEL - STEADY STATE BASE LOAD OPERATION

Hessler Associates, Inc.
Consultants in Engineering Acoustics

PROJECT: **RUSSELL CITY ENERGY CENTER**
LOCATION: RUSSELL CITY, CA
JOB NO: 24405-002

MODEL RUN: 1
RUN DATE: 2/7/01
RECEPTOR X: 1567 m
RECEPTOR Y: 449 m
RECEPTOR: **3. WATERFORD APTS. - 1.6 km E OF PLANT**
DESCRIPTION: **STANDARD PLANT NOISE EMISSIONS**
SITE PLAN: DRWG. 24405-002 P1-0010-001 REV B (2/27/01)

Radial Dist., m	Angle, deg.	
1630	**16**	
45.0	Ldn	**39.4** dBA

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
SOURCE NUMBER	SOURCE DESCRIPTION	SOURCE QTY	SOURCE HGT, m	SOURCE TYPE	LOCATION X, m	LOCATION Y, m	MEAS/*EST* Lw dBA re 1 pW	RECEPTOR DISTANCE, m	EST. SHIELDING ATTENUATION	ESTIMATED DIRECTIVITY	ESTIMATED GROUND ABS.	ANOMAL. ATTENUATION	NOISE ABATEMENT	DISTANCE CORRECTION	AIR ABSORP. 15°C/70% RH	QTY CORR.	**EXPECTED LEVEL AT RECEPTOR**	**Lp> 30**
1	E UNIT GT TRANSFORMER	1	3	1	54	89	102	1556	-1	0	-2.7	-4.8	0	-71.8	-3.3	0	**18**	
2	E UNIT GT AIR INLET	1	7	1	62	59	95	1554	-3	0	-2.6	-4.8	0	-71.8	-3.3	0	**9**	
3	E UNIT GT AIR INLET DUCT	1	7	1	46	57	104	1571	-2	0	-2.6	-4.9	0	-71.9	-3.3	0	**19**	
4	E UNIT GT GENERATOR	1	6	1	41	62	107	1574	-1	0	-2.7	-4.9	0	-71.9	-3.3	0	**23**	
5	E UNIT GT ENCLOSURE	1	5	1	41	50	107	1577	-5	0	-2.7	-4.9	0	-71.9	-3.3	0	**19**	
6	E UNIT EXHAUST DUCT	1	4	1	41	42	105	1579	-5	0	-2.7	-4.9	0	-72.0	-3.3	0	**17**	
7	E UNIT HRSG INLET SIDE	1	8	2	41	29	108	1583	-1	0	-2.6	-4.9	0	-69.0	-3.3	0	**27**	
8	E UNIT HRSG SIDE WALL	1	12	2	41	14	102	1586	0	0	-2.6	-4.9	0	-69.0	-3.3	0	**22**	
9	E UNIT HRSG STACK (0° DIR.)	1	53	1	41	0	110	1590	0	-6	-2.1	-4.9	0	-72.0	-3.3	0	**21**	
10	E UNIT STEAM LINES	1	15	1	41	17	102	1586	0	0	-2.6	-4.9	0	-72.0	-3.3	0	**19**	
11	E UNIT PIPE RACK STEAM LINES	1	14	1	52	17	105	1576	0	0	-2.6	-4.9	0	-71.9	-3.3	0	**22**	
12	E UNIT BURNER CONTROL SKID	1	1	1	53	22	*115*	1573	-8	0	-2.7	-4.9	0	-71.9	-3.3	0	**24**	
13	E UNIT CT ENCL. VENT FANS	2	7	1	41	54	*102*	1576	-2	0	-2.6	-4.9	0	-71.9	-3.3	3	**20**	
14	E UNIT BFP BLDG.	1	3	1	56	6	*95*	1575	0	0	-2.7	-4.9	0	-71.9	-3.3	0	**12**	
15	W UNIT GT TRANSFORMER	1	3	1	12	89	102	1596	0	0	-2.7	-4.9	0	-72.0	-3.3	0	**19**	
16	W UNIT GT AIR INLET	1	7	1	21	59	95	1594	-2	0	-2.6	-4.9	0	-72.0	-3.3	0	**10**	
17	W UNIT GT AIR INLET DUCT	1	7	1	5	57	104	1610	-4	0	-2.6	-5.0	0	-72.1	-3.4	0	**17**	
18	W UNIT GT GENERATOR	1	6	1	0	62	107	1614	-4	0	-2.7	-5.0	0	-72.1	-3.4	0	**20**	
19	W UNIT GT ENCLOSURE	1	5	1	0	50	107	1617	-5	0	-2.7	-5.0	0	-72.2	-3.4	0	**19**	
20	W UNIT EXHAUST DUCT	1	4	1	0	42	105	1619	-4	0	-2.7	-5.0	0	-72.2	-3.4	0	**18**	
21	W UNIT HRSG INLET SIDE	1	8	2	0	29	108	1622	-2	0	-2.6	-5.0	0	-69.2	-3.4	0	**26**	
22	W UNIT HRSG SIDE WALL	1	12	2	0	14	102	1626	-3	0	-2.6	-5.0	0	-69.2	-3.4	0	**19**	
23	W UNIT HRSG STACK (0° DIR.)	1	53	1	0	0	110	1630	0	-6	-2.2	-5.1	0	-72.2	-3.4	0	**21**	
24	W UNIT STEAM LINES	1	15	1	0	17	102	1625	0	0	-2.6	-5.0	0	-72.2	-3.4	0	**19**	
25	W UNIT PIPE RACK STEAM LINES	1	14	1	11	17	105	1615	-1	0	-2.6	-5.0	0	-72.1	-3.4	0	**21**	
26	W UNIT BURNER CONTROL SKID	1	1	1	11	22	*115*	1613	-13	0	-2.7	-5.0	0	-72.1	-3.4	0	**19**	
27	W UNIT CT ENCL. VENT FANS	2	7	1	0	54	*102*	1616	-2	0	-2.6	-5.0	0	-72.2	-3.4	3	**20**	
28	W UNIT BFP/CHEM FEED BLDG	1	3	1	14	6	*95*	1615	-7	0	-2.7	-5.0	0	-72.1	-3.4	0	**5**	
29	AIR COMPRESSOR SKIDS	2	2	1	20	19	89	1605	-11	0	-2.7	-5.0	0	-72.1	-3.4	3	**0**	
30	GAS COMPRESSOR BLDG	1	4	1	86	-17	*110*	1552	0	0	-2.7	-4.8	0	-71.8	-3.2	0	**27**	
31	WATER TREAT/WHSE VENT FANS	8	10	1	96	35	*85*	1528	0	0	-2.6	-4.7	0	-71.7	-3.2	9	**12**	
32	STEAM TURBINE	1	6	1	-32	48	107	1648	0	0	-2.7	-5.1	0	-72.3	-3.4	0	**23**	
33	ST GENERATOR	1	6	1	-32	62	107	1645	0	0	-2.7	-5.1	0	-72.3	-3.4	0	**24**	
34	CONDENSER AREA E FACE	1	5	2	-20	53	113	1636	-5	0	-2.7	-5.1	0	-69.2	-3.4	0	**28**	
35	CONDENSER AREA N FACE	2	5	2	-32	77	113	1641	-1	-4	-2.7	-5.1	0	-69.3	-3.4	3	**31**	31
36	CONDENSER AREA W FACE	1	7	1	-44	53	116	1659	-2	-20	-2.6	-5.1	0	-72.4	-3.5	0	**10**	
37	CONDENSER AREA S FACE	1	1	1	-32	29	111	1653	-8	-7	-2.7	-5.1	0	-72.3	-3.4	0	**12**	
38	ST TRANSFORMER	1	3	1	-23	86	102	1631	0	0	-2.7	-5.1	0	-72.2	-3.4	0	**19**	
39	CIRC. WATER PUMPS	2	5	1	-65	2	108	1692	-15	0	-2.7	-5.2	0	-72.6	-3.5	3	**12**	
40	COOLING TOWER EXHAUSTS	10	21	1	-65	93	106	1670	0	0	-2.5	-5.2	0	-72.4	-3.5	10	**32**	32
41	COOLING TOWER W. WET INLETS	10	4	2	-75	93	99	1680	0	-20	-2.7	-5.2	0	-69.5	-3.5	10	**8**	
42	COOLING TOWER W. DRY INLETS	10	14	2	-75	93	99	1680	0	-20	-2.6	-5.2	0	-69.5	-3.5	10	**8**	
43	COOLING TOWER E. WET INLETS	10	4	2	-57	93	99	1663	-3	0	-2.7	-5.2	0	-69.4	-3.5	10	**25**	
44	COOLING TOWER E. DRY INLETS	10	14	2	-57	93	99	1663	-1	0	-2.6	-5.2	0	-69.4	-3.5	10	**27**	

TOTAL EXPECTED PLANT SOUND PRESSURE LEVEL AT RECEPTOR POSITION, dBA: 39

ESTIMATED RECEPTOR ELEV. REL. TO PLANT BASELINE: 1.5 m

ESTIMATED GROUND POROSITY (0-1): 0.9 LOW BUILDINGS/INTERVENING STRUCTURES

NOTES:
SOURCE LEVELS EXPRESSED IN TERMS OF A-WTD SOUND POWER LEVEL, dBA re 1 pW
ANOMALOUS ATTENUATION BASED ON NEUTRAL WEATHER/WIND CONDITIONS PER EEI GUIDE
UNLESS NOTED ALL SOURCE LEVELS BASED DIRECTLY ON, OR EXTRAPOLOATED FROM, FIELD MEASUREMENTS OF SIMILAR EQUIPMENT

SOURCE TYPE RADIATION PATTERNS:

PLANT NOISE EMISSIONS MODEL - STEADY STATE BASE LOAD OPERATION

Hessler Associates, Inc.
Consultants in Engineering Acoustics

PROJECT: **RUSSELL CITY ENERGY CENTER**
LOCATION: RUSSELL CITY, CA
JOB NO: 24405-002

MODEL RUN: **1**
RUN DATE: **2/7/01**
RECEPTOR X: -543 m
RECEPTOR Y: -904 m
RECEPTOR: **4. HAYWARD SHORELINE INTERPRETIVE CENTER - 1 km SW OF PLANT**
DESCRIPTION: **STANDARD PLANT NOISE EMISSIONS**
SITE PLAN: DRWG. 24405-002 P1-0010-001 REV B (2/27/01)

Radial Dist., m	Angle, deg.	
1055	**239**	
51.7	Ldn	**46.1** dBA

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
SOURCE NUMBER	SOURCE DESCRIPTION	SOURCE QTY	SOURCE HGT, m	SOURCE TYPE	LOCATION X, m	LOCATION Y, m	MEAS/*EST* Lw dBA re 1 pW	RECEPTOR DISTANCE, m	EST. SHIELDING ATTENUATION	ESTIMATED DIRECTIVITY	ESTIMATED GROUND ABS.	ANOMAL. ATTENUATION	NOISE ABATEMENT	DISTANCE CORRECTION	AIR ABSORP. 15°C/70% RH	QTY CORR.	**EXPECTED LEVEL AT RECEPTOR**	**Lp> 30**
1	E UNIT GT TRANSFORMER	1	3	1	54	89	102	1159	-15	0	-1.8	-3.6	0	-69.3	-2.5	0	**10**	
2	E UNIT GT AIR INLET	1	7	1	62	59	95	1138	-14	0	-1.7	-3.5	0	-69.1	-2.5	0	**4**	
3	E UNIT GT AIR INLET DUCT	1	7	1	46	57	104	1128	-12	0	-1.7	-3.5	0	-69.0	-2.4	0	**15**	
4	E UNIT GT GENERATOR	1	6	1	41	62	107	1130	-8	0	-1.8	-3.5	0	-69.0	-2.4	0	**22**	
5	E UNIT GT ENCLOSURE	1	5	1	41	50	107	1119	-7	0	-1.8	-3.5	0	-69.0	-2.4	0	**23**	
6	E UNIT EXHAUST DUCT	1	4	1	41	42	105	1112	-6	0	-1.8	-3.4	0	-68.9	-2.4	0	**22**	
7	E UNIT HRSG INLET SIDE	1	8	2	41	29	108	1101	-1	-3	-1.7	-3.4	0	-65.8	-2.4	0	**31**	31
8	E UNIT HRSG SIDE WALL	1	12	2	41	14	102	1089	0	-2	-1.7	-3.4	0	-65.7	-2.4	0	**27**	
9	E UNIT HRSG STACK (0° DIR.)	1	53	1	41	0	110	1077	0	-6	-1.3	-3.3	0	-68.6	-2.3	0	**28**	
10	E UNIT STEAM LINES	1	15	1	41	17	102	1091	0	0	-1.7	-3.4	0	-68.7	-2.4	0	**26**	
11	E UNIT PIPE RACK STEAM LINES	1	14	1	52	17	105	1097	-4	0	-1.7	-3.4	0	-68.8	-2.4	0	**25**	
12	E UNIT BURNER CONTROL SKID	1	1	1	53	22	*115*	1101	-15	0	-1.8	-3.4	0	-68.8	-2.4	0	**24**	
13	E UNIT CT ENCL. VENT FANS	2	7	1	41	54	*102*	1122	-1	0	-1.7	-3.5	0	-69.0	-2.4	3	**27**	
14	E UNIT BFP BLDG.	1	3	1	56	6	*95*	1089	0	0	-1.8	-3.4	0	-68.7	-2.4	0	**19**	
15	W UNIT GT TRANSFORMER	1	3	1	12	89	102	1138	-15	0	-1.8	-3.5	0	-69.1	-2.5	0	**10**	
16	W UNIT GT AIR INLET	1	7	1	21	59	95	1117	-14	0	-1.7	-3.5	0	-68.9	-2.4	0	**4**	
17	W UNIT GT AIR INLET DUCT	1	7	1	5	57	104	1107	-9	0	-1.7	-3.4	0	-68.9	-2.4	0	**19**	
18	W UNIT GT GENERATOR	1	6	1	0	62	107	1109	-2	0	-1.8	-3.4	0	-68.9	-2.4	0	**29**	
19	W UNIT GT ENCLOSURE	1	5	1	0	50	107	1098	-2	0	-1.8	-3.4	0	-68.8	-2.4	0	**29**	
20	W UNIT EXHAUST DUCT	1	4	1	0	42	105	1091	-1	0	-1.8	-3.4	0	-68.7	-2.4	0	**28**	
21	W UNIT HRSG INLET SIDE	1	8	2	0	29	108	1080	0	-3	-1.7	-3.3	0	-65.6	-2.4	0	**32**	32
22	W UNIT HRSG SIDE WALL	1	12	2	0	14	102	1067	0	-2	-1.7	-3.3	0	-65.5	-2.3	0	**27**	
23	W UNIT HRSG STACK (0° DIR.)	1	53	1	0	0	110	1055	0	-6	-1.2	-3.3	0	-68.4	-2.3	0	**28**	
24	W UNIT STEAM LINES	1	15	1	0	17	102	1070	0	0	-1.7	-3.3	0	-68.6	-2.3	0	**26**	
25	W UNIT PIPE RACK STEAM LINES	1	14	1	11	17	105	1075	-3	0	-1.7	-3.3	0	-68.6	-2.3	0	**26**	
26	W UNIT BURNER CONTROL SKID	1	1	1	11	22	*115*	1080	-7	0	-1.8	-3.3	0	-68.6	-2.4	0	**32**	32
27	W UNIT CT ENCL. VENT FANS	2	7	1	0	54	*102*	1101	-1	0	-1.7	-3.4	0	-68.8	-2.4	3	**28**	
28	W UNIT BFP/CHEM FEED BLDG	1	3	1	14	6	*95*	1067	0	0	-1.8	-3.3	0	-68.5	-2.3	0	**19**	
29	AIR COMPRESSOR SKIDS	2	2	1	20	19	89	1082	-2	0	-1.8	-3.4	0	-68.7	-2.4	3	**14**	
30	GAS COMPRESSOR BLDG	1	4	1	86	-17	*110*	1088	0	0	-1.8	-3.4	0	-68.7	-2.4	0	**34**	34
31	WATER TREAT/WHSE VENT FANS	8	10	1	96	35	*85*	1136	-1	0	-1.7	-3.5	0	-69.1	-2.5	9	**16**	
32	STEAM TURBINE	1	6	1	-32	48	107	1081	0	0	-1.8	-3.4	0	-68.7	-2.4	0	**31**	31
33	ST GENERATOR	1	6	1	-32	62	107	1094	0	-3	-1.8	-3.4	0	-68.8	-2.4	0	**28**	
34	CONDENSER AREA E FACE	1	5	2	-20	53	113	1091	0	-8	-1.8	-3.4	0	-65.7	-2.4	0	**32**	32
35	CONDENSER AREA N FACE	2	5	2	-32	77	113	1106	0	-20	-1.8	-3.4	0	-65.8	-2.4	3	**23**	
36	CONDENSER AREA W FACE	1	7	1	-44	53	116	1079	-3	-4	-1.7	-3.3	0	-68.6	-2.4	0	**33**	33
37	CONDENSER AREA S FACE	1	1	1	-32	29	111	1064	0	0	-1.8	-3.3	0	-68.5	-2.3	0	**35**	35
38	ST TRANSFORMER	1	3	1	-23	86	102	1119	-15	0	-1.8	-3.5	0	-69.0	-2.4	0	**10**	
39	CIRC. WATER PUMPS	2	5	1	-65	2	108	1025	0	0	-1.8	-3.2	0	-68.2	-2.2	3	**36**	36
40	COOLING TOWER EXHAUSTS	10	21	1	-65	93	106	1106	0	0	-1.6	-3.4	0	-68.9	-2.4	10	**40**	40
41	COOLING TOWER W. WET INLETS	10	4	2	-75	93	99	1102	0	-4	-1.8	-3.4	0	-65.8	-2.4	10	**32**	32
42	COOLING TOWER W. DRY INLETS	10	14	2	-75	93	99	1102	0	-4	-1.7	-3.4	0	-65.8	-2.4	10	**32**	32
43	COOLING TOWER E. WET INLETS	10	4	2	-57	93	99	1109	0	-9	-1.8	-3.4	0	-65.9	-2.4	10	**27**	
44	COOLING TOWER E. DRY INLETS	10	14	2	-57	93	99	1109	0	-9	-1.7	-3.4	0	-65.9	-2.4	10	**27**	

TOTAL EXPECTED PLANT SOUND PRESSURE LEVEL AT RECEPTOR POSITION, dBA: **46**

ESTIMATED RECEPTOR ELEV. REL. TO PLANT BASELINE: 1.5 m

ESTIMATED GROUND POROSITY (0-1): 0.6 GRASS/DRY MARSHES

NOTES:
SOURCE LEVELS EXPRESSED IN TERMS OF A-WTD SOUND POWER LEVEL, dBA re 1 pW
ANOMALOUS ATTENUATION BASED ON NEUTRAL WEATHER/WIND CONDITIONS PER EEI GUIDE
UNLESS NOTED ALL SOURCE LEVELS BASED DIRECTLY ON, OR EXTRAPOLOATED FROM, FIELD MEASUREMENTS OF SIMILAR EQUIPMENT

Russell City Energy Center

Appendix 8.7-B
Noise Complaint Resolution Form

May 2001

Russell City Energy Center AFC

May 2001

Appendix 8.7-B. Noise Complaint Resolution Form.

NOISE COMPLAINT RESOLUTION FORM **RUSSELL CITY ENERGY CENTER** **HAYWARD, CALIFORNIA**
Complainant's name and address:
Date complaint received: Time complaint received:
Nature of noise complaint:
Definition of problem after investigation by plant personnel:
Initial noise levels at 3 feet: _____ dBA Initial noise levels at the complainant's property: _____ dBA Final noise levels at 3 feet: _____ dBA Final noise levels at the complainant's property: _____ dBA
Description of corrective measures taken:
This information is certified to be correct: Plant Manager's Signature
Approximate installed cost of corrective measures: Date installation completed: Date first letter sent to complainant: (copy attached) Date final letter sent to complainant: (copy attached) *(Attach additional pages and supporting documentation, as required.)*

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 8.8-A
Paleontological Resources Technical Report and Map

(Filed under separate cover under a request for confidentiality)

May 2001

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 8.12-A
City of Hayward Peak Traffic Data

May 2001

Russell City Energy Center AFC

May 2001

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 02-09-2000
Center For Microcomputers In Transportation

Streets: (E-W) Industrial (N-S) SR92
Analyst: TJKM File Name: 4AEXIST.HC9
Area Type: Other 2-8-0 am peak
Comment: Existing Conditions

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	1	0	> 1	1	1	2	< 0	1	2	1
Volumes	132	5	68	77	28	9	501	873	128	2	407	92
Lane W (ft)		12.0	12.0		12.0	12.0	12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*	*		
Thru	*				Thru		*	*	
Right	*				Right		*	*	
Peds					Peds		*		
WB Left	*				SB Left	*			
Thru	*				Thru			*	
Right	*				Right			*	
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	21.0A				Green	3.0A	14.0A	10.0A	
Yellow/AR	4.0				Yellow/AR	4.0	0.0	4.0	

Cycle Length: 60 secs Phase combination order: #1 #5 #6 #7

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LT	426	1163	0.338	0.367	9.1	B	8.8	B
	R	580	1583	0.124	0.367	8.1	B		
WB	LT	464	1265	0.237	0.367	8.6	B	8.5	B
	R	580	1583	0.016	0.367	7.8	B		
NB	L	531	1770	0.992	0.300	41.7	E	20.7	C
	TR	1522	3654	0.727	0.417	10.7	B		
SB	L	118	1770	0.017	0.067	16.9	C	15.9	C
	T	683	3725	0.657	0.183	16.3	C		
	R	290	1583	0.334	0.183	14.0	B		

Intersection Delay = 18.1 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.638

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 02-09-2000
Center For Microcomputers In Transportation

Streets: (E-W) Industrial (N-S) SR92
Analyst: TJKM File Name: 4PEXIST.HC9
Area Type: Other 2-8-0 pm peak
Comment: Existing Conditions

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	1	0	> 1	1	1	2	< 0	1	2	1
Volumes	136	34	77	17	6	12	327	466	61	6	960	63
Lane W (ft)		12.0	12.0		12.0	12.0	12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*	*		
Thru	*				Thru		*	*	
Right	*				Right		*	*	
Peds					Peds		*		
WB Left	*				SB Left	*			
Thru	*				Thru			*	
Right	*				Right			*	
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	21.0A				Green	3.0A	12.0A	22.0A	
Yellow/AR	4.0				Yellow/AR	4.0	0.0	4.0	

Cycle Length: 70 secs Phase combination order: #1 #5 #6 #7

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LT	510	1623	0.351	0.314	12.1	B	11.8	B
	R	498	1583	0.163	0.314	11.2	B		
WB	LT	453	1441	0.053	0.314	10.8	B	10.8	B
	R	498	1583	0.026	0.314	10.7	B		
NB	L	405	1770	0.850	0.229	27.6	D	14.5	B
	TR	1830	3661	0.318	0.500	6.8	B		
SB	L	101	1770	0.059	0.057	20.2	C	18.7	C
	T	1224	3725	0.868	0.329	19.1	C		
	R	520	1583	0.127	0.329	10.6	B		

Intersection Delay = 16.1 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.677

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 02-09-2000
Center For Microcomputers In Transportation

Streets: (E-W) Depot Road (N-S) Industrial Blvd.
Analyst: TJKM File Name: 3AEXIST.HC9
Area Type: Other 2-8-0 am peak
Comment: Existing Conditions

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	1	0	> 1	< 0	1	2	1	1	2	1
Volumes	13	39	155	67	304	41	463	424	48	20	377	8
Lane W (ft)	12.0	12.0	12.0		12.0		12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*	*		
Thru	*				Thru		*	*	
Right	*				Right			*	
Peds	*				Peds		*		
WB Left	*				SB Left	*			
Thru	*				Thru			*	
Right	*				Right			*	
Peds	*				Peds			*	
NB Right					EB Right				
SB Right					WB Right				
Green	26.0A				Green	5.0A	26.0A	11.0A	
Yellow/AR	4.0				Yellow/AR	4.0	0.0	4.0	

Cycle Length: 80 secs Phase combination order: #1 #5 #6 #7

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	145	430	0.096	0.338	11.7	B	12.5	B
	T	629	1863	0.065	0.338	11.6	B		
	R	534	1583	0.305	0.338	12.7	B		
WB	LTR	537	1592	0.808	0.338	21.8	C	21.8	C
NB	L	708	1770	0.688	0.400	14.8	B	11.9	B
	T	1769	3725	0.265	0.475	8.2	B		
	R	237	1583	0.215	0.150	19.4	C		
SB	L	133	1770	0.158	0.075	22.4	C	24.6	C
	T	559	3725	0.746	0.150	24.8	C		
	R	237	1583	0.034	0.150	18.8	C		

Intersection Delay = 16.7 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.743

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 02-09-2000
Center For Microcomputers In Transportation

Streets: (E-W) Depot Road (N-S) Industrial Blvd.
Analyst: TJKM File Name: 3PEXIST.HC9
Area Type: Other 2-8-0 pm peak
Comment: Existing Conditions

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	1	0	> 1	< 0	1	2	1	1	2	1
Volumes	22	323	470	32	31	17	135	289	70	46	537	7
Lane W (ft)	12.0	12.0	12.0		12.0		12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*	*		
Thru	*				Thru		*	*	
Right	*				Right			*	
Peds	*				Peds		*		
WB Left	*				SB Left	*			
Thru	*				Thru			*	
Right	*				Right			*	
Peds	*				Peds			*	
NB Right					EB Right				
SB Right					WB Right				
Green	33.0A				Green	5.0A	9.0A	21.0A	
Yellow/AR	4.0				Yellow/AR	4.0	0.0	4.0	

Cycle Length: 80 secs Phase combination order: #1 #5 #6 #7

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	597	1405	0.039	0.425	8.7	B	13.3	B
	T	792	1863	0.429	0.425	10.7	B		
	R	673	1583	0.736	0.425	15.4	C		
WB	LTR	465	1094	0.183	0.425	9.3	B	9.3	B
NB	L	332	1770	0.428	0.188	19.1	C	13.4	B
	T	1443	3725	0.221	0.387	10.6	B		
	R	435	1583	0.170	0.275	14.3	B		
SB	L	133	1770	0.362	0.075	23.5	C	17.2	C
	T	1024	3725	0.579	0.275	16.8	C		
	R	435	1583	0.016	0.275	13.6	B		

Intersection Delay = 14.4 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.622

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 02-09-2000
Center.For Microcomputers In Transportation

Streets: (E-W) Industrial Blvd. (N-S) Clawater
Analyst: TJKM File Name: 2AEXIST.HC9
Area Type: Other 2-8-0 am peak
Comment: Existing Conditions

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	> 0	< 0	0	0	0	1	2	0	0	2	0
Volumes	141		3				32	438			317	
Lane W (ft)	12.0	12.0					12.0	12.0			12.0	
RTOR Vols			0						0			0
Lost Time	3.00		3.00				3.00	3.00			3.00	

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*	*		
Thru					Thru		*	*	
Right	*				Right			*	
Peds	*				Peds				
WB Left					SB Left	*			
Thru					Thru			*	
Right					Right			*	
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	18.0A				Green	3.0A	5.0A	17.0A	
Yellow/AR	4.0				Yellow/AR	4.0	0.0	4.0	

Cycle Length: 55 secs Phase combination order: #1 #5 #6 #7

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	611	1770	0.242	0.345	8.3	B	8.3	B
	LR	547	1583	0.005	0.345	7.6	B		
NB	L	290	1770	0.117	0.164	12.7	B	7.3	B
	T	1558	3725	0.311	0.418	7.0	B		
SB	T	1219	3725	0.288	0.327	8.9	B	8.9	B

Intersection Delay = 8.0 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.236

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 02-09-2000
Center For Microcomputers In Transportation

Streets: (E-W) Industrial Blvd. (N-S) Clawater
Analyst: TJKM File Name: 2PEXIST.HC9
Area Type: Other 2-8-0 pm peak
Comment: Existing Conditions

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	> 0	< 0	0	0	0	1	2	0	0	2	0
Volumes	783		15				60	362			579	
Lane W (ft)	12.0	12.0					12.0	12.0			12.0	
RTOR Vols			0						0			0
Lost Time	3.00		3.00				3.00	3.00			3.00	

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*	*		
Thru					Thru		*	*	
Right	*				Right			*	
Peds	*				Peds				
WB Left					SB Left	*			
Thru					Thru			*	
Right					Right			*	
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	18.0A				Green	3.0A	5.0A	17.0A	
Yellow/AR	4.0				Yellow/AR	4.0	0.0	4.0	

Cycle Length: 55 secs Phase combination order: #1 #5 #6 #7

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	611	1770	0.674	0.345	12.0	B	12.3	B
	LR	610	1767	0.701	0.345	12.5	B		
NB	L	290	1770	0.218	0.164	12.9	B	7.6	B
	T	1558	3725	0.257	0.418	6.8	B		
SB	T	1219	3725	0.524	0.327	10.0	B	10.0	B

Intersection Delay = 10.4 sec/veh Intersection LOS = B
Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.537

@bFOUT4; HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 02-09-200
Center For Microcomputers In Transportation

Streets: (E-W) Depot Road (N-S) Clawater
Analyst: TJKM File Name: 1AEXIST.HC9
Area Type: Other 2-8-0 am peak
Comment: Existing Conditions

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 2	< 0	0	> 2	1	0	> 2	< 0	0	> 2	1
Volumes	59	149	48	208	516	3	54	66	27	21	771	306
Lane W (ft)		12.0			12.0	12.0		12.0			12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds	*				Peds	*			
WB Left		*			SB Left	*			
Thru		*			Thru	*			
Right		*			Right	*			
Peds		*			Peds	*			
NB Right					EB Right				
SB Right					WB Right				
Green	18.0A	23.0A			Green	27.0A			
Yellow/AR	4.0	4.0			Yellow/AR	4.0			

Cycle Length: 80 secs Phase combination order: #1 #2 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	850	3579	0.333	0.237	16.4	C	16.4	C
WB	LT	1102	3673	0.726	0.300	17.9	C	17.9	C
	R	475	1583	0.006	0.300	12.7	B		
NB	DfL	93	266	0.612	0.350	21.5	C	15.2	C
	TR	624	1782	0.156	0.350	11.6	B		
SB	LT	1231	3516	0.712	0.350	15.9	C	15.6	C
	R	554	1583	0.581	0.350	14.8	B		

Intersection Delay = 16.4 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.615

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 02-09-2000
Center For Microcomputers In Transportation

Streets: (E-W) Depot Road (N-S) Clawater
Analyst: TJKM File Name: 1PEXIST.HC9
Area Type: Other 2-8-0 pm peak
Comment: Existing Conditions

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 2	< 0	0	> 2	1	0	> 2	< 0	0	> 2	1
Volumes	246	531	43	38	148	7	40	426	220	18	113	79
Lane W (ft)		12.0			12.0	12.0		12.0			12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
WB Left		*			SB Left *			
Thru		*			Thru *			
Right		*			Right *			
Peds		*			Peds *			
NB Right					EB Right			
SB Right					WB Right			
Green	34.0A	14.0A			Green 32.0A			
Yellow/AR	4.0	4.0			Yellow/AR 4.0			

Cycle Length: 92 secs Phase combination order: #1 #2 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	1386	3642	0.654	0.380	16.0	C	16.0	C
WB	LT	601	3688	0.343	0.163	22.2	C	22.1	C
	R	258	1583	0.027	0.163	20.9	C		
NB	LTR	1172	3266	0.647	0.359	16.8	C	16.8	C
SB	LT	986	2748	0.147	0.359	12.9	B	12.9	B
	R	568	1583	0.146	0.359	12.9	B		

Intersection Delay = 16.6 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.595

Y OF HAYWARD

Fax 786-2879

File Name : ENTCL
Site Code : 000000
Start Date : 04/19/2
Page No : 1

Groups Printed- Movement 1

Start Time	CLAWITER RD. Southbound Left	Thru	Rght		App. Total	ENTERPRISE AVE. Westbound Left	Thru	Rght		App. Total	CLAWITER RD. Northbound Left	Thru	Rght		App. Total	BERKELEY FARMS Eastbound Left	Thru	Rght		App. Total	Int. Tot
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	1	188	44	0	233	4	0	1	0	5	12	80	6	0	98	7	0	6	0	13	349
07:15 AM	0	182	34	0	216	2	0	1	0	3	7	81	2	0	90	13	0	4	0	17	326
07:30 AM	1	191	41	0	233	5	0	1	0	6	17	80	3	0	100	9	0	9	0	18	357
07:45 AM	1	187	57	0	245	2	0	1	0	3	10	85	6	0	101	8	0	9	0	17	366
Total	3	748	176	0	927	13	0	4	0	17	46	326	17	0	389	37	0	28	0	65	1398
08:00 AM	1	200	49	0	250	1	0	1	0	2	13	87	1	0	101	15	1	11	0	27	380
08:15 AM	2	175	30	0	207	1	0	1	0	2	12	91	2	0	105	13	0	4	0	17	331
08:30 AM	1	132	30	0	163	4	0	1	0	5	8	68	3	0	79	7	0	8	0	15	262
08:45 AM	3	114	38	0	155	1	1	1	0	3	10	86	2	0	98	13	2	14	0	29	285
Total	7	621	147	0	775	7	1	4	0	12	43	332	8	0	383	48	3	37	0	88	1258
11:00 AM	0	81	11	0	92	1	0	0	0	1	16	97	2	0	115	10	0	15	0	25	233
11:15 AM	0	85	11	0	96	2	0	0	0	2	18	102	4	0	124	9	0	16	0	25	247
11:30 AM	0	89	22	0	111	4	1	0	0	5	17	86	8	0	111	19	0	14	0	33	260
11:45 AM	0	91	24	0	115	2	0	1	0	3	19	87	6	0	112	23	0	12	0	35	265
Total	0	346	68	0	414	9	1	1	0	11	70	372	20	0	462	61	0	57	0	118	1005
12:00 PM	1	101	8	0	110	3	1	1	0	5	8	111	8	0	127	25	1	16	0	42	284
12:15 PM	5	101	11	0	117	2	0	1	0	3	10	111	5	0	126	24	0	13	0	37	283
12:30 PM	0	104	14	0	118	3	1	2	0	6	16	110	1	0	127	21	0	22	0	43	294
12:45 PM	0	101	13	0	114	1	0	1	0	2	19	112	1	0	132	20	0	24	0	44	292
Total	6	407	46	0	459	9	2	5	0	16	53	444	15	0	512	90	1	75	0	166	1153
04:00 PM	1	99	10	0	110	5	0	0	0	5	12	162	2	0	176	45	0	35	0	80	371
04:15 PM	0	105	7	0	112	3	0	0	0	3	10	168	1	0	179	48	0	41	0	89	383
04:30 PM	1	137	5	0	143	8	0	6	0	14	5	143	3	0	151	41	0	21	0	62	370
04:45 PM	2	129	3	0	134	5	0	8	0	13	6	147	2	0	155	31	0	29	0	60	362
Total	4	470	25	0	499	21	0	14	0	35	33	620	8	0	661	165	0	126	0	291	1486
05:00 PM	0	128	8	0	136	3	0	1	0	4	4	144	1	0	149	51	0	21	0	72	361
05:15 PM	1	124	11	0	136	5	0	1	0	6	6	149	1	0	156	53	0	24	0	77	375
05:30 PM	0	111	3	0	114	7	0	1	0	8	4	134	4	0	142	42	0	17	0	59	323
05:45 PM	0	105	7	0	112	3	0	1	0	4	23	131	1	0	155	23	0	12	0	35	306
Total	1	468	29	0	498	18	0	4	0	22	37	558	7	0	602	169	0	74	0	243	1365
Grand Total	21	3060	491	0	3572	77	4	32	0	113	282	2652	75	0	3009	570	4	397	0	971	7665
Apprch %	0.6	85.7	13.7	0.0		68.1	3.5	28.3	0.0		9.4	88.1	2.5	0.0		58.7	0.4	40.9	0.0		
Total %	0.3	39.9	6.4	0.0	46.6	1.0	0.1	0.4	0.0	1.5	3.7	34.6	1.0	0.0	39.3	7.4	0.1	5.2	0.0	12.7	

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 8.14-A
Phase I Environmental Site Assessment
3590 and 3636 Enterprise Avenue

May 2001

Russell City Energy Center AFC

May 2001

PHASE I ENVIRONMENTAL SITE ASSESSMENT

of the

3590 and 3636 Enterprise Avenue

Hayward, California

Prepared for:

Calpine Bechtel Joint Development

FOSTER WHEELER ENVIRONMENTAL CORPORATION

April 2001

PHASE I ENVIRONMENTAL SITE ASSESSMENT

of

3590 & 3636 ENTERPRISE AVENUE

HAYWARD, CALIFORNIA

Prepared for:

Calpine-Bechtel Joint Development

6700 Koll Center Parkway
Pleasanton, California

Prepared by:

FOSTER WHEELER ENVIRONMENTAL CORPORATION
Sacramento, California 95834

April 2001

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EXECUTIVE SUMMARY

This Phase I Environmental Site Assessment (ESA) was prepared for the Calpine-Bechtel Joint Development (Calpine-Bechtel) for two, contiguous parcels of land, Runnels Industries and the KFAX radio transmitter site located at 3590 & 3636 Enterprise Avenue, respectively, in the City of Hayward, Alameda County, California. These parcels are planned for development as the Russell City Energy Centner. They are indicated here as the Runnels parcel and KFAX parcel, respectively.

Historical aerial photographs and other site documents indicate the parcels were in agricultural use from before 1939 until at least 1965. The Runnels parcel was developed for commercial use in 1970. The C.E. Freeman Company, a metal painting business, originally developed the Runnels parcel and later sold the property to current occupant, Runnels Industries. The KFAX parcel remains mostly undeveloped with only KFAX radio transmitter towers and associated support facility located on it.

Several reports on environmental assessments conducted at the Runnels parcel were reviewed by Foster Wheeler for this Phase I site assessment. These reports indicate that three former underground storage tanks (one 1,000-gallon Methyl Ethyl Ketone (MEK) tank, one 1,000-gallon diesel fuel tank, and one 500-gallon gasoline tank) were removed from the site in 1993. Various soil and groundwater investigations have reported concentrations of volatile organic compounds (VOCs) and methyl tertiary butyl ether (MTBE) present in groundwater, and concentrations of total petroleum hydrocarbons (TPH) present in soil at the site. Additionally, sandblast grit was reportedly used as fill material in certain areas of the Runnels parcel. The source of soil contamination is most likely site operational activities and management/ housekeeping practices. The source of the groundwater contamination is reportedly undetermined and the Runnels Industries consultant has proposed that groundwater impacts may be originating from an up-gradient off-site source located to the east. Requests for regulatory closure on these issues have been submitted to Alameda County and the Hayward Fire Department. No reply from either agency has yet been received.

The Runnels and KFAX parcels were visually surveyed in February and March 2001 to note the physical conditions and activities occurring on the parcels and in their vicinity. The parcels are bordered by a paved road (Enterprise Avenue) running east to west along the north boundary of the property, and a paved road (Whitesell Drive) running north to south along the east portion of the property perimeter. A railroad spur and an Alameda Flood Control channel run along the south project site boundary.

The Runnels parcel, located at 3590 Enterprise Avenue, is currently occupied by Runnels Industries. The facility applies surface coatings to prefabricated metal materials. The Runnels property is developed with numerous temporary and permanent metal structures which are primarily used to house the on-site sandblasting and spray-on coating processes. Numerous interior and exterior chemical storage areas were observed. Chemical storage includes paints, solvents (primarily Methyl Ethyl Ketone), petroleum-based lubricating oils, hydraulic fluids, and diesel fuel. Secondary containment was provided for the virgin and used solvents, waste oils, and diesel fuel. Some surface staining was observed in the chemical storage areas.

A steam cleaning area improved with a four-stage clarifier system to collect waste water was also observed on-site. An open exterior water tank used with the steam cleaning system was observed adjacent to the west Runnels property fence. Surface runoff from this area was observed flowing onto the KFAX parcel.

No visible evidence of existing under ground storage tanks, such as pumps, fill ports or vent pipes, was observed on the Runnels parcel. One groundwater monitoring well was observed to the west of the former UST area.

The KFAX parcel, located at 3636 Enterprise Avenue, is currently occupied by the KFAX Radio transmission towers. The Site is developed with four radio transmitter towers and one white metal equipment building that is approximately 200 square feet in size. Access to the equipment building and the fenced enclosures at the bases of the radio towers was not provided. No evidence of underground storage tanks, no aboveground storage tanks, and no chemical storage was observed on the KFAX parcel. However, one approximately 8-inch-diameter circular cover installed at ground surface was observed near the southeast corner of the on-site equipment building. The cover may indicate the presence of a groundwater monitoring well or other below-ground utility located in the vicinity of the equipment building. In addition, one permanent survey control marker was observed near the approximate center point between the four radio transmission towers. One temporary survey stake was also observed along the south property boundary near the Alameda County Flood Control channel.

Visible evidence of waste dumping was observed along the property boundary between the Runnels and KFAX parcels. Based on staining observed on the ground surface at the KFAX parcel and staining observed on the chain-link fence separating the two, it appears that unknown waste was dumped from the Runnels parcel onto the KFAX parcel. The stained soil covers a surface area of approximately 3 feet by 6 feet.

Based on the BBL regulatory database search report, nine sites are listed within a 1-mile radius of the project site under the Historical Abandoned Site Survey Program (also known as the

CALSITES database) from information compiled by the California Department of Toxic Substances Control (DTSC). Two sites within a 1-mile radius of the site property are listed under the Solid Waste Information System (SWIS) database. The SWIS database is maintained by the California Integrated Waste Management Board. Twenty-six sites are listed within a 0.5-mile radius of the project site under the Leaking Underground Storage Tanks Information System (LUSTIS) database, which contains information compiled by the State Water Resources Control Board (SWRCB). The site plus two adjacent sites are listed on the SWRCB's Underground Storage Tanks (UST) database. Two facilities located adjacent to the project site are identified as small quantity generators of hazardous waste under the Resource and Conservation Recovery Information System (RCRIS) database, which is maintained by the United States Environmental Protection Agency (USEPA). The project site is identified on the DTSC's Hazardous Waste Information System (HWIS) database, and has been issued a USEPA ID Number. Seven hazardous materials releases or spills are listed adjacent to the project site under the Emergency Response Notification System (ERNS) database, which is a compilation of information from the USEPA and other regulatory agency records.

CONCLUSIONS

Recognized environmental conditions, as defined by the ASTM Standard Practice E152, exist at the Runnels and KFAX parcels due to the activities that occurred on and in the vicinity of these parcels. Soil and groundwater impacts have been documented by previous investigations of the Runnels parcel. In addition to the previous investigations, our observations, interviews and records review support the position that historical use of the property by a metal finishing company, the processes and USTs used in support of company operations contributed to the soil and groundwater contamination. Surface staining on the West Site parcel, historically reported dumping from the Runnels parcel onto the KFAX parcel, wastewater run-off from the Runnels parcel parcel, and proximity to the Runnels parcel indicate the potential for soil and groundwater contamination on the KFAX parcel. It would be prudent to assess the area of observed surface staining and the waste water runoff on the KFAX parcel; and the areas of reported TPH and VOC contamination, waste water runoff, selected outdoor operational areas based on observed surface staining, and the former UST area on the Runnels parcel.

In addition, according to the BBL Environmental Record Search report, addresses and facility names that identify the project site and several neighboring sites are listed on Federal and State environmental regulatory databases including USEPA's RCRIS and ERNS, California EPA's CALSITES, California DTSC's HWIS, SWRCB's LUSTIS and UST, and California Integrated Waste Management Board's SWIS.

RECOMMENDATIONS

In order for the Runnels and KFAX parcels to be used in the future for the intended purpose of industrial development, closure of Runnels parcel groundwater and potentially soil impact concerns with regulatory authorities is appropriate. The closure options potentially associated with the Runnels parcel may include: No Further Action, Risk Assessment, Site Investigation and Reporting; Site Investigation and Risk Assessment; Long Term Groundwater Monitoring, or Hydraulic Containment It is our recommendation that Calpine-Bechtel evaluate options for obtaining site closure to industrial land use standards, the potential time and costs associated with implementation of each option, and the potential agency and community acceptance of the each option. Based on this evaluation, the preferred closure option should be identified and then discussed with the regulatory agency(s) to obtain their agreement. Following acceptance of the preferred closure option for the Runnels parcel, work should commence to implement the option and the request for closure should be submitted following completion of the option implementation.

1.0 INTRODUCTION

This report presents the results of a Phase I Environmental Site Assessment (ESA) of contiguous properties located at 3590 Enterprise Avenue (Runnels parcel) and at 3636 Enterprise Avenue (KFAX parcel), Hayward, California. This report was prepared by Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) for the sole use of Calpine-Bechtel Joint Development (Calpine-Bechtel) pursuant to the proposal to Calpine-Bechtel, dated December 21, 1999. The format of this report is generally consistent with the recommended format in "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" issued by the American Society for Testing and Materials (ASTM Standard E1527-97).

1.1 PURPOSE AND ORGANIZATION OF REPORT

Pursuant to the scope of work, specified in the December 21, 1999 proposal, the purpose of this Phase I ESA was to identify recognized environmental conditions in connection with the property. As defined in the ASTM Standard Practice E1527-97, "recognized environmental conditions" are defined as "the presence or likely presence of hazardous substances or petroleum products on a property under conditions that, without employing sampling, testing, or intrusive techniques, appear to indicate an existing release, a past release, or a material threat of a release into the property's structures or into the ground, groundwater, or surface water of the property."

1.2 LIMITING CONDITIONS AND METHODOLOGY USED

Foster Wheeler Enviornmental's scope of services for this project was limited to the following tasks:

- Task 1 - Review of Available Records and Documents
- Task 2 - Site Reconnaissance
- Task 3 - Interview
- Task 4 - Report Preparation

The above tasks were accomplished in accordance with the procedures described in the December 21, 1999 proposal. This Phase I ESA did not include wetlands evaluation, testing for or surveying of asbestos, radon, lead in potable water, lead paint, soil or groundwater sampling.

2.0 SITE LOCATION AND DESCRIPTION

The project site is approximately 14.66 acres in size. The project site consists of two parcels of land. The 3.57-acre east parcel (Runnels parcel) located at 3590 Enterprise Avenue, is occupied by the Runnels Industries metal coating company. The 11.09-acre west parcel (KFAX parcel) located at 3636 Enterprise Avenue, is occupied by the KFAX radio transmitter towers (Figure 1). The surrounding properties are mainly commercial and industrial.

2.1 SITE INSPECTION AND CURRENT LAND USE

Mr. Dean Sedlachek of Foster Wheeler Environmental performed an on-site reconnaissance and vicinity survey of the Runnels parcel on February 27, 2001, and of the KFAX parcel on March 22, 2001. The purpose of the on-site surveys was to observe the physical condition of the Runnels and KFAX parcels , note recogonized environmental conditions, interview personnel familiar with the Sites and to collect information on past and present uses of the property. During the vicinity surveys, a "drive-by" of the properties neighboring the project site was conducted to observe neighboring property development.

The two parcels are bordered by a paved road (Enterprise Avenue) running east to west along the north boundary of the site property, and a paved road (Whitesell Drive) running north to south along the east portion of the property perimeter. A railroad spur and an Alameda Flood Control channel run along the south project site boundary.

Color photographs of the project site were taken from the on-site survey and during the vicinity survey and are provided in Appendix A-2. Plans of the project site parcels are shown in Figures 2 and 3.

2.1.1 Runnels Industries Parcel

The Runnels parcel, located at 3590 Enterprise Avenue, is currently occupied by Runnels Industries (Figure 2). The facility applies surface coatings to prefabricated metal materials. Prefabrication of metal occurs prior to receipt by Runnels Industries. The surface coatings process conducted by Runnels Industries involves surface preparation and spray application of various coating materials. Surface preparation is conducted by sandblasting with silicon, nickel slag or glass-beads followed by steam cleaning or chemical treatment. Spray-on surface coatings include paints and high performance coating such as zinc epoxy urethane. The ground surface of the site is relatively flat; however, surface drainage along the western perimeter of the site drains to the KFAX parcel. The surface of the site appears to be or have been graveled. The site also includes numerous temporary and permanent metal structures. The buildings house the metal finishing operations and painting areas. Some painting and sand blasting takes place in the buildings and some occurs in the open (uncontained or controlled areas).

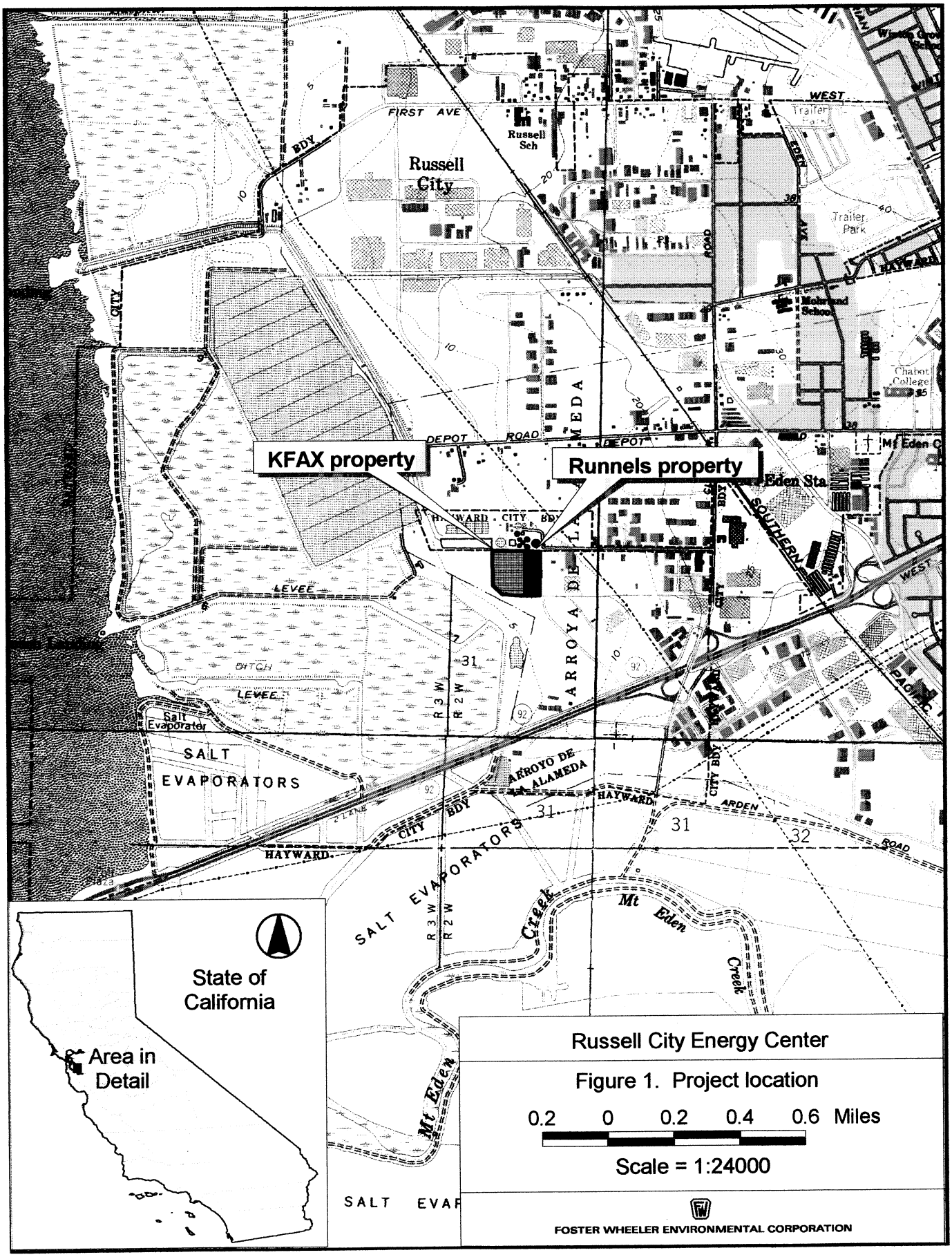
During the site visit, sandblasting was observed in the following locations: two interior silicon sandblasting sheds, one exterior nickel slag blasting area, and one interior glass-bead blasting shed. Spray-on paint and coating applications were observed indoors within two site buildings and outdoors, near the central portion of the site. No control facilities were observed for the outdoor spray painting operations. Chemical storage areas for paints and solvents appeared within each of the spray application buildings, within two exterior storage areas, and within five flammable materials storage lockers located around the site. According to Mr. Doug Pepoon, Vice President of Operations for Runnels Industries, solvents include primarily pure MEK and a blend containing MEK. Waste solvent storage areas were provided with secondary containment. Limited surface staining was observed in the paint and solvent storage areas.

A steam cleaning area was also observed during the site visit. According to Mr. Pepoon, the area was recently improved with a four-stage clarifier system to collect waste water from the steam cleaning process. The recently installed sump system located near the steam cleaning area and the west property line was observed to be overflowing. The overflow was discharging to the KFAX parcel. An exterior water tank associated with the steam cleaning system was observed near the steam cleaning area and adjacent to the west property fence. Surface runoff from this area was observed flowing onto the KFAX parcel.

Petroleum-based hydraulic fluids, lubricants, and diesel fuel are also used at Runnels Industries for the operation and maintenance of the facility's fork lift trucks. One flammable materials locker was observed containing hydraulic fluids and lubrication oils. In addition, one double-contained exterior storage area was observed containing four 55-gallon drums of diesel fuel and two 55-gallon drums of waste oil. Limited surface staining was observed near the hydraulic fluids, lubricants and diesel fuel storage areas. Housekeeping in these areas was lacking.

No visible evidence of existing underground storage tanks, such as pumps, fill ports or vent pipes, was observed on-site. However, three former underground storage tanks (one 1,000-gallon MEK tank, one 1,000-gallon diesel fuel tank, and one 500-gallon gasoline tank) were reported to have been removed from the site in 1993 (Section 3.4). One groundwater monitoring well was observed to the west of the former UST area adjacent to the existing employee locker room and maintenance shop. One aboveground propane storage tank was observed near the northeast corner of the Runnels property. No other aboveground storage tanks were observed on-site.

City of Hayward Department of Public Works utilities maps indicate that City sewer and water services are extended throughout the entire lengths of Enterprise Avenue and Whitesell Drive. According to Mr. Pepoon, a large municipal sewer main that discharges to the adjacent Hayward



Russell City Energy Center

Figure 1. Project location

Water Pollution Control Facility is buried approximately 12 feet bgs and runs north to south through the central portion of the property.

2.1.2 KFAX Parcel

The KFAX parcel is located at 3636 Enterprise Avenue is currently occupied by the KFAX Radio transmitter towers (Figure 3). At the time of the site visit, the parcel was covered with tall grasses. The surface of the property generally slopes from north to south with a decline in elevation of approximately 5 feet. The property is developed with four radio transmitter towers and one white metal equipment building that is approximately 200 square feet in size. Access to the equipment building and the fenced enclosures at the bases of the radio towers was not provided.

Visible evidence of waste dumping was observed along the property boundary between the Runnels and KFAX parcels and immediately behind the glass bead blasting building located on the Runnels parcel. Based on staining observed on the ground surface at the KFAX parcel and staining observed on the chain-link fence separating the two sites, it appears that an unknown material has been discharged from the Runnels parcel onto the KFAX parcel. The surface staining appears on the KFAX parcel soil in a grassy area located immediately to the west of the Runnels glass-bead blasting building and adjacent to a locked gate in the chain-link fence running along the property boundary. The stained soil covers a surface area of approximately 3 feet by 6 feet. Vegetation in the area of the staining is absent.

No aboveground storage tanks or chemical storage of any kind was observed, and no visible evidence of existing underground storage tanks was observed on-site. However one approximately 8-inch diameter circular cover installed flush with the ground surface was observed near the southeast corner of the on-site equipment building. The type of cover is typically associated with a groundwater monitoring well or below ground utility. One permanent survey control marker was observed near the approximate center point between the four radio transmission towers. One temporary survey stake was also observed along the south property boundary near the Alameda County Flood Control channel.

2.2 DESCRIPTION OF ADJACENT LAND USE

Surrounding properties are mainly commercial and industrial. To the north of the Runnels and KFAX parcels and across Enterprise Avenue is the City of Hayward Water Pollution Control Facility. To the east of the Runnels parcel across Whitesell Drive is MAG Trucking Company. South of MAG Trucking Company and approximately 100 yards southeast of the Runnels parcel is the Rohm and Haas Chemical Company facility. Bordering the southern boundary of the Runnels and KFAX parcels is a railroad spur and an Alameda County Flood Control channel. Further south, beyond the flood control channel, are a number of commercial office and

warehouse buildings. To the southwest of the KFAX parcel is a large tract of vacant and topographically low-lying, marshy property that extends south to Highway 92. To the west of the KFAX parcel is the Enterprise Distribution Center which is developed with two commercial warehouse buildings. Foster Wheeler Environmental personnel did not enter the above-mentioned adjacent properties.

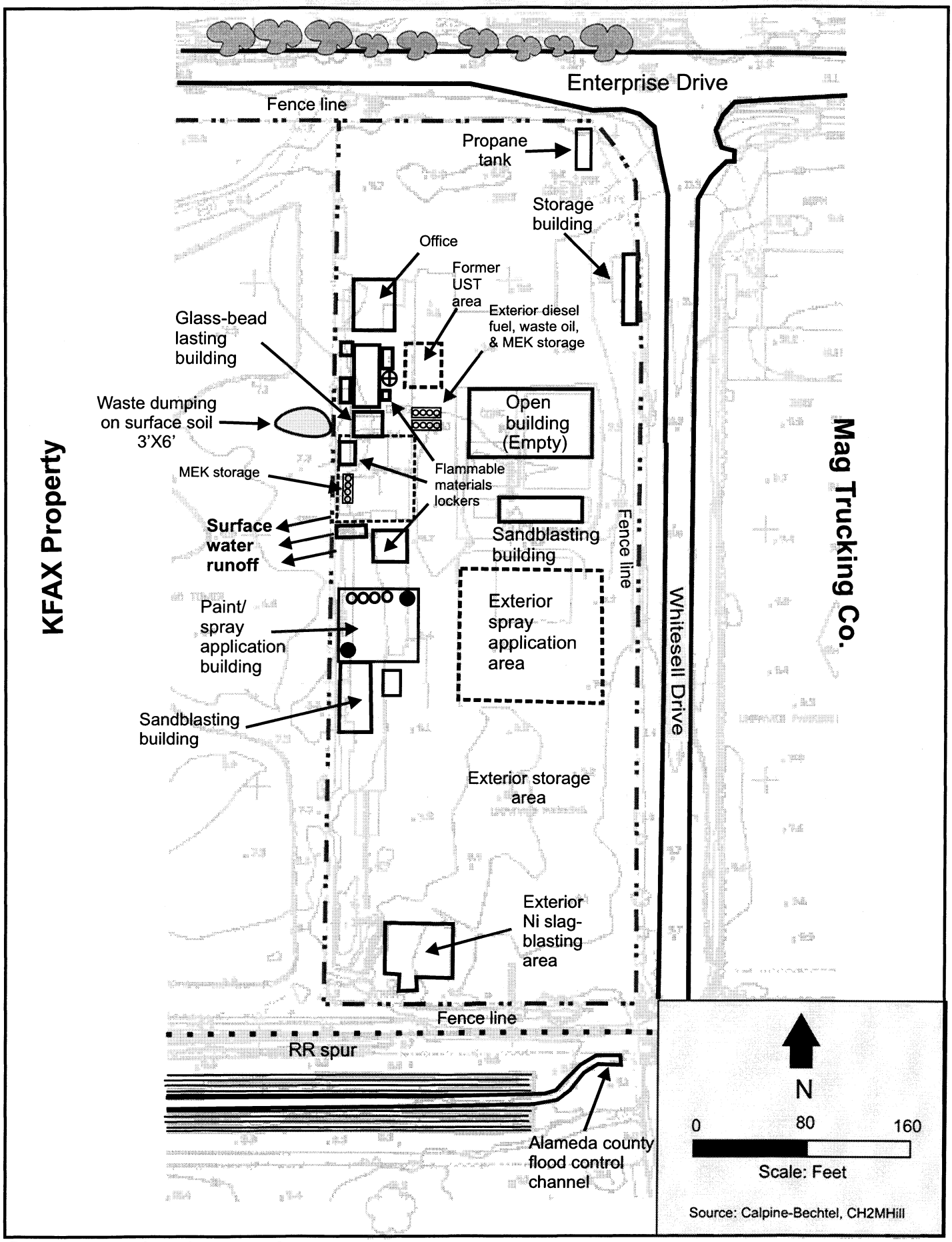


Figure 2. Surface features, Runnels Industries property at 3590 Enterprise Avenue.

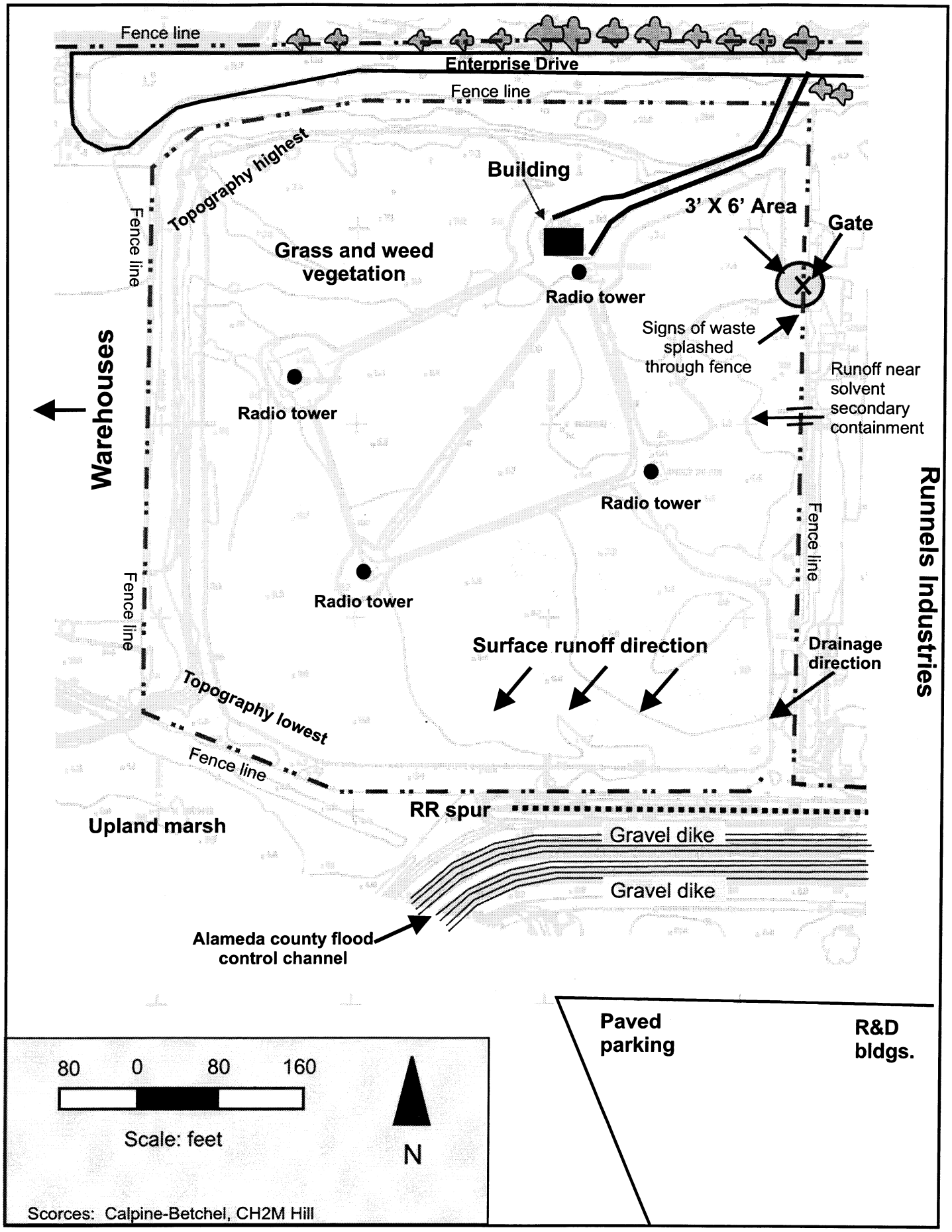


Figure 3. Surface features, KFAX radio transmitter property at 3636 Enterprise Ave..

3.0 ENVIRONMENTAL SETTING

3.1 REGIONAL GEOLOGY

The project site is located within the East Bay Plain Groundwater Basin (East Bay Plain), which is on the eastern shore of the San Francisco Bay and lies within the Coast Ranges Geomorphic Province of northern California. The East Bay Plain is a 25-mile-long and 2-mile-wide basin that is bounded on the west by the San Francisco Bay, by San Pablo Bay to the north, and by the Hayward Fault to the east. The southern boundary of the East Bay Plain is defined as the northern boundary of the Alameda County Water District, which is approximately 1.5 miles south of the project site.

The East Bay Plain overlies a section of a broad Franciscan bedrock depression, the core of which is roughly centered over the San Francisco Bay (SWRCB, 1999). The Hayward Fault and the San Andreas Fault form the eastern and western boundaries of the depression. The Hayward Fault is the dominant structural feature in the plain and parallels the axis of the East Bay Plain in a northwest direction.

Bedrock is structurally complex and is approximately 800 feet below ground surface (bgs) in the vicinity of the project site. The unconsolidated sediments are approximately 800 feet thick below the project site and consist of Santa Clara Formation, Alameda Formation, Temescal and Holocene Alluvial Deposits.

The Santa Clara Formation is early Pleistocene in origin and is between 300 to 600 feet thick. This formation consists of sandstone, siltstone and clay (DWR, 1967). Well data indicates that the permeability of this formation decreases from east to west, towards the San Francisco Bay.

The Alameda Formation includes three members that consist of black, organic clay, 25 to 50 feet thick, with a gravel/sand/shell layer; a 0- to 120-foot sequence of alluvial fan deposits with sands; gravels and silts; and a sequence ranging from 1 to 75 feet and consisting of black, organic-rich clay with occasional sand and gravel layers.

The Temescal is an early Holocene alluvial deposit ranging from 1 to 50 feet thick and consists of silts and clays with a base layer of cobbles up to 8 inches thick in certain sections.

The project site is immediately underlain by Holocene alluvial deposits, derived from the San Lorenzo Alluvial fan, and varying in thickness from 1 to 12 feet. These unconsolidated deposits are moderately sorted, moderately permeable fine sand, silty and clayey silt with occasional thin beds of coarse sand (USGS 1979).

Native surface soils in the area of the site are identified as the Clear Lake unit (SCS 1981). This deep, poorly drained soil consists of dark gray, neutral and moderately alkaline clay about 37 inches thick. The underlying material is calcareous, dark gray and grayish brown clay and silty clay to a depth of 60 inches or more. Soil permeability is low and the shrink-swell potential is high.

3.2 REGIONAL HYDROGEOLOGY

The East Bay Plain is subdivided into seven hydrogeological subareas. Of these subareas, the San Lorenzo Subarea (SLS) underlies the project site. The SLS contains a water-bearing sequence that ranges in thickness from about 400 feet at the hillfront to the east to as much as 1,000 feet beneath the East Bay Plain. The SLS consists of a series of flat-lying aquifers, separated by clay aquitards, and is divided into an upper and lower zone (DWR, 1967). The upper zone includes the water-bearing sequence to a depth of 400 feet. The alluvium in the upper zone contains two main aquifers, an upper aquifer at a depth of about 60 feet and a lower aquifer at a depth of about 250 feet. The upper zone aquifer ranges between 60 and 140 feet bgs. The lower zone aquifer is encountered at depths between 180 and 200 feet bgs.

The nearest municipal groundwater monitoring wells with respect to the project site are approximately 0.25 miles to the northeast, along Industrial Road (ACWD, 1999). It can be reasonably inferred, based upon data collected from nearby wells, that depth to groundwater beneath the project site is less than 5 feet. The shallow groundwater gradient is approximately 0.0008 ft./ft. and flows to the west towards the San Francisco Bay. In addition, data from nearby wells suggest that groundwater quality has been degraded beneath the project site as a result of saltwater intrusion. Chloride concentrations in nearby wells exceed 20,000 parts per million (ppm), which is comparable to seawater.

The upper zone aquifer is considered to be a significant conductor of saltwater intrusion. Saltwater intrusion occurred due to persistent pumping from the region and was first noticed in the 1920s (ACWD, 1999). Many years of overdraft caused the groundwater levels to drop below sea level. This elevation difference between the groundwater in the basin and the saline water from the San Francisco Bay caused a landward direction of groundwater flow through the aquifer and an intrusion of saltwater into the groundwater basin. Saltwater intrusion may also occur through the salt ponds located along the tidelands of the Bay Plain (west of the project site) and through vertical migration into other underlying aquifers.

3.3 SURFACE WATER RESOURCES AND DRAINAGE

Surface topography of the Runnels and KFAX parcels is relatively flat and varies from approximately 5-10 feet above mean sea level (msl). Topographical maps of the area indicate a decline in elevation from east to west of approximately 10 feet (from 10 to 0 feet above msl) in the

vicinity of the Runnels and KFAX parcels. The potential exists for surface water from easterly lying properties to drain toward the Runnels parcel.

Storm water drains were observed at the Runnels parcel. According to Mr. Pepoon, storm water runoff at the Runnels parcel is collected in a system of on-site storm water drains and discharged to the south of the property near the Alameda County Flood Control channel. However, surface runoff originating from the steam cleaning area was observed discharging directly onto the KFAX parcel during the site visits conducted on February 27 and March 22, 2001. The sump associated with the steam cleaning operation was observed in an overflow condition as depected by the photographs included in Appendix A-2.

The KFAX parcel is a grass-covered area with radio transmission towers and a small locked building. Storm water runoff, based on review of topographic maps is to the southwest and toward the marshy area southwest of the KFAX parcel property line.

4.0 HISTORIC SITE CONDITIONS

4.1 INTERVIEWS

Mr. Dean Sedlachek of Foster Wheeler interviewed Mr. Doug Pepoon, Vice President of Operations for Runnels Industries, on February 27, 2001. Mr. Pepoon toured the Runnels property with Mr. Sedlachek, explaining the facility's operations and pointing out areas of chemical storage. Mr. Pepoon indicated that three underground storage tanks were removed from the Runnels Industries site in 1993, and that no USTs currently exist on-site. In addition, Mr Pepoon identified the locations of numerous on-site surface drains that collect surface water runoff and discharge to the south of the East Site near the Alameda County Flood Control channel. No interviews were conducted with personnel associated with the KFAX parcel.

4.2 HISTORICAL AERIAL PHOTOGRAPHS

A review of historical aerial photographs was performed using aerial photos from the U.S. Department of Agriculture, Soil Conservation Service (SCS), Fairchild Aerial, Cartwright Aerial Surveys and Napp 2nd Cycle Aerial. Table 1 is a list of the aerial photos reviewed. Copies of the Aerial photographs are provided in Appendix A-1. Site photographs are provided in Appendix A-2.

Table 1. Aerial photographs reviewed.

Date	Photo Identification	Scale
1939	Depot Road, Hayward, CA	1:500
1958	Depot Road, Hayward, CA	1:500
1965	Depot Road, Hayward, CA	1:500
1993	Depot Road, Hayward, CA	1:833
2000	Looking east from SF Bay	Oblique aerial

1939 Aerial Photograph

This photograph revealed that the project site and surrounding areas were primarily in agricultural use. Scattered residential home sites and farm buildings are visible to the north of the site parcels. Low-lying estuarine wetlands located approximately 0.5 mile west appear to be tidal waters.

1958 Aerial Photograph

The Hayward Water Pollution Control Facility is now located immediately north of the project site and has several aboveground sediment tanks and a large evaporation pond towards the west. A drainage channel has been constructed, running from the evaporation pond to the northwest

towards the San Francisco Bay. The site parcels and adjoining properties to the south, east, and west remain in agricultural use. Dikes and drainage channels are visible along the wetland areas to the west of the project site.

1965 Aerial Photograph

The project parcels and immediately adjoining properties to the south and west remain in agricultural use. Several buildings appear directly east of the project site. The ground surface around the existing wastewater treatment plant appears to have been improved with concrete, and additional open storage tanks and ponds have been constructed. The property further north beyond the water treatment plant is an automobile salvage yard. Industrial development and possible landfilling activities appear approximately 0.25 mile west of the project site. Low-lying surface impoundments, located approximately 0.125 mile southwest, appear to be under water. Additional dikes and drainage canals are visible along the wetland areas further to the west.

1993 Aerial Photograph

Extensive development has occurred within surrounding areas. The site parcels appear to be developed much as they exist to date. Four radio tower pads are visible on the west parcel and several small buildings have been built on the east parcel. Two large industrial warehouse buildings are developed immediately to the west of the project site, and large evaporation ponds have been constructed approximately 0.25 mile to the northwest. A drainage channel is visible near the southern site property boundary. A vacant lot is visible immediately southwest of the project site. Landfilling operations appear within the low-lying area located approximately 0.125 mile to the southwest.

2000 Aerial Photograph

The oblique-angled aerial photograph taken for the project in the spring of 2000 shows the subject property, the Hayward industrial area to the north and east, vacant land to the south, and Hayward residential areas further east to the East Bay hills.

4.3 HISTORICAL DOCUMENT REVIEW

A review of various city directories, street address directories and criss-cross directories (were referenced to identify the owners/tenants (either the owner or lessee) of the property over the last 75 years (see BBL Historical Tenant Report in Appendix B).

The California Division of Oil & Gas Field Map was reviewed for oil and gas wells in the vicinity of the project site. No wells were found within 0.5 mile of the project site. Sanborn Fire Maps were not available for the proposed properties or surrounding areas. Lack of coverage for these properties indicates limited commercial development prior to 1950.

4.4 PRIOR ENVIRONMENTAL INVESTIGATIONS

Several reports of environmental studies conducted at the Runnels property were reviewed by Foster Wheeler for this Phase I site assessment. These included: Phase I and Phase II site assessment reports by Blymer Engineers in 1996, a follow-up Phase II site assessment report by Blymer Engineers in 1997, various reports on investigations conducted at the request of Alameda County Health Care Services Agency (ACHCSA) by H_2OGEOL in 1997, and quarterly groundwater monitoring reports prepared by H_2OGEOL in 1998, 1999 and 2000.

Historical information indicates that Runnels Industries established a groundwater monitoring well in the area of three underground storage tanks in December 1985. Low concentrations of total petroleum hydrocarbons (TPH) were detected in the groundwater. In May 1993, DECON Environmental removed three UST, including a 1,000-gallon methyl ethyl ketone (MEK) tank, a 1,000-gallon diesel fuel tank, and a 500-gallon gasoline tank under permit from the City of Hayward Fire Department. Closure letters were not received following the removal of these tanks.

The 1996 Phase I report indicated that an interview with Mr. Hugh Murphy of the Hayward Fire Department indicated that "sand blast materials had been disposed of in low spots on the property and off the property at the adjacent radio station". The report also indicated that Mr. Murphy recalled that "there might be an MEK problem, based on his memory of monitoring results from the UST removal". According to Fire Department records, the soils under the MEK tank were not analyzed for MEK. The soils were analyzed for TPH as diesel, BTEX, total concentrations of cadmium, chromium, lead, nickel and zinc. The soil samples reportedly contained low concentrations of contaminants, and the soils involved with the UST removal were placed back into the UST excavation. The Phase I report identified two major findings:

- The city of Hayward Fire Department had not approved closure for an underground storage tank release identified at the property during the May 1993 removal of three USTs.
- Conditions of concern included overspray from outside painting, solvent spills documented by the City Hayward Fire Department, use of blasting sand to fill low areas of the Runnels parcel, use of lead-based paints, and diesel staining in the area of the former aboveground storage tank.

These two major findings led Blymyer Engineers to recommend shallow soil and groundwater investigations intended to assess whether contaminants resulting from Runnels Industries' operations were present in soil or groundwater The field and laboratory scope of services portion of Blymyer Engineers' Phase II June 1996 investigation included:

- Install six soil borings to a maximum depth of 16 feet in those areas identified as having the greatest potential for soil or groundwater impact
- Collect one soil sample from each soil boring at a depth of approximately 2 feet below ground surface (BGS)
- Collect a grab groundwater sample from each of the six soil borings
- Analyze all soil and filtered groundwater samples for TEPH as diesel, stoddard solvent and motor oil; and total metals concentrations for antimony, arsenic, cadmium, chromium, cobalt, lead, mercury, molybdenum, nickel, and zinc; and volatile organic compounds.

Detectable concentrations of TEPH were identified in each soil sample ranging from less than 100 milligrams per kilogram (mg/kg) to 610 mg/kg. No VOCs were detected in soil samples. Chromium, lead, and zinc exceed 10X the STLC in two soil samples; however, TTLC for these metals were not exceeded. A review of the boring logs indicates that the upper two to four feet in each boring revealed green to brown or black sand and or gravel material that was recorded as "fill". This appears to support the presumption that blasting sand was used as fill in areas of the site.

Five of the six groundwater samples were reported to contain VOCs, and significant petroleum hydrocarbon concentrations were detected in the sample collected near the washing facility. Seven different VOC compounds were detected, including 1,1-Dichloroethene (1,1-DCE), 1,2 Dichloroethane (1,2-DCA), 1,1-Dichloroethane (1,1-DCA), Trichloroethene (TCE), Tetrachloroethene (PCE), and the biodegradation products Cis-1,2-Dichloroethene, Trans-1,2-Dichloroethene, and Vinyl Chloride. Groundwater samples collected from a borehole near Open Paint Building B were reported to contain VOCs (1,1-DCA, 1,1-DCE, and TCE) exceeding the Maximum Contaminant Levels (MCLs).

In 1998, ACHCSA requested further investigation to define the extent of the Runnels parcel contamination near borehole B-8 and required quarterly groundwater monitoring well sampling at monitoring wells MW-1 through MW-5 for one year. B-8 is appears to have been located immediately adjacent to the property line between the Runnels and KFAX parcels and very near the waste dumping area identified in Figure 4. H_2OGEOL concluded that there was no contamination near B-8. Vinyl Chloride, 1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethene, Cis-1,2-Dichloroethene, Trichlorethene, and Tetrachlorethene were identified in the wells. The highest concentrations of VOCs were observed in groundwater samples from monitoring wells near the center of Runnels parcel, with lower concentrations detected along the east property boundary and in the down-gradient location near the west property boundary. Each of the four H_2OGEOL quarterly report provided to ACHCSA suggest that the contamination is originating from an off-site

source to the east of the Runnels parcel.

In November and December of 1998, Runnels installed an oil-water clarifier system plus drainage trenches adjacent to the existing concrete pad in the washing area. This was designed to halt additional diesel fuel and motor oil drainage into the existing TPH-contaminated soil. The Hayward Public Works Department, Water Pollution Source Control Group also installed a monitoring device in the washing area.

In June 2000, Alameda County requested another analysis of MW-1 for dissolved metals. In June 2000, H_2OGEOL reported metals in groundwater to be at less than method detection limits (below threshold limits).

In April 2000, H_2OGEOL, on behalf of Runnels Industries, sent a letter to ACHCSA requesting closure of the former UST area. H_2OGEOL sent another letter to ACHCSA in May 2000 requesting closure on the TPH-contaminated soil and the VOC-contaminated groundwater. H_2OGEOL also sent a letter to the City of Hayward Fire Department in May 2000 requesting closure of the former UST area. The ACHCSA and City of Hayward Fire Department have not yet responded to the requests for closure.

Russell City Energy Center AFC

May 2001

5.0 REVIEW OF REGULATORY AGENCY RECORDS

According to the BBL Environmental Record Search report, the Runnels parcel at 3590 Enterprise Avenue is listed on the UST and HWIS regulatory database. Foster Wheeler contacted local and state regulatory agencies, including the California Department of Toxic Substances Control (DTSC), California Integrated Waste Management Board (CIWMB), and Alameda County Department of Environmental Health with requests to review available information regarding the project site and selected neighboring facilities/addresses. Available files were provided from each of these agencies with the exception of the California DTSC, whose reply was pending at the date of this report.

5.1 HAZARDOUS/REGULATED WASTES

According to the USEPA's Resource Conservation and Recovery Information System (RCRIS) database and the California Department of Toxic Substances Control (DTSC) Hazardous Waste Information System (HWIS), the Runnels parcel plus three additional adjacent facilities are identified as small quantity generators of hazardous waste (see Section 6.4, *Compilation of Listed Properties*, and the BBL Environmental Record Search in Appendix B).

Files provided by the Hayward Fire Department included correspondence between the Fire Department and Runnels Industries; hazardous materials site inspection forms; and, a hazardous materials inventory statement from Runnels Industries. The 1999 Hazardous Materials Inventory Statement from Runnels Industries was reviewed. Hazardous materials reported to be stored at Runnels Industries are listed in Table 2.

Several hazardous materials site inspections conducted by the Hayward Fire Department between 1989 and 1997 are documented in the Runnels Industries files provided by the Hayward Fire Department. The site inspections indicate a general lack of good housekeeping practices, including several reports of unlabeled waste containers stored on-site without secondary containment; stained soil within the waste solvent storage area (this area needs to be clearly identified in the site description section); a solvent recycling system, and aerating paint sludge on-site without an air quality permit. In addition, a hazardous materials inspection form dated May 19, 1989, indicates that spent sand blasting material from Runnels Industries was being dumped on the KFAX property. No indication of the constituents or the amount of material deposited was provided.

Table 2. Hazardous materials inventory summary (Runnels Industries).

Chemical	Average Daily Amount	Maximum Daily Amount	Units	Container Type
Gasoline	400	1,000	gallons	UST
Diesel	250	500	gallons	UST
Methyl ethyl ketone (MEK)	500	1,000	gallons	UST
T-605 solvent blend	55	110	gallons	steel drum
Alcohol	55	55	gallons	steel drum
Propane	varies	Varies	gallons	AST
Hydraulic oil	varies	Varies	gallons	steel drum
Ethanol Solvent	varies	Varies	gallons	steel drum
Epoxy 605 and solvent	varies	Varies	gallons	steel drum
Motor oil	varies	Varies	gallons	steel drum
Compressed oxygen	varies	Varies	cubic feet	cylinder
Acetylene	varies	Varies	cubic feet	cylinder
Urethane paint	500	500	pounds	(unspecified)
Epoxy paint	1,260	1,260	pounds	(unspecified)
Alkyld paint	540	540	pounds	(unspecified)

5.2 UNDERGROUND STORAGE TANKS

Twenty-six sites were listed within a 0.5-mile radius of the project site under the Leaking Underground Storage Tanks Information System (LUSTIS) database, which is maintained by the State Water Resources Control Board (SWRCB). The Runnels parcel plus two adjacent sites are listed on the Underground Storage Tanks (UST) database, which was maintained by the SWRCB from July 1984 to 1987 (see Section 6.4, *Compilation of Listed Properties*, and the BBL Environmental Record Search in Appendix B).

5.3 HAZARDOUS MATERIALS INCIDENTS AND INVESTIGATIONS

According to the Emergency Response Notification System (ERNS) database, a compilation of USEPA and other regulatory agency records, there are seven documented hazardous materials releases or spills that occurred adjacent to the project site (see Section 6.4, *Compilation of Listed Properties*, and the BBL Environmental Record Search in Appendix B).

5.4 INDUSTRIAL WASTE DISCHARGE PERMITS

According to the Permit Compliance System (PCS) database maintained by the USEPA, one facility located adjacent to the project site is identified as having an industrial waste discharge permit. The PCS is a database which contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities; and, was developed to meet the information needs of the NPDES program under the Clean Water Act. The PCS database tracks permit, compliance,

and enforcement states of NPDES facilities. The facility listed on the PCS is identified as follows:

- **City of Hayward Water Pollution Control Facility (3700 Enterprise Avenue)**, located adjacent and to the north of the project site, is identified with NPDES Permit No. CAD981667868.

5.5 TRANSFORMERS AND PCBS

PCB-containing oils, commonly used in electrical transformers, capacitors, and various kinds of hydraulic fluids, were banned by USEPA in 1978. The BBL database report lists no operations or businesses located on the property as current or prior handlers of PCBs. No prior investigations for PCB soil contamination were noted as a result of this investigation. However, files provided by the Hayward Fire Department include a letter from Salem Communications (KFAX radio) to the Hayward Fire Department dated December 2, 1988, indicating that one piece of PCB-containing equipment was found during an inspection of the KFAX radio equipment. The equipment was reported to be routinely checked with no observed leakage in the vicinity of the equipment.

6.0 REVIEW OF ENVIRONMENTAL DATABASES

BBL Environmental Information performed a search of regulatory databases to determine whether hazardous materials releases have occurred on properties within a given radius of the site. The search radii varied for each regulatory database, from a 0.125-mile radius to a 1-mile radius, as specified in the ASTM E1527-97 standard. A detailed description of the sites identified by BBL, a radius map, and a description of the databases are provided in Appendix B. A brief summary of the results of the database searches are provided below. Note that BBL searched all databases required by the ASTM standard, plus some additional databases not required by ASTM.

6.1 FEDERAL AGENCY SOURCES

USEPA, *National Priorities List (NPL), Final and Proposed Sites*

USEPA, *Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Sites Database, EPA Region IX (California).*

USEPA, *Emergency Response Notification Systems (ERNS).*

USEPA, *Resource and Conservation Recovery Information System (RCRIS) Region IX Database, RCRA Treatment Storage and Disposal Facilities (RCRA-TSD Facilities).*

USEPA, *RCRA Hazardous Waste Generator Listing (RCRA Generators)*

6.2 CALIFORNIA AND LOCAL REGULATORY AGENCY SOURCES

California EPA, *List of Active Annual Workplan Sites (AW Database),*

California EPA, *CALSITES Database*

California Office of Planning and Research, *State of California Hazardous Waste and Substances Sites List (CORTESE List)*

State Water Resources Control Board (SWRCB), *Leaking Underground Storage Tanks Information System (LUSTIS)*

California EPA, *Hazardous Waste Information System (HWIS)*

6.3 LANDFILLS AND OPEN DUMPS

California Integrated Waste Management Board, *Solid Waste Information System (SWIS), Active, Inactive, and Closed Landfill Sites*

6.4 COMPILATION OF LISTED PROPERTIES

A total of 182 listed sites were identified as a result of the BBL environmental database records search. No sites within a 1-mile radius of the project site were listed in the USEPA's NPL or CERCLIS databases, or in RCRIS databases for hazardous waste treatment, storage and disposal (TSD) facilities. USEPA maintains the NPL to prioritize CERCLA sites with a significant risk to human health and the environment. USEPA maintains the CERCLIS database to track activities

under CERCLA and to identify parties that are financially responsible for cleanup activities. USEPA tracks hazardous waste TSD facilities through the RCRIS and the submittal of notifications and permit applications. In addition, no sites are listed within a 1-mile radius of the project site under the State Annual Work Plan (AW) database, or under the State of California Hazardous Waste and Substances Sites List (Cortese List). The AW database is maintained by the California EPA and identifies California hazardous waste sites targeted for cleanup by responsible parties, the California EPA, and the USEPA over the next five years. The Cortese database is maintained by the California Office of Planning and Research and lists potential and confirmed hazardous waste sites throughout California. Facilities that have been included under other databases are not included under the Cortese listing on the BBL Environmental Record Search.

Based on the review of the sites discussed below, including the relative location and description of the sites and the reported environmental concerns, there may be a potential for the listed sites to cause or contribute to soil and/or groundwater contamination at the project site

6.4.1 CALSITES Database

Nine sites are listed within a 1-mile radius of the project site under the Historical Abandoned Site Survey Program (also known as the CALSITES database) from information compiled by the DTSC. These sites are described as follows:

- **Natural Protein Products (2034 American Avenue)** is located approximately 1 mile northeast of the project site, and is identified as a manufacturer of food and kindred products. An underground gasoline tank was removed from the property in February of 1991 under the supervision of the Hayward Fire Department. DTSC performed a file review of the site after a citizen complaint in July of 1993 and detected levels of soil contamination with the following concentrations: total petroleum hydrocarbons 1,100 parts per million (ppm), benzene 41 parts per billion (ppb), toluene 1,500 ppb, ethyl benzene 3,200 ppb, and xylene 50,000 ppb. Corresponding levels of contaminants in groundwater were also listed as follows: benzene 120 ppb, toluene 790 ppb, ethyl-benzene 460 ppb.

- **Big Al's Waste Hauling (4125 Breakwater Avenue)** is located approximately 0.50 mile south of the project site, and is identified as a trucking/warehouse operation. According to the BBL report, this site conducted illegal storage and disposal of hazardous wastes on the site, was cited for chemical releases, and issued a cleanup order by the San Francisco RWQCB in January 1981. The site was subsequently remediated by DTSC and was rendered suitable for zoned industrial usage as of February 1994.

- **Continental White Cap, Inc. (24493 Clawiter Road)** is located between 0.75 mile and 1 mile east of the project site, and is identified as a manufacturer of chemicals and allied products. A preliminary assessment based on well contaminants located near underground solvent tanks was forwarded to the USEPA for prioritization under the CERCLA program. USEPA recommended no further action due to the lack of air or surface water contamination.

- **26569-75 Corporate Avenue Site (26569 Corporate Avenue)** is located between 0.5 and 0.75 mile northeast of the project site, and is identified as a wholesaler of durable goods. A site screening investigation conducted in October 1987 detected TCE concentrations in groundwater at 140 ppb with lesser concentrations in soil. The contaminant source was unknown, and was potentially off-site. The site screening investigation results were evaluated by the EPA and it was determined that the site was not a candidate for the NPL.

- **Samuel Cabot Inc. (23284 Eichler Street)** is located between .50 to .75 mile north of the project site, and is identified as a manufacturer of chemicals and allied products. Remedial action at the site consisted of the removal of 323 cubic yards of contaminated soil and 300 gallons of liquids. DTSC provided a certification date for the completed cleanup action as January 1, 1985.

- **Les McDonald Construction Company (3500 Enterprise Avenue)** is located within .25 mile south of the project site, and is identified as a general building contractor. DTSC site screening indicated diesel contamination may have occurred from a broken hose while operating heavy equipment. Soil analysis indicated contaminant concentrations between 1,500 ppm and 540 ppm for TPH as diesel (TPHd). DTSC also sampled for DDT, DDE and DDD with analytical results falling below "threshold" levels. BBL last reviewed this case file on March 17, 1988.

- **Xerox–Hayward (24500 Industrial Boulevard)** is located between 0.75 and 1 mile northeast of the project site, and is identified as a manufacturer of printing and publishing products. DTSC site screening documented reports of soil contamination with toluene, tetrachloroethane (PCE), trichloroethane (TCA), and dichloroethene (DCE). Groundwater was reported to be contaminated with DCE, TCA, dichloroethane (DCA), chloroform, and Freon-113. DTSC submitted a voluntary cleanup invitation letter to Xerox, but received no response. As of January 25, 1996, the RWQCB was reportedly actively working on the site.

- **Food Development Corporation (3563 Investment Boulevard, Suite 6)** is located between .5 and .75 mile southeast of the project site. Site investigations prior to the sale of the property in March 1984 identified soil and groundwater contamination. Groundwater analysis detected concentrations of TCE at 4.9 ppb, Freon 113 at 50 ppb, and trichloroluoroethylene at 100 ppb. TCE was also detected in the soil at 220 ppb. The contaminant source was not identified;

however, adjacent sites have shown groundwater contamination with halogenated volatile organic compounds up to 140,000 ppb. Site screening and preliminary assessment were conducted by the EPA in 1989. EPA recommended no further action on March 17, 1989.

- **Trident Truck Line (23724 Saklan Road)** is located between 0.75 and 1 mile northeast of the project site and is identified as providing transportation services. According to DTSC, the facility was proposing to close three underground storage tanks. The site was referred to Alameda County to determine the presence of soil or groundwater contamination. Alameda County was specified by DTSC as the future lead agency and the property was designated as a county health site as of June 10, 1991.

6.4.2 SWIS Database

Two sites are listed within a 1-mile radius of the project site under the Solid Waste Information System (SWIS), which is maintained by the California Integrated Waste Management Board. This database lists active solid waste disposal sites, inactive or closed solid waste disposal sites, and transfer stations. These sites are detailed as follows:

- **Old West Winton Landfill (West Winton Road, south side of West End)** is located approximately 1 mile northwest of the project site. According to documents provided by the Alameda County Office of Solid and Medical Waste Management, the West Winton Landfill (WWLF) is an approximately 60 acre closed municipal waste landfill facility. Landfilling operations at the WWLF began in approximately 1938 and continued until 1974. The landfill was owned and operated by Oakland Scavenger Company. Oakland Scavenger Company was later acquired by Waste Management of Alameda County. The landfill is currently owned by the City of Hayward. On April 19, 1995, the RWQCB issued the current Waste Discharge Requirements (Order No. 95-088) specifying provisions to update the landfill's groundwater, surface water, and leachate monitoring program, and to insure compliance with current regulations. Order No. 95-088 was issued jointly to the City of Hayward and Waste Management of Alameda County. As a result, both parties have been active in the post-closure maintenance and monitoring of the landfill, including the installation and monitoring of numerous groundwater and leachate wells, a leachate extraction system, and a vegetative cover over the original cap.

- **Lakin Tire West, Inc. (3453 Enterprise Avenue)** is located within .25 mile east of the project site. According to files provided by the California Integrated Waste Management Board, Lakin Tire West, Inc. sorts and temporarily stores used tires in fully enclosed movable containers. The facility was given an exemption from permit requirements based its use of fully enclosed movable containers. The California Integrated Waste Management

Board determined that there will be no potential environmental impact associated with the ongoing business.

6.4.3 LUSTIS Database

Twenty-six sites are listed within a 0.5-mile radius of the project site under the Leaking Underground Storage Tank Information System (LUSTIS) database, which is maintained by the State Water Resources Control Board (SWRCB). They are as follows:

- **Unocal (3500 Breakwater Avenue)** is located between.25 and.50 mile southeast of the project site. During tank closure, a release from a gasoline UST was reported in April 1988. No remedial action has yet been taken at the site. The case, #01-1591, is managed by a local agency. Hayward Fire Department files indicate that the site is under a groundwater monitoring program. An annual groundwater monitoring report from March 1999 indicates that groundwater flow direction is toward the west at this site. Three on-site wells were sampled and analyzed. Analysis indicates less than detectable concentrations of BTEX and total petroleum hydrocarbons as gasoline (TPHg). Methyl t-butyl ether (MTBE) was detected at concentrations of 1,200 ppb, 110ppb and non-detect (ND) in three on-site wells.

- **Weyerhauser Company (3495 Breakwater Court)** is located between. .25 and .50 mile southeast of the project site. During tank closure, a release from a gasoline UST was reported in December 1985. The case, #01-1671, is managed by a local agency. The case was reported closed on September 15, 1994.

- **Excel Movers (3505 Breakwater Court)** is located between .25 and .50 mile southeast of the project site. During tank closure, a release from a gasoline UST was reported in June 1997. The case, #01-2234, is managed by a local agency, and was last reviewed on September 10, 1999. A Phase 2 Investigation was reportedly received by the local agency with an addendum on September 2, 1999. Hayward Fire Department files indicate that the former site occupant, SMA Equipment, a heavy equipment sales and service company, occupied the site prior to 1996. Potential contamination sources were two acid dip tanks and one truck wash area. No sampling or characterization data was on file.

- **Herrick Corporation (25450 Clawiter Road)** is located between.25 and.50 mile east of the project site. During tank closure, a release from a gasoline UST was reported in May 1986. Preliminary Site Assessment was started in June 1986. The contaminated soil has been excavated and disposed of at an approved site. The case, #01-0756, is managed by a Local agency, and was reported closed as of December 30, 1993.

- **Yellow Freight Systems, Inc. (25555 Clawiter Road)** is located between.25 and.50 mile east of the project site. During tank closure, a release from a waste oil UST was reported in November 1987. The contaminated soil has been excavated and disposed at an approved site. A Preliminary Site Assessment work plan was submitted on October 16, 1987, and started on October 20, 1987. The case, #01-1688, is managed by the Regional Water Quality Board, and was last reviewed in April 1997. Hayward Fire Department files indicate that three USTs were also removed in March 1999. Three on-site monitoring wells are under a monitoring program. Low levels, near the method detection limit, for TPHd and benzene, toluene, ethylbenze and xylene compounds (BTEX) were periodically found during monitoring. The most recent groundwater monitoring report shows less than detectable concentrations in all three on-site wells.

- **Gillig Facility (25800 Clawiter Road)** is located between .25 and.50 mile east of the project site. During tank closure, a release from a diesel UST was reported in March 1992. The leak was confirmed in August 1992. Only the soil is reported to be impacted. No remedial action has yet been taken at the site. The case, #01-0701, is managed by a Local agency, and was last reviewed in August 1992.

- **East Bay Oil Company (3111 Depot Road)** is located between.25 and.50 mile northeast of the project site. During tank closure, a release from a gasoline UST was reported in April 1990. Preliminary Site Assessment was started on June 17, 1991. No remedial action has yet been taken at the site. The case, #01-0532, is managed by the (insert name of the region please) Regional Water Quality Board. A letter from the RWQCB dated May 26, 2000 provided by the Hayward Fire Department indicates that the adjacent properties, Thermoplastics Metal Processing, Inc. (3118 Depot Road), the Diablo Industrial Park, and the East Bay Oil Company site may all have co-mingling contaminant plumes in shallow groundwater. The RWQCB is requesting additional site characterizations.

- **Westland Metal, Inc. (3149 Depot Road)** is located between .25 and .50 mile northeast of the project site. During tank closure, a release from a gasoline UST was reported in June 1992. The leak was confirmed on August 1996. The contaminated soil has been excavated and treated by landfarming. The case, #01-1958, is managed by a Local agency (name of local agency), and was last reviewed on August 30, 1996.

- **Concise Casting Corporation (3197 Depot Road)** is located between .25 and .50 mile northeast of the project site. The BBL Environmental Record Search report indicates that this site is a closed leaking underground storage tank site. However, no additional details are provided.

- **Sierra Pacific Steel (3200 Depot Road)** is located between 0.25 and 0.50 mile northeast of the project site. During tank closure, a release from a gasoline UST was reported in December 1990. The leak was confirmed in July 1991. A Preliminary Site Assessment work plan was submitted in June 1991. Only the soil is reported to be impacted. The contaminated soil has been excavated and disposed. . The case, #01-1389, is managed by a (Name please), and was last reviewed on February 6, 1998. Hayward Fire Department files indicate that groundwater contaminated with chlorinated solvents was detected at the site. The source was not identified; however, an off-site source, East Bay Oil Co., was identified as a potentially responsible party.

- **Forni Corporation (3600 Depot Road)** is located between 0.25 and 0.50 mile north of the project site. During tank closure, a release from a gasoline UST was reported in April 1992. The leak was confirmed in September 1994. Only the soil is reported to be impacted. The contaminated soil has been excavated and treated through landfarming. The case, #01-0655, is managed by the Regional Water Quality Board. The last status update recorded that a Preliminary Site Assessment was being performed. Site vicinity observations confirm that this operation is no longer located at the above address and that an XTRA leasing operation for semi-trailers now occupies the site.

- **American Auto Wreckers (3744 Depot Road)** is located between 0.25 and 0.50 mile northwest of the project site. During tank closure, a release from a gasoline UST was reported in January 1995. The leak was confirmed in July 1995. The case, #01-2091, is managed by a Local agency name please. A Preliminary Site Assessment was performed.

- **J & M, Inc. (3826 Depot Road)** is located between 0.50 and 0.75 mile northwest of the project site. During tank closure, a release from a diesel UST was reported in August 1990. The case, #01-0805, is managed by a Local agency. A preliminary Site Assessment work plan was submitted April 1991. The site was reported closed in December 1995.

- **Herning Underground Supply (3135 Diablo Avenue)** is located between 0.25 and 0.50 mile east of the project site. During tank closure, a release from a gasoline UST was reported in March 1990. The leak was confirmed in July 1993. The contaminated soil has been excavated and disposed of at an approved site. The case, #01-1957, is managed by a Local agency, and was last reviewed on August 31, 1994. Hayward Fire Department files indicate that subsequent investigations detected the following maximum groundwater contaminant concentrations: 120 ppb Benzene, 21 ppb Toluene, 24 ppb Ethylbenzene, 28 ppb Xylene, 150 ppb TPHg, 72 ppb 1,1-DCE, 6 ppb 1,1-DCA, 42 ppb TCA, and 590 ppb TCE. Some history of light solvent usage was recorded at the site, but maximum contaminant

concentrations were detected in up-gradient wells. Sonoco Products Co. (25101 Clawiter Road) is the suspected off-site source.

- **Hayward Sign Factory (3210 Diablo Avenue)** is located between 0.25 and 0.50 mile northeast of the project site. During tank closure, a release from a gasoline UST was reported in July 1995. The case, #01-2089, is managed by a Local agency. The case was reported closed on July 11, 1995.

- **Panther Lines (23475 Eichler Street)** is located between 0.25 and 0.50 mile north of the project site. During tank closure, a release from a diesel UST was reported in June 1992. The case, #01-1134, is managed by a Local agency. Hayward Fire Department files indicate that one 12,000 gallon diesel UST was removed from the site. Contamination was detected in soil and UST pit waters. Maximum concentrations detected ranged from 1800 ppb TPHd in soil to 51000 TPHd ppb in pit water. One groundwater monitoring well was installed, and groundwater contamination was reported to be limited to the UST area. Case closure was requested in February 1994.

- **Precision Metals (3390 Enterprise Avenue & 3402 Enterprise Avenue)** is located between 0.25 and 0.50 mile east of the project site. During tank closure, a release from a gasoline UST was reported in January 1995. Only the soil is reportedly impacted. The case, #01-2090, is managed by a Local agency. Post remedial action monitoring was started in July 1995. The case was reported closed in September 1995.

- **Stiles Paint (3428 Enterprise Avenue)** is located within 0.25 mile east of the project site. During tank closure, a release from a solvent UST was reported in January 1989. The leak was confirmed in March 1995. The case, #01-2036, is managed by a Local agency (name). The Preliminary Site Assessment work plan was submitted in April 1995, and the case was reported closed in August 1995.

- **Layfayette Manufacturing (3440 Enterprise Avenue)** is located within 0.25 mile east of the project site. During tank closure, a release from a diesel UST was reported in May 1991. The case, #01-0873, is managed by a Local agency name. Pollution characterization was started in June 1991, and the case was reported closed in July 1997.

- **Vanier Trucking (3453 Enterprise Avenue)** is located within 0.25 mile east of the project site. During tank closure, a release from a diesel UST was reported in April 1997. The case, #01-2222, is managed by a Local agency. The case was reported closed in May 1997.

- **Allgood Industries (3466 Enterprise Avenue)** is located within 0.25 mile east of the project site. During tank closure, a release from a diesel UST was reported in August 1985. The case, #01-0062, is managed by a Local agency. The Preliminary Site Assessment work plan was submitted in August 1985. The case was reported closed in October 1997.

- **Mag Trucking (3500 Enterprise Avenue)** is located within 0.25 mile east of the project site. During tank closure, a release from a UST containing miscellaneous motor vehicle fuel was reported in April 1988. The case, #01-0952, is managed by a Local agency. The Preliminary Site Assessment work plan was submitted in November 1997. The case is reported closed, however no date is provided.

- **City of Hayward Water Pollution Control Facility (3700 Enterprise Avenue)** is located north and adjacent to the project site. During tank closure, a release from a gasoline UST was reported in March 1990. The case, #01-1650, is managed by a Local agency. Hayward Fire Department files indicate that one 550-gallon diesel UST was removed from the site in March 1999. Elevated concentrations of TPHd were detected in the soil and water samples collected from the 550-gallon UST excavation, ranging from 92,000 ppb in water to 230 ppb in soil. One 2,000-gallon diesel UST was abandoned in place. Soil samples collected from one bore hole indicated maximum concentrations of TPHd at 23 ppb. Site closure was requested with the analytical results. No response from the RWQCB or the Hayward Fire Department was on file.

- **Point Eden Business Park (3920 Point Eden Way)** is located between 0.25 and 0.50 mile south of the project site. During tank closure, a release from an unleaded gasoline UST was reported in July 1990. Only the soil is reportedly impacted. No remedial action has been taken at the site. The case, #01-1209, is managed by a Local agency, and was last reviewed on October 18, 1990.

- **Old Oliver Salt Plant (4150 Point Eden Way)** is located between 0.25 and 0.50 mile south of the project site. A release from a gasoline UST was reported during tank closure. The case, #01-2465, is currently managed by the local agency. Hayward Fire Department files indicate that two gasoline USTs were removed in April 1998. Soil and potential groundwater contamination were detected during tank removal. Maximum contaminant concentrations in soil detected during a September 2000 site investigation were as follows: 120 ppb TPHd, 1700 ppb TPHg, 1200 ppb Benzene, 550 ppb Toluene, 26 ppb Ethylbenzene, 230 ppb total xylenes. Hayward Fire Department requested additional investigation of soil and groundwater.

- **Rohm and Haas California, Inc. (25500 Whitesell Drive)** is located southeast and adjacent to the project site. During tank closure, a release from a waste oil UST was reported in March 1985. Only the soil is reportedly impacted. No remedial action has yet been taken at the site. The case, #01-1257, is managed by a Local agency, and was last reviewed on June 12, 1990.

6.4.4 RCRIS/HWIS Databases-Generators of Hazardous Waste

According to the USEPA Resource Conservation and Recovery Information System (RCRIS) and the California DTSC Hazardous Waste Information System (HWIS) databases, the project site plus three additional adjacent facilities are identified as small quantity generators of hazardous waste. The RCRIS database is maintained by USEPA and tracks generators through the submittal of activity notifications. The HWIS database is maintained by the DTSC to track the movement and disposal of hazardous waste. These sites are described as follows:

- **Runnels Industries (3590 Enterprise Avenue)** is the eastern parcel of the subject site. Runnels Industries is listed with EPA ID #CAC000790824.

- **City of Hayward Water Pollution Control Facility (3700 Enterprise Avenue)** is located adjacent and to the north of the project site. The City of Hayward WPCF is listed with EPA ID #CAD981667868. In 1991 this facility reported generating the following wastes: 1.87 tons of waste oil and 0.45 tons of liquids with halogenated organic concentrations greater than 1000 ppm (a California Restricted Waste).

- **Nellcor, Inc. (25496 Whitesell Drive)** is located adjacent and to the east of the project site. Nellcor, Inc. is listed with EPA ID #CAD982336166. In 1991 this facility reported generating the following wastes: 0.08 tons of waste oil and 2.16 tons of laboratory waste chemicals.

- **Rohm and Haas California, Inc. (25500 Whitesell Drive)** is located southeast and adjacent to the project site. Rohm and Haas is listed with EPA ID #CAD020028072. In 1989 this facility reported generating the following wastes: 6.71 tons of unspecified organic mixed liquids and 4.95 tons of liquids with PCB concentrations greater than 50 ppm (a California Restricted Waste). Table 3 lists the hazardous wastes generated at this facility during an unspecified reporting period.

Table 3. Generated hazardous waste (Rohm and Haas).

Description	Quantity (pounds)
Discarded laboratory wastes and supplies	532
Absorbent and debris contaminated with ignitable or corrosive liquid from cleanup and repackaging of accidental spills	1,719
Combustible liquid (petroleum naptha) used in degreasing operations	651
Combustible liquid (petroleum oil) used in crankcase lubrication	6,682
Reactive organic liquid from storage tank cleanout	110
Reactive organic sludge from storage tank cleanout	4,140
Spent instrument mercury	50

6.4.5 Permitted UST Database

According to the Permitted Underground Storage Tanks (UST) database, which was maintained by the SWRCB from July 1984 to 1987, the project site plus two additional adjacent facilities are identified as permitted UST sites. The database reflects information that includes permitted tanks and surface impoundments in use or closed after 1974. These sites are as follows:

- **Runnels Industries (3590 Enterprise Avenue)** is the eastern parcel of the subject site. Table 4 lists the permitted USTs reported at Runnels Industries.

Table 4. Permitted USTs (Runnels Industries)

Size (gallons)	Contents	Type	Date of Installation
1,000	Unleaded gasoline	Single-walled, unlined carbon steel	1979
500	Regular gasoline	Single-walled, unlined carbon steel	1979
1,000	Unspecified	Unlined carbon steel	1981

- **City of Hayward Water Pollution Control Facility (3700 Enterprise Avenue)** is located adjacent and to the north of the project site. Table 5 lists the permitted USTs reported at the City of Hayward WPCF.

Table 5. Permitted USTs (City of Hayward WPCF).

Size (gallons)	Contents	Type	Date of Installation
1,000	Unleaded gasoline	Single-walled, unlined carbon steel	1971
2,000	Waste oil	Single-walled, unlined fiberglass	1977
550	Waste oil	Single-walled, unlined fiberglass	1977
550	Waste oil	Single-walled, unlined fiberglass	1977

- **Rohm and Haas California, Inc. (25500 Whitesell Drive)** is located southeast and adjacent to the project site. Table 6 lists the permitted USTs reported at the Rohm and Haas facility.

Table 6. Permitted USTs (Rohm and Haas).

Size (gallons)	Contents	Type	Date of Installation
7,150	Unspecified	Single-walled, unlined carbon steel	1977
9,800	Unspecified	Single-walled, unlined concrete	1971
7,150	Unspecified	Single-walled, unlined carbon steel	1977
20,000	Waste oil	Single-walled, unlined carbon steel	1977

6.4.6 ERNS Database

Seven unauthorized releases adjacent to the subject site are listed under the Federal Emergency Response Notification System (ERNS). This system tracks information on unauthorized releases of oil and hazardous substances and is a compilation of USEPA and other agency records. These releases are detailed as follows:

- **City of Hayward Water Pollution Control Facility (3700 Enterprise Avenue)** is located adjacent and to the north of the project site. The release of 10,000 gallons of primarily treated wastewater was reported to have occurred at the WPCF, although no date is specified. According to the report, a mechanical valve failure caused approximately 600 gallons of wastewater to enter the storm drain, while the remaining approximately 9,400 gallons of wastewater were contained on-site. Cleanup was accomplished by City crews.

- **Rohm and Haas California, Inc. (25500 Whitesell Drive)** is located southeast and adjacent to the project site. Table 7 lists the reported releases at the Rohm and Haas facility.

Table 7. Reported releases (Rohm and Haas)

Date	Description
July 10, 1989	Unknown odor causing irritation and light headedness. No reported action.
Unspecified	5,000 gallons of methyl methacrylate spilled while filling aboveground storage tank. Vacuum truck used to remove the spilled material.
Unspecified	Up to 22,500 pounds of acrylamide spilled while filling an aboveground storage tank. The release was controlled within a containment vessel.
February 13, 1989	2,000 gallons of styrene monomer spilled while filling aboveground storage tank. Vacuum truck used to remove the spilled material.
July 2, 1990	Up to 22,500 pounds of acrylamide spilled due to valve malfunction. The release was controlled within a containment vessel.
December 14, 1998	Unidentified material released while off-loading a railcar. Cleanup by reporting party.

7.0 ASBESTOS ASSESSMENT

Asbestos containing materials (ACMs) were utilized in building materials beginning in 1910. Due to increasing concerns over the health effects of asbestos, use of friable ACM was restricted beginning in 1972 and banned in 1978 by USEPA.

The BBL database report lists no operations or businesses located on the designated properties as current or prior generators of asbestos waste. However, asbestos may be present in building materials at the project site.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 CONCLUSIONS

Recognized environmental conditions, as defined by the ASTM Standard Practice E1527, exists at the Runnels and KFAX parcels due to the activities that occurred on and in the vicinity of these parcels. Soil and groundwater impacts have been documented by previous investigations of the Runnels parcel. In addition to the previous investigations, our observations, interviews and records review support the position that historical use of the property by a metal finishing company, the processes and USTs used in support of company operations contributed to the soil and groundwater contamination. Surface staining on the KFAX parcel, historically reported dumping from the Runnels parcel onto the KFAX parcel, waste water run-off from the Runnels parcel parcel, and proximity to the Runnels parcel indicate the potential for soil and groundwater contamination on the KFAX parcel. It would be prudent to assess the area of observed surface staining and the waste water runoff on the KFAX parcel; and the areas of reported TPH and VOC contamination, waste water runoff, selected outdoor operational areas based on observed surface staining, and the former UST area on the Runnels parcel.

In addition, according to the BBL Environmental Record Search report, addresses and facility names that identify the project site and several neighboring sites are listed on Federal and State environmental regulatory databases including USEPA's RCRIS and ERNS, California EPA's CALSITES, California DTSC's HWIS, SWRCB's LUSTIS and UST, and California Integrated Waste Management Board's SWIS.

8.2 RECOMMENDATIONS

In order for the Runnels and KFAX parcels to be used in the future for the intended purpose of industrial development, closure of Runnels parcel groundwater and potentially soil impact concerns with regulatory authorities is appropriate. The closure options potentially associated with the Runnels parcel may include: No Further Action, Risk Assessment, Site Investigation and Reporting; Site Investigation and Risk Assessment; Long Term Groundwater Monitoring, or Hydraulic Containment It is our recommendation that Calpine-Bechtel evaluate options for obtaining site closure to industrial land use standards, the potential time and costs associated with implementation of each option, and the potential agency and community acceptance of the each option. Based on this evaluation, the preferred closure option should be identified and then discussed with the regulatory agency(s) to obtain their agreement. Following acceptance of the preferred closure option for the Runnels parcel, work should commence to implement the option and the request for closure should be submitted following completion of the option implementation.

9.0 LIMITATIONS

This report is prepared for the sole use of the Calpine-Bechtel Joint Development, pursuant to our proposal, dated December 1999. The scope of work and the findings should not be considered suitable for other potential users and any use by other parties shall be at their sole risk.

This report is based on review of the limited data, as described therein, in accordance with generally accepted professional practices, applicable to work of similar nature and complexity at similar localities, at the time the services were performed. No warranty, express or implied, is made. The scope of this report is limited in nature and intended to provide a preliminary evaluation of the current conspicuous environmental conditions at the site at the time of the report and does not constitute definitive or in-depth review of all the potential environmental impairments and situations. Foster Wheeler Environmental assumes no responsibility for conditions of which it is unaware and/or as to which there was no opportunity or request for review.

It is important to recognize that even the most comprehensive scope of services may not detect all the environmental liabilities at a particular site. Therefore, nothing herein shall be construed as a representation or certification that the site is either fully characterized or is free of environmental impairments and/or contamination.

In order to conduct the investigation for this report, Foster Wheeler Environmental relied upon the readily available information, as discussed in the report and unless explicitly included in our scope there was no verification of the accuracy or completeness of documentation or data or evaluation of possible withholding of information by the interviewees, agencies, or other parties.

10.0 REFERENCES

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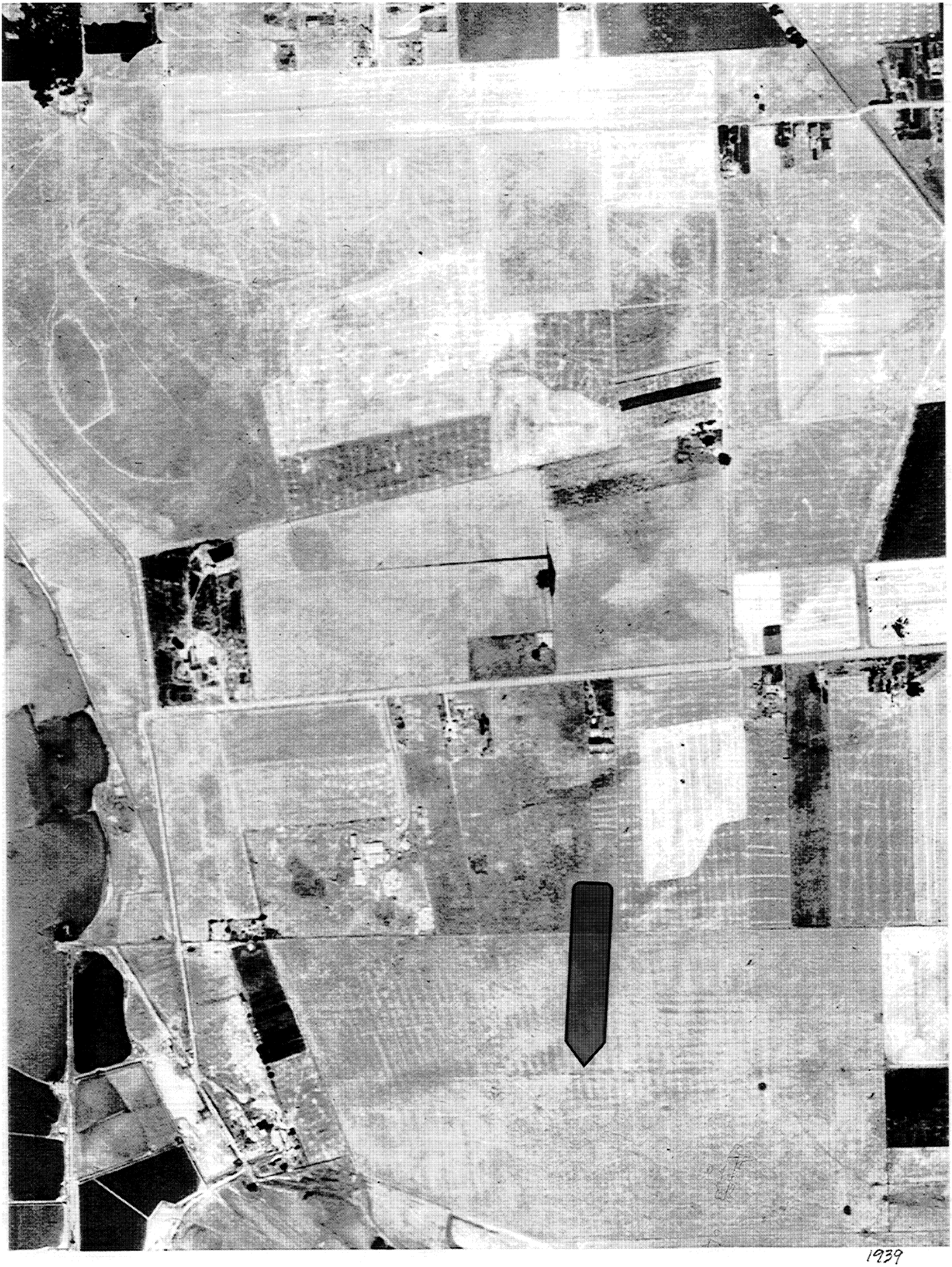
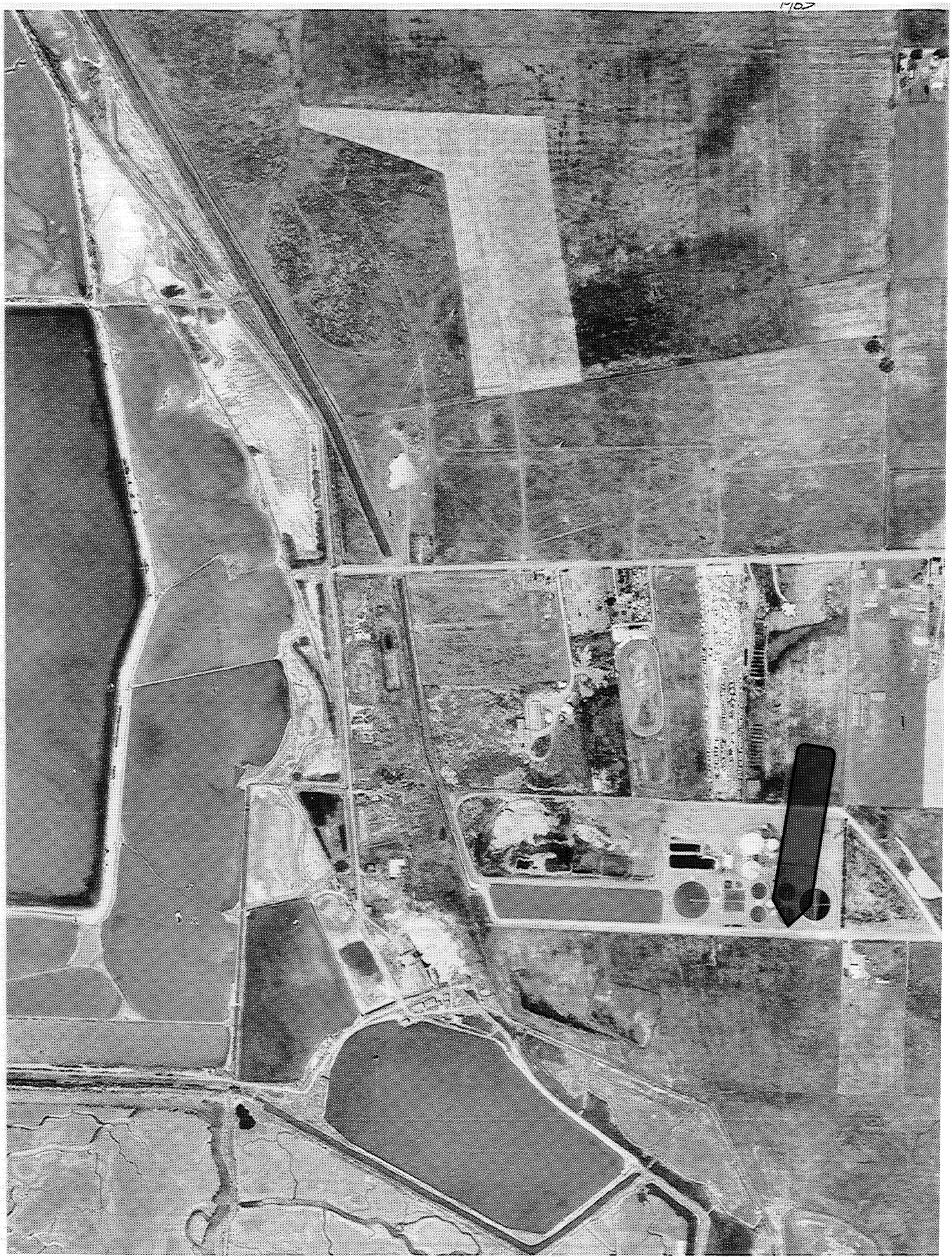
APPENDIX A

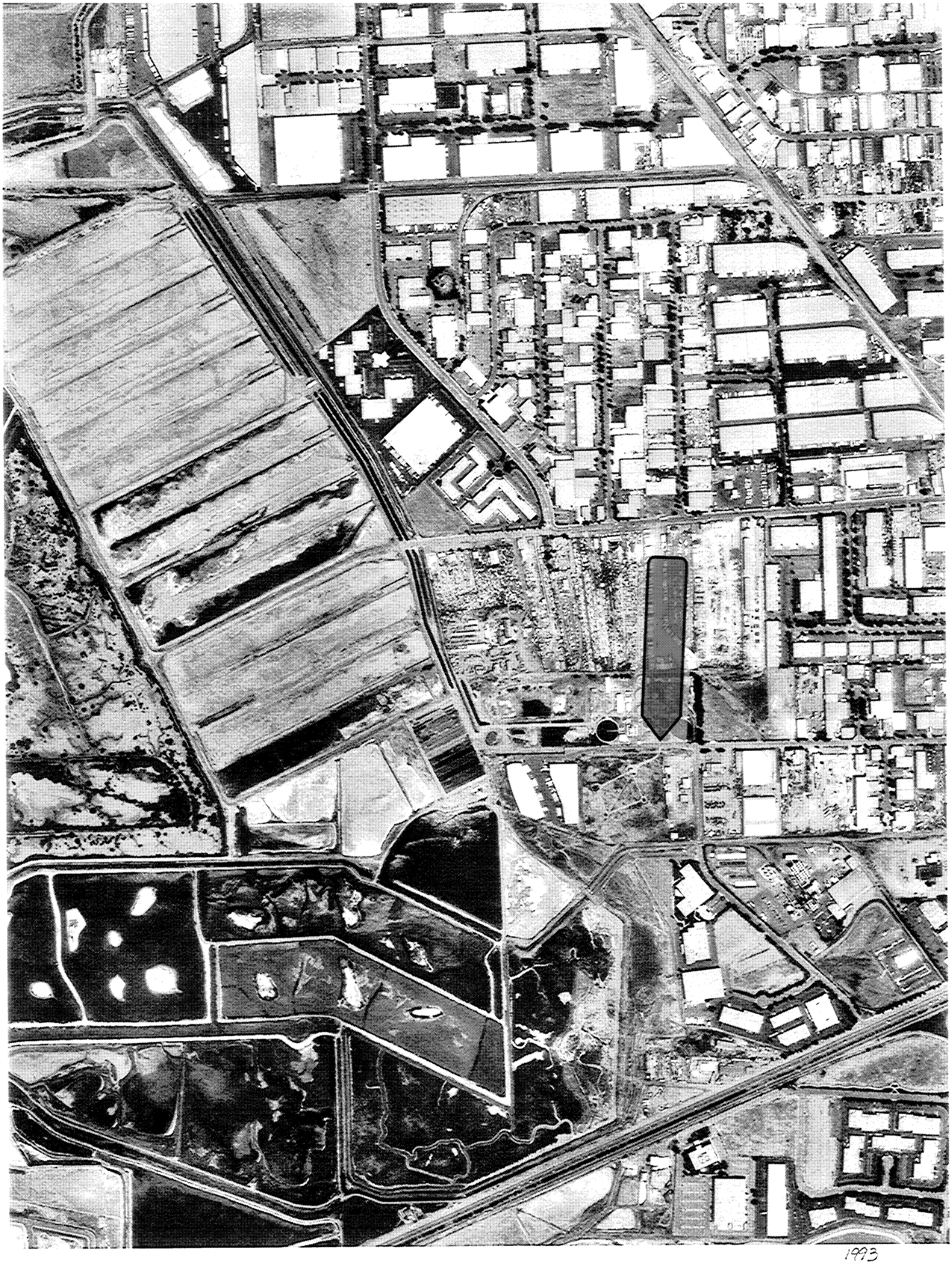
AERIAL PHOTOGRAPHS



1939

1958





1993

APPENDIX B

SITE PHOTOGRAPHS

Figure A1. The west portion of the KFAX radio property, facing northwest. The Enterprise Distribution Center is visible on the left half of the photograph.

Figure A2. The east potion of the KFAX radio property, facing northeast. Runnels Industries is visible along the right side of the photograph, and the Hayward Water Pollution Control Facility is visible beyond.

Figure A3. Southeast corner of the Runnels property, facing southeast. Scrap metal and wood debris visible on-site. Rohm and Haas chemical facility visible in the background.

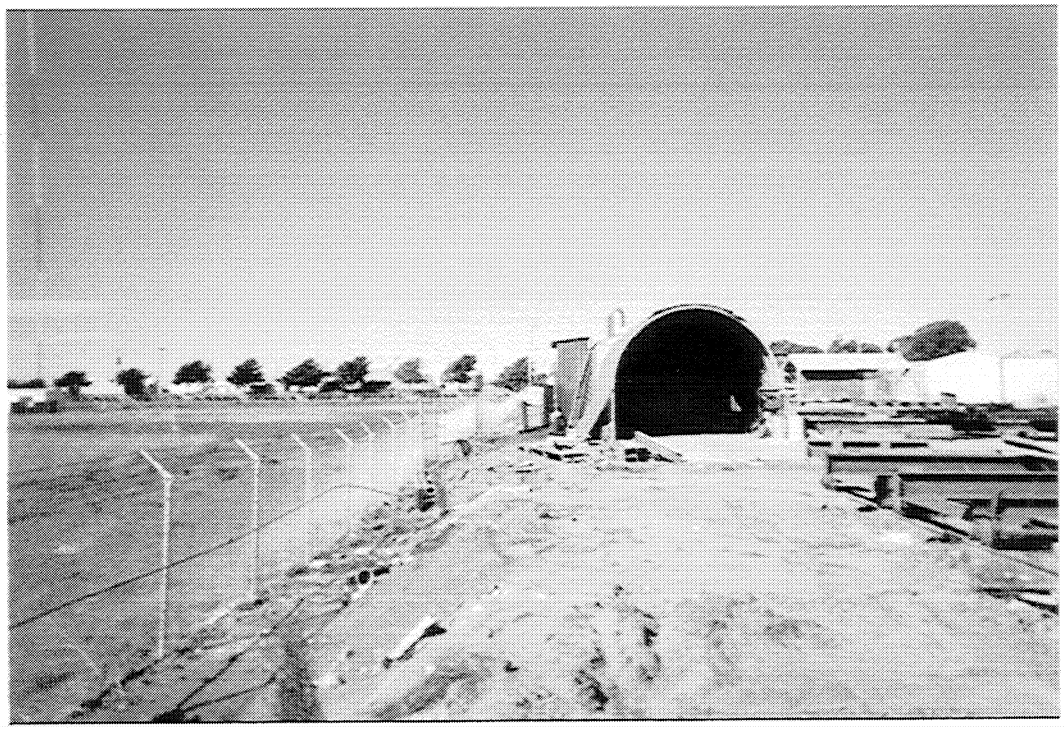


Figure A4. Interior sand blasting shed, located near the southwest Runnels property boundary and adjacent to the KFAX radio parcel. The view in this photograph is facing north. The Hayward Water Pollution Control Facility is visible in the distance.

Figure A5. Exterior spray application area located in the central portion of the Runnels property. Paint and solvent containers are visible in the foreground.

Figure A6. Interior spray application area located in the central portion of the Runnels property. Miscellaneous paint and chemical storage visible along the far wall of the building.

APPENDIX C

BBL RECORD SEARCH REPORT

ENVIRONMENTAL RECORD SEARCH

for the site

WEST ENTERPRISE AVE

3590 & 3636 ENTERPRISE AVE, HAYWARD

performed for

FOSTER WHEELER

01-09-2001

INTRODUCTION

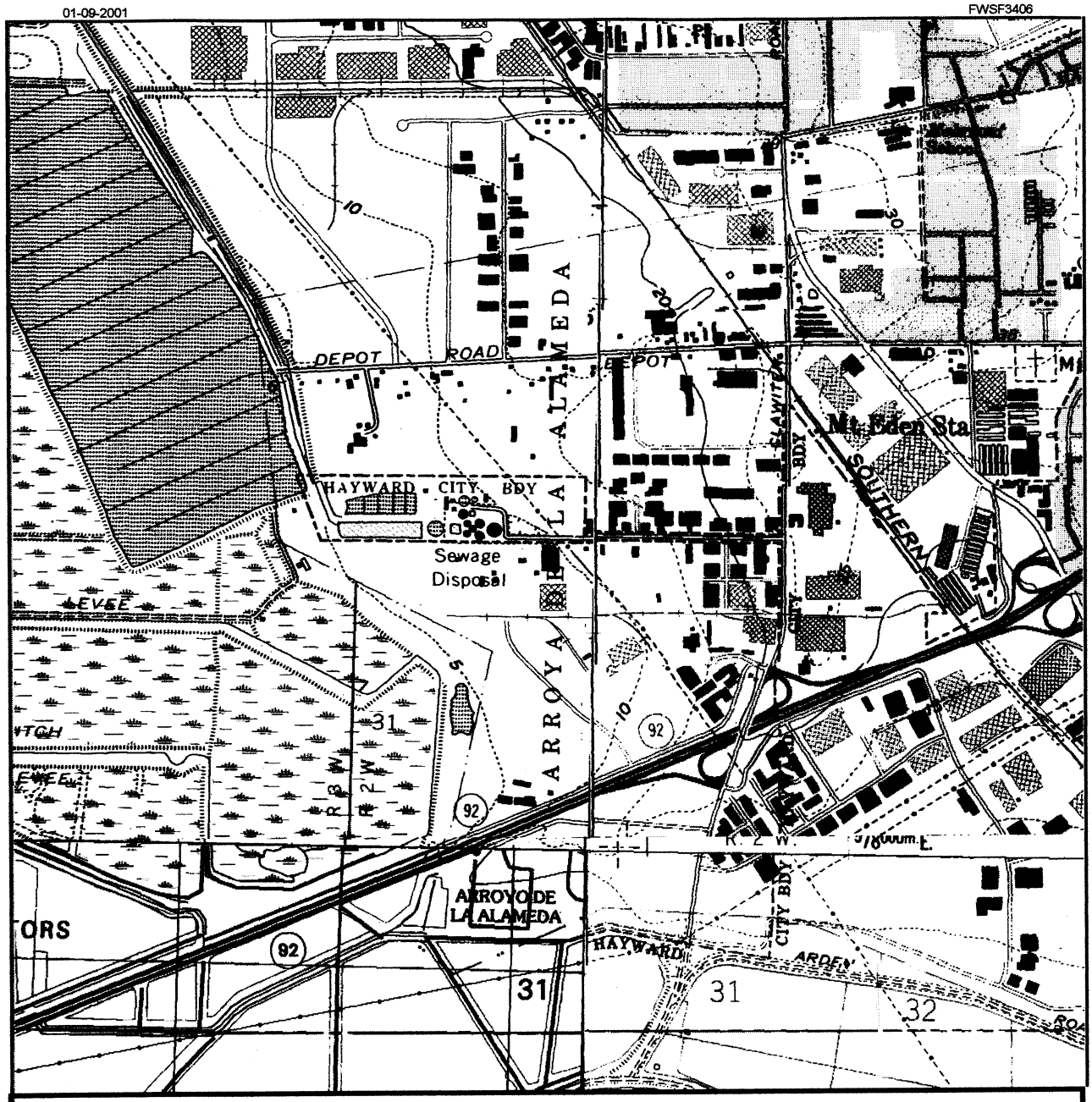
This document, prepared on the request of FOSTER WHEELER, reports the findings of BBL's investigation of environmental concerns in the vicinity of 3590 & 3636 Enterprise Ave, Hayward. It is divided in the following segments:

- **Map** - showing the location of the identified sites relative to the subject site. A total of 182 separate sites were identified.
- **Topo Graphic** Map - showing the surrounding area of the subject site.
- **Dept of Oil & Gas Field Map** - showing the surrounding area of the subject site.
- **Summary** - listing the identified sites by street names.
- **Final Report** - describing the sources investigated and the resulting findings:

Federal sources			
National Priority List	no sites	within 1 mile radius.	Page:1
CERCLIS	no sites	within 1 mile radius.	1
NFRAP	9 sites	within 1 mile radius.	1
Federal Facilities	no sites	within 1 mile radius.	3
Emergency Response Notification System	9 sites	within half of a mile.	3
Site Enforcement Tracking System	1 site	within 1 mile radius.	6
Enforcement Docket System (DOCKET/CDETS)	no sites	within half of a mile.	7
C-Docket	no sites	within half of a mile.	7
RCRA Violators List	3 sites	within 1 mile radius.	7
Federal Enforcement Dockets	no sites	within 1 mile radius.	8
California State sources			
Annual Work Plan	no sites	within 1 mile radius.	8
CALSITES	9 sites	within 1 mile radius.	8
CALSITES - No Further Action	21 sites	within half of a mile.	12
Cortese	no sites	within 1 mile radius.	15
Leaking Underground Storage Tanks	49 sites	within 1 mile radius.	15
Solid Waste Information System	2 sites	within 1 mile radius.	28
Well Investigation Program	no sites	within 1 mile radius.	28
Drinking Water Program	1 site	within 1 mile radius.	28
Regional sources			
Toxic Releases	33 sites	within 1 mile radius.	29
Toxic Pits	no sites	within 1 mile radius.	36
Solid Waste Assessment Test - Regional	no sites	within 1 mile radius.	36
Operating permits			
RCRA Generators	48 sites	within half of a mile.	37
RCRA - TSD Facilities	no sites	within 1 mile radius.	44
SARA Title III,section 313 (TRIS)	5 sites	within half of a mile.	45
Nuclear Regulatory Commission Licensees	no sites	within half of a mile.	46
PCB Waste Handlers Database	1 site	within half of a mile.	46
Permit Compliance System (PCS)	1 site	within half of a mile.	46
AIRS Facility System (AFS)	3 sites	within half of a mile.	47
Section Seven Tracking System	3 sites	within half of a mile.	47
FIFRA/TSCA tracking system	5 sites	within half of a mile.	48
Federal Facilities Information System (FFIS)	no sites	within half of a mile.	49
Chemicals in Commerce Information System	1 site	within half of a mile.	49
FINDS EPA Facility Index System	2 sites	within half of a mile.	49
Hazardous Waste Information System	104 sites	within half of a mile.	50
Underground Storage Tanks	32 sites	within half of a mile.	71

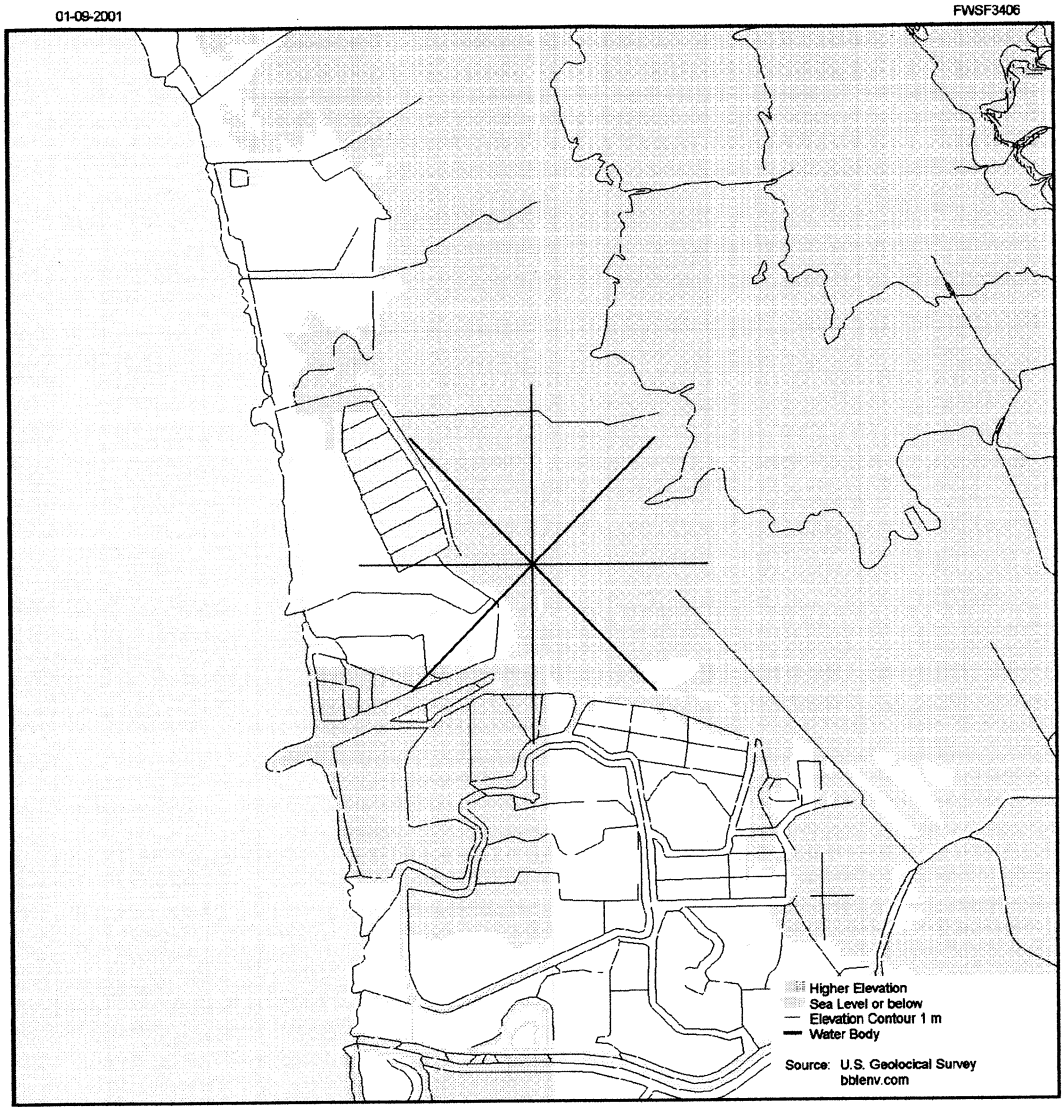
- **Fire Insurance Map** review - describing the area of the subject site.

01-09-2001 FWSF3406

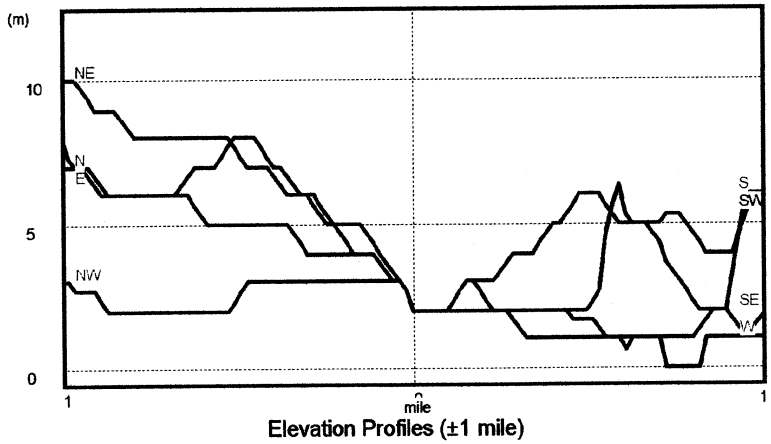


longitude:	-122 7' 35.1"	1.8 inches to 1/2 mile
latitude:	37 37' 58.4"	Universal Transverse Mercator North is straight up
utm easting:	577079 meters	
utm northing:	4165239 meters	
utm zone:	NAD 10	
county:	ALAMEDA	
AREA RADON ESTIMATES	SOURCE:	U.S. Dept of Interior, Geological Survey
ALAMEDA County (60 sites tested)		
<2 pCi/L	90.0%	SAN LEANDRO (1959 1980)
2-4 pCi/L	10.0 %	HAYWARD (1959 1980)
4-8 pCi/L	0.0 %	REDWOOD POINT (1993)
8-20 pCi/L	0.0 %	NEWARK (1959 1980)
20 > pCi/L	0.0%	

TOPOGRAPHIC MAP OF THE VICINITY OF THE SUBJECT SITE LOCATED AT
3590 & 3636 ENTERPRISE AVE, HAYWARD



Elevation Contour overview map (6*6 mile)



Elevation Profiles (±1 mile)

CONTOUR DATA IN THE VICINITY OF THE SUBJECT SITE LOCATED AT
3590 & 3636 ENTERPRISE AVE, HAYWARD

Scale: 1 inch to 400 feet

UTM North is straight up

Longitude: -122° 7' 35.1"
Latitude: 37° 37' 58.4"

UTM Easting: 577079 meters
UTM Northing: 4165239 meters
UTM Zone: NAD 10

County: ALAMEDA

Project: PAPP 1361 202
Quadrangle: SAN LEANDRO SE
Date: 1993 7 10 source imag
Film Type: "BLACK AND WHITE FILM"

Source: U.S. Dept of Interior, Geological Survey

AERIAL PHOTOGRAPH OF THE VICINITY OF THE SUBJECT SITE LOCATED AT
3590 & 3636 ENTERPRISE AVE, HAYWARD

1. RUNNELS INDUSTRIES
2. CLYDE ROBIN SEED CO
3. VS TIRE SALES
4. LES MC DONALD CONSTRUCTION CO
5. HAYWARD CITY OF TREATMENT PLNT
6. NELLCOR INC
7. MINTER & FAHY CONSTRUCTION
8. ALLGOOD INDUSTRIES
9. BARBOSA - REBAR
10. ROHM & HAAS CA INC
11. TRIMAC TRANSPORATATION
12. LAFAYETTE MANUFACTURING INC
13. ASPHALT CULTIVATORS
14. Q I P
15. ALLINGTON INDUSTRIES
16. STILES PAINT MANUFACTURING
17. WESTERN STATE DESIGN
18. QUALITY PRECISION FINISHING
19. PAK/CON CO
20. DIABLO INDUSTRIAL PARK
21. TRM COPY CENTERS CORPORATION
22. LAWSON DRAYAGE
23. 3BJ LEASING
24. ABB SERVICE COMPANY
25. KEM MIL CO
26. SIGNET TESTING LABORATORIES IN
27. METABOLEX INC
28. INDUSTRIAL TRUCK SERVICES INC
29. SOGETAL INC
30. CHEMICAL LEAMAN TANK LINES, IN
31. CLARENCE J. PERRY TRUCK YARD
32. FORNI CORP
33. GARLOCK WEST EQUIP
34. LINCOLN PROP CO/HAYWARD IND PK
35. KEEBLER COMPANY
36. MICROSIL CORP
37. MIRACLE TRUCK PAINTING
38. NORTH AMERICAN COMPLIANCE
39. NUBULK SERVICES INC
40. CHEMMARK OF SAN FRANCISCO
41. CONNECTICUT DEPOT PRINT CO
42. YUASA-EXIDE INC
43. BIG JOE CALIFORNIA INC
44. AMERICAN EXTERIOR COATING
45. UC PLASTIC
46. PERRY TOOL & RESEARCH COMPANY
47. CURRY GRAPHICS INC
48. ALL STAR BODY SHOP
49. LYNX THERAPEUTICS
50. ELECTROCHEM
51. HAYWARD SIGN FACTORY
52. ADVANCED LIGHTWEIGHT CONCRETE
53. BENNETT AUTO MANUFACTURING
54. PRECISION METALS
55. GENERAL MILL RIGHTS
56. I-CHEM RESEARCH
57. GORMAN, R. H. CO
58. AUTO AND TRUCK BUMPER RECYCLIN
59. HAYWARD ELECTRIC
60. EXCEL MOVERS
61. CALIFORNIA COURIERS
62. AIR & TOOL ENGINEERING
63. DIABLO MOVING SERVICE
64. A V D METAL FABRICATION
65. JML, INC.
66. GOLDEN BAY EQUIPMENT CO
67. SIERRA PACIFIC STEEL FACILITY
68. SCHMALZ & NELSON PIANO SERVICE
69. BIG AL'S WASTE HAULING
70. OLYMPIAN OIL COMPANY
71. CELEBRITY T'S
72. CONTINENTAL DELIGHT
73. DECON ENVIRONMENTAL SERVICES
74. WEYERHAUSER COMPANY
75. DORIS AUTO WRECKERS
76. PACKAGE DELIVERY EXPRESS
77. MLH, INC.
78. UNKNOWN
79. CONTRACTORS CHEMICAL INC
80. AMERICAN AUTO WRECKERS INC
81. AIR & TOOL ENGINEERING
82. THOMAS S B INC
83. CONCISE CASTING CORPORATION
84. ABBLEY TRANSP INC
85. HERNING UNDERGROUND SUPPLY
86. D & B MACHINE INC
87. BEDFORD PROPERTY INC.
88. TRIMAC TRANSPORTATION
89. QUANTEL
90. PANTHER LINES
91. COMPUGRAPHIC CORPORATION
92. PT EDEN BUSINESS PARK
93. GEOBIOTICS INC
94. UNOCAL SVC STA #6074
95. PERKIN ELMER ETEC
96. HWY 92 & CLAWITER
97. OLD OLIVER SALT PLANT
98. CAREMARK INC
99. RICHARDSON RESEARCHES
100. WESTLAND METAL INC
101. AJAX AUTO
102. THERMIOHIES METAL PROCESSING I
103. MINERLAB INC.
104. SHELL PIPELINE LEAK
105. PRUDENTIAL INSURANCE CO. OF AM
106. PRUDENTIAL PROPERTY CO
107. RELOCATABB CONFINEMENT FACILIT
108. JAY BEE TRUCKING INC
109. CALIFORNIA AERIAL EQUIP
110. NELLCOR INC.
111. CLEAN AIR VEHICLE TEST CENTER
112. EAST BAY OIL COMPANY
113. GOODYEAR TRUCK TIRE CENTER
114. GILLIG CORPORATION
115. BERKELY FARMS
116. HENKEL ADHESIVES CORP.
117. YELLOW FREIGHT LINES
118. FORENSIC ANALYTICAL SPECIALTIE
119. WESTERN PAPER BOX DIVISION
120. SAMUAL CABOT INC. (SCI)
121. HERRICK CORP THE
122. DON & TERRYS GM AUTO REPAIR
123. ARTEC ASSOCIATES INC
124. THERMIONICS METAL PROCESSING I
125. BAY AREA CONSTRUCTION FRAMERS
126. MDC VACUUM PRODUCTS CORP.
127. A-Y SUPPLY INC
128. Q C SERVICES INC
129. DECON ENVIRONMENTAL SERVICES
130. EDEN LANDING COMMERCE PARK
131. P S W ASSOCIATES
132. ST FRANCIS ELECTRIC
133. JACK TURRENTINE CORPORATION
134. FIRE FAB INC
135. J & M INC
136. FOOD DEVELOPMENT CORPORATION
137. EPSTEIN INVESTMENTS
138. EDEN PLAZA PROPS
139. CALIFORNIA COURIERS INC
140. FAIRBANKS SCALES
141. XEROX CORPORATION
142. ALAMEDA MOSQUITO ABATEMENT
143. CONTINENTAL WHITE CAP INC
144. WACHOVIA BANK
145. JARDINE PIPELINE
146. MUELLER PROPERTY
147. NATURE'S FARM
148. CONAGRA INC
149. PG & E HAYWARD SVCS CENTER
150. VINCENT ROOFING COMPANY
151. LOVE PROPERTY
152. WACHOVIA REAL ESTATE FUND
153. VENTURA PROPERTIES
154. ELDER & COMPANY
155. SUPER STRUCTURES INC
156. FOODMAKER INC
157. THERMO-FUSION INC
158. THERMOFUSION
159. OWEN PACIFIC ROOFING
160. PERKIN ELMER PROPERTY
161. TRIDENT TRUCK LINE
162. HUNTER PROPERTY
163. WACHOVIA BANK PROPERTY
164. CG CONTRACTORS INC
165. ALUMTREAT NORTH
166. UNION BANK
167. 26569-75 CORPORATE AVENUE SITE
168. LUSK METALS & PLASTICS
169. EDEN PLAZA & EDEN ROCK
170. FRANKLIN OPTICAL
171. MOHRLAND MUTUAL WATER SYSTEM/
172. OLD WEST WINTON LANDFILL

UNKNOWN LOCATIONS

ARDEN ROAD PROPERTY
CITY OF HAYWARD-MARATHON PUMP
UNK
HAMLIN PROPERTY
SOUTHERN PACIFIC R.R.
VOLVO GM HEAVY TRUCK
OLIVER DE SILVA INC.
LUCKY STORES INC
ST FRANCIS ELECTRIC
THE PRESLEY COS

INDEX OF SITES LISTED BY MAP NUMBERS

HISTORICAL TENANT REPORT

INTRODUCTION

The purpose of this Historical Tenant Report is to identify the tenants (be it the owner or lessee) of 3590 & 3636 ENTERPRISE AVE, HAYWARD over the last 75 years.

Sources for the research includes various city directories, street address directories and criss-cross directories published from 1920 forward. The actual site address as well as neighboring addresses on the same block are also investigated for informational purposes, and to cover a potential address change of the subject site.

BBL has used its best effort but makes no claims as to the completeness of the referenced sources or completeness of the search. For additional information call (858) 793-0641.

DIRECTORY INFORMATION

The three general types of directories researched for the Historical Tenant Report are the 1) city directory, 2) street address directory, and 3) criss-cross directory. All three either are devoted to or have sections that list the Tenant and telephone number of given street addresses by their street name and address. These telephone directories, not as readily available to the public as white pages or yellow pages, are excellent for uncovering names, business names and the nature of businesses as listed by street address.

In addition to the actual site address the following neighboring addresses have been researched as well:

3500 Enterprise Ave
3656 Enterprise Ave
3664 Enterprise Ave
3670 Enterprise Ave
3700 Enterprise Ave

The actual site address, as it is known presently, is marked by an asterisk in the findings of the searchas reported on the following pages.

1998

3500 Enterprise Ave	MAG Trucking
3590 Enterprise Ave *	Runnels Industries Inc
3670 Enterprise Ave	Robin Clyde Seed Co
Source:	DIGITAL DIRECTORY ASSISTANCE

1995

3500 Enterprise Ave	MAG Trucking
3590 Enterprise Ave *	Runnels Industries Inc
3656 Enterprise Ave	North American Transportation
3664 Enterprise Ave	Alumax Bath Enclosures
3670 Enterprise Ave	Clyde Robin Seed Co
Source:	DIGITAL DIRECTORY ASSISTANCE

1993

3500 Enterprise Ave	MAG Trucking McDonald Construction Co
3590 Enterprise Ave *	Runnels Industries Inc
3656 Enterprise Ave	North American Transportation
Source:	PACIFIC TELEPHONE & TELEGRAPH CO.'S DIRECTORY

1989

3500 Enterprise Ave	MAG Trucking McDonald Construction Co
3590 Enterprise Ave *	Runnels Industries Inc
3656 Enterprise Ave	no listing
3700 Enterprise Ave	Darling Compost
Source:	PACIFIC TELEPHONE & TELEGRAPH CO.'S DIRECTORY

1971

3500 Enterprise Ave	SOP Trucking
3590 Enterprise Ave *	Freeman CE Co
3656 Enterprise Ave	no listing
3700 Enterprise Ave	City Sewage Treatment Plant
Source:	R.L. POLK & CO'S CITY DIRECTORY

1967

3500 Enterprise Ave	Standard Testing Svc
3590 Enterprise Ave *	West Coast Painting
3656 Enterprise Ave	no listing
3700 Enterprise Ave	Mitoma Bro Mulch
Source:	R.L. POLK & CO'S CITY DIRECTORY

ENVIRONMENTAL RECORDS SEARCH

SUMMARY

ENVIRONMENTAL RECORDS SEARCH FOR
WEST ENTERPRISE AVE
3590 & 3636 ENTERPRISE AVE, HAYWARD

Page: 1
Date: 01-09-2001
Job: FWSF3406

;

ENVIRONMENTAL CONCERNS, WITHIN 1/4 MILE OF THE SUBJECT SITE

ADDRESS		CITY	LOCATION	SOURCE	MAP	PAGE	MAPDIR LOC	
3590	ENTERPRISE AVE	HAYWARD	RUNNELS INDUSTRIES	NT	I	33	**1**	
			C E FREEMAN	CS-nfa	NFA	14		
			RUNNELS INDUSTRIES, INC.	UST	8798A	76		
			RUNNELS IND	HWIS		67		
3500	ENTERPRISE AVE	HAYWARD	MAG TRUCKING	LUST	9	26	**4**	E
			LES MCDONALD CONSTRUCTION COMP	CalSite	REFOA	11		
			LES MC DONALD CONSTRUCTION CO	RCRA	S	43		
			LES MC DONALD CONSTRUCTION CO	HWIS		66		
			LES MCDONALD CONSTRUCTION CO.	UST	1995I	76		
			MCDONALD CONSTUCTION	HWIS		67		
			VANDERA, DENNIS	HWIS		67		
			MAG TRUCKING	HWIS		67		
			MAG TRUCKING	UST	87&99	76		
			MAG TRUCKING	HWIS		67		
3700	ENTERPRISE AVE	HAYWARD	WASTE WATER TREATMENT PLANT	LUST	1	26	**5**	W
			CITY OF HAYWARD PUBLIC WORKS	ERNS		4		
			HAYWARD CITY OF TREATMENT PLNT	PCS		46		
			HAYWARD CITY OF TREATMENT PLNT	RCRA	S	43		
			HAYWARD CITY OF TREATMENT PLNT	HWIS		67		
			WASTEWATER TREATMENT PLANT	UST	87&99	77		
25495	WHITESELL DR, & 25503	HAYWARD	25495 & 25503 WHITESELL ST	NT		36	**6**	SE
25495	WHITESELL DR	HAYWARD	NELLCOR INC	HWIS		71	**6**	SE
			NELLCOR INC	RCRA	S	44		
			CROW-SPEAKER-SINGLETON #87&115	HWIS		71		
3466	ENTERPRISE AVE	HAYWARD	ALLGOOD INDUSTRIES	LUST	9	25	**8**	E
			ALLGOOD INDUSTRIES	NT	9	33		
			ALLGOOD INDUSTRIES	UST	8798I	76		
			ALLGOOD INDUSTRIES	HWIS		66		
3458	ENTERPRISE AVE	HAYWARD	BARBOSA - REBAR	CS-nfa	RED	14	**9**	E
25500	WHITESELL DR	HAYWARD	ROHM AND HAAS	ERNS		6	**10**	SE
			ROHM AND HAAS	ERNS		6		
			ROHM AND HAAS	ERNS		6		
			ROHM & HAAS INC	NT	I	36		
			ROHM & HAAS	CS-nfa	NFA	15		
			ROHM AND HAAS	ERNS		6		
			ROHM & HAAS	ERNS		6		
			ROHM & HAAS CA INC	NFRAP	NFA	3		
			ROHM & HAAS	ERNS		6		
			ROHM HAAS CALIFORNIA INC	LUST	1	27		
			ROHM & HAAS CA INC	RV		8		
			ROHM & HAAS INC	NT		36		
			ROHM & HAAS CA INC	AFS		47		
			ROHM & HAAS CALIFORNIA INC.	SARA		46		
			ROHM AND HAAS CALIFORNIA INCOR	HWIS		71		
			ROHM & HAAS CA INC	PE		48		
			ROHM & HAAS CALIFORNIA INC.	UST	8798I	77		
			ROHM & HAAS CA INC	RCRA	S	44		
			ROHM & HAAS CA INC	CICIS		49		
3453	ENTERPRISE AVE	HAYWARD	VANIER TRUCKING	LUST	9	25	**11**	E
			Lakin Tire West, Inc.--Hayward	SWIS	ACTV	28		
			TRIMAC TRANSPORATATION	HWIS		65		
			ROBERT VANIER	HWIS		66		
			VANIER TRUCKING	HWIS		66		
			MAZLACK INC	HWIS		66		
3440	ENTERPRISE AVE	HAYWARD	LAFAYETTE MANUFACTURING	LUST	9	25	**12**	E
			LAFAYETTE MANUFACTURING INC	UST	8798I	76		
			LAFAYETTE MANUFACTURING INC	AFS		47		
			LAFAYETTE MANUFACTURING INC	RCRA	S	42		
			LAFAYETTE MFG. INC.	HWIS		65		
25545	SEABOARD LN	HAYWARD	ALLINGTON INDUSTRIES INC	CS-nfa	RED	15	**15**	NE
			ALLINGTON INDUSTRIES	HWIS		69		
			DETENTION DEVICE SYSTEMS	HWIS		69		
3428	ENTERPRISE AVE	HAYWARD	STILES PAINT	LUST	9	25	**16**	E
			STILES PAINT MANUFACTURING	AFS		47		
			RES ROOFING EQUP SUC	HWIS		64		
			GRAYOX CORP	PE		47		
			STILES PAINT MANUFACTURING	HWIS		64		
			STILES PAINT MFG. INC.	UST	8798I	76		

ADDRESS		CITY	LOCATION	SOU-RCE	MAP TUS	PAGE	MAPDIR LOC	
			STYLE MANUFACTURING	HWIS		65		
	VIKING & DIABLO AVE	HAYWARD	DIABLO INDUSTRIAL PARK	NT	C	35	**20**	NE
3402	ENTERPRISE AVE	HAYWARD	PRECISION METALS	LUST	9	24	**22**	E
			LAWSON DRAYAGE	HWIS		64		
			PRECISION METAL FABRICATORS	UST	8798I	75		
			PRECISION METAL FABRICATORS	HWIS		64		
			PRECISION METAL FABRICATORS	RCRA	S	42		
3393	ENTERPRISE AVE	HAYWARD	MIRACLE TRUCK PAINTING	CS-nfa	RED	14	**37**	E
			MIRACLE TRUCK PAINTING	HWIS		63		
			MIRACLE TRUCK PAINTING	RCRA	S	42		
ENVIRONMENTAL CONCERNS, WITHIN 1/4 - 1/2 MILE OF THE SUBJECT SITE								
3600	DEPOT RD	HAYWARD	FORNI CORP	NT	I	32	**32**	N
			FORNI CORPORATION	CS-nfa	RED	13		
			FORNI CORPORATION	LUST	3B	22		
			FORNI CORPORATION	NT		32		
			FORNI CORPORATION	LUST	9	22		
			FORNI CORPORATION	HWIS		58		
			FORNI CORPORATION	UST	1998I	74		
			FORNI CORPORATION	RCRA	S	40		
	EICHLER & DEPOT RD	HAYWARD	LINCOLN PROP CO/HAYWARD IND PK	NT		33	**34**	N
23978	CONNECTICUT ST	HAYWARD	ASSOCIATED SCREW MACHINE PRODU	CS-nfa	RED	13	**41**	NW
			CONNECTICUT DEPOT PRINT CO	HWIS		55		
			ASSOCIATED SCREW MACHINE PROD	RCRA	S	39		
			SCHENKHUIZEN, MIKE	HWIS		55		
			ASSOCIATED SCREW MACHINE PROD	HWIS		56		
25020	VIKING ST,(WASTE TREATMENT ARE	HAYWARD	ELECTROCHEM	ERNS		5	**50**	NE
25020	VIKING ST	HAYWARD	ELECTROCHEM	HWIS		70	**50**	NE
			QMECT INC DBA ELECTROCHEM	HWIS		70		
			QMECT INC DBA ELECTROCHEM	RCRA	L	44		
3210	DIABLO AVE	HAYWARD	HAYWARD SIGN FACTORY	LUST	9	23	**51**	NE
			WALLNER, WALTER	HWIS		61		
			DIABLO INDUSTRIAL PARK	UST	9598I	75		
3390	ENTERPRISE AVE	HAYWARD	PRECISION METALS	LUST	9	24	**54**	E
			DANA CORPORATION	CS-nfa	RED	14		
			DANA CORPORATION	HWIS		63		
			SPICER UNIVERSAL JOINT DIC RDC	RCRA	S	42		
			CONTINENTAL DELIGHTS	HWIS		63		
			SPICER UNIVERSAL JOINT DIC RDC	HWIS		63		
23839	CONNECTICUT ST	HAYWARD	GENERAL MILL RIGHTS	CS-nfa	RED	13	**55**	N
23839	CONNECTICUT ST,SUITE 7	HAYWARD	DAVE'S EQUIPMENT REPAIR	HWIS		55	**55**	N
23787	EICHLER ST	HAYWARD	I-CHEM RESEARCH FACILITY	NT		33	**56**	N
23787	EICHLER ST, F	HAYWARD	I-CHEM RESEARCH	HWIS		62	**56**	N
23787	EICHLER ST	HAYWARD	AMERICAN AUTOPIAN INC	RCRA	S	41	**56**	N
			I-CHEM RESEARCH	HWIS		62		
23787	EICHLER ST,F	HAYWARD	I-CHEM RESEARCH INC.	FN		49	**56**	N
23787	EICHLER ST, G1	HAYWARD	AMERICAN AUTOPIAN INC	HWIS		62	**56**	N
23787	EICHLER ST	HAYWARD	I-CHEM RESEARCH INC.	SARA		45	**56**	N
3501	BREAKWATER CT	HAYWARD	GORMAN R H CO	RV		7	**57**	SE
			GORMAN, R. H. CO	HWIS		52		
			GORMAN R H CO	RCRA	L	38		
3503	BREAKWATER CT	HAYWARD	EXCEL MOVERS	LUST	1	17	**60**	SE
3190	DIABLO AVE	HAYWARD	AVD METAL FAB INC	CS-nfa	RED	13	**64**	NE
			A V D METAL FABRICATION	HWIS		60		
			AVD METAL FAB INC	HWIS		61		
			AVD METAL FAB INC	RCRA	S	41		
3200	DEPOT RD	HAYWARD	SIERRA PACIFIC STEEL FACILITY	NT	C	32	**67**	NE
			SIERRA PACIFIC STEEL	LUST	3B	21		

ADDRESS		CITY	LOCATION	SOU-RCE	MAP TUS	PAGE	MAPDIR LOC	
			SIERRA PACIFIC STEEL	HWIS		57		
23673	CONNECTICUT ST	HAYWARD	HORIZON PHOTOGRAPHIC LABORATOR	CS-nfa	RED	12	**68**	N
23673	CONNECTICUT ST,# 7	HAYWARD	SCHMALZ & NELSON PIANO SERVICE	HWIS		55	**68**	N
23673	CONNECTICUT ST,UNIT 5	HAYWARD	GUARANTEED AUTO	RCRA	S	39	**68**	N
23673	CONNECTICUT ST, 3 5# 1	HAYWARD	GUARANTEED AUTO SERVICE	HWIS		55	**68**	N
23673	CONNECTICUT ST, 5	HAYWARD	GUARANTEED AUTO	RCRA		39	**68**	N
23673	CONNECTICUT ST,NUMBER 5	HAYWARD	GUARANTEED AUTO	RCRA		39	**68**	N
4125	BREAKWATER AVE	HAYWARD	BIG AL'S WASTE HAULING	CalSite	NFA	9	**69**	S
			BIG AL'S WASTE HAULING	NFRAP	NFA	2		
			BIG AL'S SUPER SERVICE	HWIS		52		
			D & E STEELPLATE RENTAL INC	HWIS		52		
3366	ENTERPRISE AVE	HAYWARD	CONTINENTAL DELIGHT	ERNS		4	**72**	E
			CITI CORP SAVINGS	HWIS		63		
3495	BREAKWATER CT	HAYWARD	WEYERHAUSER COMPANY	LUST	9	17	**74**	SE
			WEYERHAEUSER BUILDING MATERIAL	UST	8798I	72		
			WEYERHAEUSER BLDG MAT	HWIS		52		
	BREAKWATER ST & WHITESELL AVE	HAYWARD	UNKNOWN	ERNS		4	**78**	SE
3744	DEPOT RD	HAYWARD	AMERICAN AUTO WRECKERS INC	LUST	9	22	**80**	NW
			AMERICAN AUTO WRECKERS INC	LUST	3B	22		
			AMERICAN AUTO WRECKERS	HWIS		59		
			AMERICAN AUTO WRECKERS	RCRA	S	40		
3197	DEPOT RD	HAYWARD	CONCISE CASTING	CS-nfa	RED	13	**83**	NE
			CONCISE CASTING CORP	LUST	9	21		
			CONCISE CASTING CORPORATION	UST	8798I	74		
			CONCISE CASTING CORP	HWIS		57		
			MARLEICH MECHANICAL CO	HWIS		57		
			SECURITY SERVICES CO	HWIS		57		
23481	CONNECTICUT ST	HAYWARD	MILDRED BURNHAM PROPERTY	NT	I	30	**84**	N
			BELL BRAND FOODS	CS-nfa	NFA	12		
			ABBLEY TRANSP INC	RCRA	T	39		
			ABBLEY TRANSPORT INC	HWIS		54		
			E-Z-GO TEXTRON	HWIS		54		
3135	DIABLO AVE	HAYWARD	HERNING UNDERGROUND SUPPLY	NT		32	**85**	E
			HERNING UNDERGROUND SUPPLY	NT	I	33		
			HERNING UNDERGROUND SUPPLY	LUST	1	23		
			HERNING UNDERGROUND SUPPLY	HWIS		60		
4142	POINT EDEN WAY	HAYWARD	QUANTEL BUSINESS SYSTEMS	ERNS		5	**89**	S
			QUANTEL	HWIS		69		
23475	EICHLER ST	HAYWARD	PANTHER LINES	LUST	3B	24	**90**	N
			PANTHER LINES INC	HWIS		61		
3920	POINT EDEN WAY	HAYWARD	PT EDEN BUSINESS PARK	LUST	1	27	**92**	S
			PT EDEN BUSINESS PARK	UST	9598I	77		
3500	BREAKWATER AVE	HAYWARD	UNOCAL	LUST	1	17	**94**	SE
			UNOCAL SVC STA #6074	HWIS		50		
			UNOCAL SVC STA #6074	RCRA		38		
			RICKS 76 CENTER	HWIS		50		
			UNION OIL SS #6074	UST	87&93	72		
			UNOCAL SS #6074	UST	87&99	72		
3525	BREAKWATER AVE	HAYWARD	QUANTEL CORPORATION	CS-nfa	RED	12	**95**	SE
			PERKIN ELMER ETEC	HWIS		51		
			PERKIN ELMER ETEC	RCRA	S	38		
	HWY 92 & CLAWITER RD	HAYWARD	HWY 92 & CLAWITER	NT		33	**96**	SE
			HIGHWAY 92 & CLAWITER RD	NT		34		
			BREAKWATER BUSINESS PARK	NT	I	34		
4150	POINT EDEN WAY	HAYWARD	OLD OLIVER SALT PLANT	LUST	1	27	**97**	S
3149	DEPOT RD	HAYWARD	WESTLAND METAL INC	LUST	1	21	**100**	NE
			WESTLAND METAL INC	HWIS		57		
			WESTLAND METAL INC	UST	1995I	74		

ADDRESS		CITY	LOCATION	SOURCE	MAP TUS	PAGE	MAPDIR LOC	
	DEPOT & CABOT	HAYWARD	SHELL PIPELINE LEAK	NT	C	31	**104**	NW
25571	CLAWITER RD	HAYWARD	RELOCATABB CONFINEMENT FACILIT	CS-nfa	RED	12	**107**	E
23521	CONNECTICUT ST	HAYWARD	JAY BEE TRUCKING INC	CS-nfa	RED	12	**108**	N
3111	DEPOT RD	HAYWARD	EAST BAY OIL COMPANY	NT	O	32	**112**	NE
			EAST BAY OIL COMPANY	LUST	3B	21		
			EAST BAY OIL CO.	UST	8798I	73		
			EAST BAY OIL COMPANY	RCRA	T	40		
			EAST BAY OIL COMPANY	HWIS		56		
			SOLVOIL CO	FIFRA		48		
			SOLVOIL CO	FIFRA		48		
25800	CLAWITER RD	HAYWARD	GILLIG FACILITY	LUST	1	19	**114**	E
			GILLIG CORPORATION	RCRA	L	39		
			GILLIG CORPORATION	HWIS		53		
			GILLIG CORPORATION	UST	87&99	73		
25817	CLAWITER RD	HAYWARD	ADHESIVE CONSULTANTS	SETS		7	**116**	E
			HENKEL ADHESIVES CORP.	SARA		45		
			ADHESIVES CONSULTANTS CORP	HWIS		53		
			ADHESIVES CONSULTANTS	FIFRA		48		
25555	CLAWITER RD	HAYWARD	YELLOW FREIGHT LINES	NT	I	30	**117**	E
			YELLOW FRIEGHT LINES	NT		30		
			YELLOW FREIGHT SYSTEM INC	LUST	3B	19		
			YELLOW FREIGHT SYSTEM INC	HWIS		53		
			YELLOW FREIGHT SYSTEM, INC.	UST	87&99	73		
			YELLOW FREIGHT SYSTEM INC	RCRA	S	38		
			YELLOW FREIGHT SYSTEMS	HWIS		53		
25450	CLAWITER RD	HAYWARD	HERRICK CORPORATION	LUST	9	19	**121**	E
			HERRICK CORP THE	FN		49		
			HERRICK CORPORATION, THE	HWIS		52		
			HERRICK CORP.	SARA		45		
			THE HERRICK CORPORATION	UST	8798I	73		
26046	EDEN LANDING RD	HAYWARD	ARTEC ASSOCIATES INC	CS-nfa	RED	14	**123**	SE
3118	DEPOT RD	HAYWARD	THERMIONICS METAL PROCESSING I	NT	O	32	**124**	NE
3110	DEPOT RD	HAYWARD	NIMCO	CS-nfa	NFA	13	**127**	NE
			A-Y SUPPLY INC	HWIS		56		
26062	EDEN LANDING RD, '2	HAYWARD	Q C SERVICES INC	CS-nfa	NFA	14	**128**	SE

ENVIRONMENTAL CONCERNS, WITHIN 1/2 - 3/4 MILE OF THE SUBJECT SITE

23284	EICHLER ST	HAYWARD	SAMUAL CABOT INC. (SCI)	CalSite	CERT	10	**120**	N
			SAMUEL CABOT INC	NFRAP	NFA	3		
26040	EDEN LANDING RD	HAYWARD	P S W ASSOCIATES	CS-nfa	RED	14	**131**	SE
23294	CONNECTICUT ST	HAYWARD	ST FRANCIS ELECTRIC	LUST	3A	20	**132**	N
3025	DEPOT RD	HAYWARD	JACK TURRENTINE CORPORATION	CS-nfa	RED	13	**133**	NE
23315	CONNECTICUT ST	HAYWARD	FIRE FAB INC	LUST	1	20	**134**	N
3826	DEPOT RD	HAYWARD	J & M INC	LUST	9	22	**135**	NW
			J & M INC	LUST	9	22		
			ODYSSEY TRANSPORTATION INC	RCRA	L	41		
			J & M INC	HWIS		59		
3563	INVESTMENT BLVD, STE 6	HAYWARD	FOOD DEVELOPMENT CORPORATION	CalSite	REFRW	11	**136**	SE
24785	CLAWITER RD	HAYWARD	EPSTEIN INVESTMENTS	LUST	9	19	**137**	NE
3521	INVESTMENT BLVD	HAYWARD	EDEN PLAZA PROPS	NFRAP	NFA	3	**138**	SE
			EDEN PLAZA PROPERTY	NT	I	35		
23510	BERNHARDT ST	HAYWARD	CALIFORNIA COURIERS INC	LUST	9	16	**139**	NW
3494	INVESTMENT BLVD	HAYWARD	FAIRBANKS SCALES	LUST	9	26	**140**	SE
24500	INDUSTRIAL BLVD	HAYWARD	XEROX CORP	NT	C	34	**141**	NE

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24493	CLAWITER RD	HAYWARD	CONTINENTAL WHITE CAP INC	LUST	1	18	**143**	NE
			CONTINENTAL WHITE CAP PLT 144	RV		7		
			FORMER WHITE CAP FACILITY	NT	O	30		
			CONTINENTAL WHITE CAP INC	CalSite	REFRW	10		
			CONTINENTAL WHITE CAP INC	NFRAP	NFA	2		
			CONTINENTAL WHITE CAP INC	NT	I	30		
			CONTINENTAL WHITE CAP INC	LUST	9	18		
3392	INVESTMENT BLVD	HAYWARD	WACHOVIA BANK	NT		35	**144**	SE

ENVIRONMENTAL CONCERNS, WITHIN 3/4 - 1 MILE OF THE SUBJECT SITE

24500	INDUSTRIAL BLVD	HAYWARD	XEROX CORPORATION	NT		34	**141**	NE
			XEROX - HAYWARD	CalSite	REFRW	11		
23187	CONNECTICUT ST	HAYWARD	ALAMEDA MOSQUITO ABATEMENT	LUST	1	20	**142**	N
2315	DUNN RD	HAYWARD	JARDINE PIPELINE	LUST	3B	23	**145**	N
			JARDINE PIPELINE	LUST	9	24		
2474	DUNN ST	HAYWARD	MUELLER PROPERTY	NT	I	33	**146**	N
2707	MCCONE AVE	HAYWARD	NATURE'S FARM	LUST	9	27	**147**	N
3343	ARDEN RD	HAYWARD	CONAGRA INC	NT	9	29	**148**	SE
			CONAGRA INC	LUST	9	16		
24300	CLAWITER RD	HAYWARD	PG & E HAYWARD SVCS CENTER	LUST	9	18	**149**	NE
2181	DUNN RD	HAYWARD	VINCENT ROOFING COMPANY	LUST	9	23	**150**	N
			VINCENT ROOFING COMPANY	LUST	9	23		
3201	INVESTMENT BLVD	HAYWARD	LOVE PROPERTY	NT	O	34	**151**	SE
3200	INVESTMENT BLVD	HAYWARD	WACHOVIA REAL ESTATE FUND	NT	C	34	**152**	SE
23836	SAKLAN RD	HAYWARD	VENTURA PROPERTIES	NT		35	**153**	NE
			VENTURA PROPERTIES	NT	I	35		
2148	DUNN RD	HAYWARD	ELDER & COMPANY	LUST	9	23	**154**	NE
24200	CLAWITER RD	HAYWARD	SUPER STRUCTURES INC	LUST	9	18	**155**	NE
2395	AMERICAN AVE	HAYWARD	FOODMAKER INC	LUST	9	16	**156**	N
2342	AMERICAN AVE	HAYWARD	THERMO-FUSION INC	NFRAP	NFA	2	**157**	N
2343	AMERICAN AVE	HAYWARD	THERMOFUSION	NT	O	29	**158**	N
2196	AMERICAN AVE	HAYWARD	OWEN PACIFIC ROOFING	LUST	3B	16	**159**	N
26460	CORPORATE AVE	HAYWARD	PERKIN ELMER PROPERTY	NT	C	31	**160**	SE
23724	SAKLAN RD	HAYWARD	TRIDENT TRUCK LINE	CalSite	REFOA	11	**161**	NE
2249	DAVIS CT	HAYWARD	HUNTER PROPERTY	LUST	9	20	**162**	N
26545	CORPORATE AVE	HAYWARD	WACHOVIA BANK PROPERTY	NT	O	31	**163**	SE
23878	CLAWITER RD	HAYWARD	CG CONTRACTORS INC	LUST	9	17	**164**	NE
26415	CORPORATE AVE	HAYWARD	ALUMTREAT NORTH	NT		30	**165**	SE
			ALUMTREAT NORTH	NT	C	31		
2034	AMERICAN AVE	HAYWARD	UNION BANK	LUST	9	16	**166**	NE
			NATURAL PROTEIN PRODUCTS	CalSite	REFOA	9		
26569	CORPORATE AVE	HAYWARD	26569-75 CORPORATE AVENUE SITE	CalSite	REFRW	10	**167**	SE
26569	CORPORATE AVE, THRU 26575	HAYWARD	26569-75 CORPORATE AVE	NT		31	**167**	SE
26569	CORPORATE AVE	HAYWARD	26569-75 CORPORATE AVE PROPERT	NFRAP	NFA	2	**167**	SE
26587	CORPORATE AVE	HAYWARD	LUSK METALS & PLASTICS	LUST	9	20	**168**	SE
3146	CORPORATE PL, EDEN ROCK BLVD,	HAYWARD	EDEN PLAZA & EDEN ROCK	NT		31	**169**	SE

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3146	CORPORATE PL	HAYWARD	EDEN ROCK PROPS	NFRAP	NFA	2	**169**	SE
26200	INDUSTRIAL BLVD	HAYWARD	FRANKLIN OPTICAL	LUST	1	26	**170**	E
_	WELL 02 - STANDBY		MOHRLAND MUTUAL WATER SYSTEM/	WQ	SR	29	**171**	NE
W	WINTON AVE S SIDE OF W END	HAYWARD	OLD WEST WINTON LANDFILL	SWIS	CLSD	28	**172**	NW

SITES WITH UNKNOWN OR NON-SPECIFIC LOCATION

ARDEN RD	HAYWARD	HAYWARD GATEWAY CENTER	NT	I	29	
		ARDEN ROAD PROPERTY	NT		29	
		ARDEN ROAD PROPERTY	NFRAP	NFA	2	
CABOT BLVD	HAYWARD	UNK	ERNS		4	
		UNK	ERNS		4	
EDEN LANDING RD	HAYWARD	UNK	ERNS		4	
ENTERPRISE AVE	HAYWARD	HAMLIN PROPERTY	LUST	3B	24	
WHITESELL DR	HAYWARD	SOUTHERN PACIFIC R.R.	ERNS		5	
		SOUTHERN PACIFIC R.R.	ERNS		5	
		SOUTHERN PACIFIC RAILROAD	ERNS		5	
		SOUTHERN PACIFIC R.R.	ERNS		5	
SAKLAN RD	HAYWARD	VOLVO GM HEAVY TRUCK	NT		35	

OPERATING PERMITS ONLY FOR
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;								
OPERATING PERMITS ONLY, WITHIN 1/4 MILE OF THE SUBJECT SITE								
3670	ENTERPRISE AVE	HAYWARD	CLYDE ROBIN SEED CO	FIFRA		49	**2**	NW
3680	ENTERPRISE AVE	HAYWARD	VS TIRE SALES	HWIS		67	**3**	NW
			VS TIRE SALES	RCRA	S	43		
3850	ENTERPRISE AVE	HAYWARD	MINTER & FAHY CONSTRUCTION	HWIS		68	**7**	W
3472	ENTERPRISE AVE	HAYWARD	ASPHALT CULTIVATORS	HWIS		66	**13**	E
			J&L PAVING & SEALCOATING INC	HWIS		66		
25546	SEABOARD LN	HAYWARD	Q I P	HWIS		70	**14**	NE
25616	NICKEL PL	HAYWARD	WESTERN STATE DESIGN	HWIS		69	**17**	E
25637	NICKEL PL	HAYWARD	QUALITY PRECISION FINISHING	HWIS		69	**18**	E
3449	ENTERPRISE AVE	HAYWARD	PAK/CON CO	HWIS		65	**19**	E
3480	DIABLO AVE	HAYWARD	TRM COPY CENTERS CORPORATION	HWIS		61	**21**	NE
			TRM COPY CENTERS CORP	RCRA	S	41		
3435	ENTERPRISE AVE	HAYWARD	3BJ LEASING	HWIS		65	**23**	E
			J NORDHAVEN & SONS, INC	HWIS		65		
			WELLS ELECTROPLATING	RCRA	S	42		
			WELLS ELECTROPLATING INC	HWIS		65		
			J NORDHAVEN & SONS, INC	RCRA	S	42		
25073	VIKING ST	HAYWARD	ABB SERVICE COMPANY	HWIS		71	**24**	NE
3468	DIABLO AVE	HAYWARD	KEM MIL CO	RCRA	S	41	**25**	NE
			KEM MIL CO	HWIS		61		
25064	VIKING ST	HAYWARD	SIGNET TESTING LABORATORIES IN	HWIS		70	**26**	NE
			SIGNET TESTING LABORATORIES IN	RCRA		44		
3876	BAY CENTER PL	HAYWARD	METABOLEX INC	HWIS		50	**27**	SE
25026	VIKING ST	HAYWARD	INDUSTRIAL TRUCK SERVICES INC	HWIS		70	**28**	NE
3872	BAY CENTER PL	HAYWARD	SOGETAL INC	RCRA	S	38	**29**	SE
			SOGETAL INC	HWIS		50		
25024	VIKING ST	HAYWARD	GARLOCK WEST EQUIP	HWIS		70	**33**	NE
3434	ENTERPRISE AVE	HAYWARD	MICROSIL CORP	RCRA	S	42	**36**	E
3202	DIABLO AVE	HAYWARD	UC PLASTIC	HWIS		61	**45**	NE
3415	ENTERPRISE AVE	HAYWARD	PERRY TOOL & RESEARCH COMPANY	RCRA	S	42	**46**	E
			PERRY TOOL & RESEARCH COMPANY	HWIS		64		
			PERRY TOOL & RESEARCH COMPANY	HWIS		64		
OPERATING PERMITS ONLY, WITHIN 1/4 - 1/2 MILE OF THE SUBJECT SITE								
3530	DEPOT RD	HAYWARD	CHEMICAL LEAMAN TANK LINES, IN	HWIS		58	**30**	N
			NU-BULK SERVICES	HWIS		58		
3639	DEPOT RD	HAYWARD	CLARENCE J. PERRY TRUCK YARD	UST	8798A	74	**31**	N
3875	BAY CENTER PL	HAYWARD	KEEBLER COMPANY	UST	8798A	72	**35**	SE
3864	BAY CENTER PL	HAYWARD	NORTH AMERICAN COMPLIANCE	HWIS		50	**38**	SE
3643	DEPOT RD	HAYWARD	NUBULK SERVICES INC	RCRA	L	40	**39**	N
			R & W TRUCKING	HWIS		58		
			NUBULK SERVICES INC	HWIS		58		
25023	VIKING ST	HAYWARD	CHEMMARK OF SAN FRANCISCO	PE		48	**40**	NE
3470	DEPOT RD	HAYWARD	YUASA-EXIDE INC	HWIS		57	**42**	N
			EXIDE CORPORATION SERVICE CTR	RCRA	S	40		
			EXIDE CORPORATION SERVICE CTR	HWIS		58		
25008	VIKING ST	HAYWARD	BIG JOE CALIFORNIA INC	HWIS		70	**43**	NE

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3852	BAY CENTER PL	HAYWARD	AMERICAN EXTERIOR COATING	RCRA	S	38	**44**	SE
			AMERICAN EXTERIOR COATING	RCRA		38		
24835	EICHLER ST	HAYWARD	CURRY GRAPHICS INC	HWIS		63	**47**	N
23888	CONNECTICUT ST,# 2	HAYWARD	ALL STAR BODY SHOP	HWIS		55	**48**	N
3832	BAY CENTER PL	HAYWARD	LYNX THERAPEUTICS	RCRA		37	**49**	SE
			LYNX THERAPEUTICS	RCRA		37		
			LYNX THERAPEUTICS	RCRA	S	37		
3156	DIABLO AVE	HAYWARD	ADVANCED LIGHTWEIGHT CONCRETE	UST	1998I	75	**52**	NE
			ADVANCED LIGHTWEIGHT CONCRE	HWIS		60		
3385	ENTERPRISE AVE	HAYWARD	BENNETT AUTO MANUFACTURING	HWIS		63	**53**	E
23986	FOLEY ST	HAYWARD	AUTO AND TRUCK BUMPER RECYCLIN	HWIS		69	**58**	NW
			AUTO AND TRUCK BUMPER RECYCLIN	RCRA	S	43		
3150	DIABLO AVE	HAYWARD	HAYWARD ELECTRIC	UST	8798I	75	**59**	NE
			HAYWARD ELECTRIC	HWIS		60		
3295	DEPOT RD	HAYWARD	CALIFORNIA COURIERS	UST	1998I	74	**61**	NE
			CALIFORNIA COURIER	HWIS		57		
23782	CONNECTICUT ST,UNIT 5	HAYWARD	AIR & TOOL ENGINEERING	HWIS		55	**62**	N
23783	EICHLER ST	HAYWARD	DIABLO MOVING SERVICE	HWIS		62	**63**	N
23783	EICHLER ST, UNIT D	HAYWARD	SENCO PRODUCTS	HWIS		62	**63**	N
			SENCO PRODUCTS	RCRA	S	41		
3146	DIABLO AVE	HAYWARD	JML, INC.	UST	1995I	75	**65**	NE
			JML INC.	HWIS		60		
3053	BREAKWATER CT	HAYWARD	GOLDEN BAY EQUIPMENT CO	HWIS		52	**66**	SE
3152	DEPOT RD	HAYWARD	OLYMPIAN OIL COMPANY	UST	87&99	74	**70**	NE
23762	FOLEY ST	HAYWARD	CELEBRITY T'S	HWIS		69	**71**	NW
23490	CONNECTICUT ST	HAYWARD	DECON ENVIRONMENTAL SERVICES	HWIS		54	**73**	N
3720	DEPOT RD	HAYWARD	DORIS AUTO WRECKERS	HWIS		59	**75**	NW
			DORRIS AUTO WRECKERS INC	UST	1998I	75		
			DORIS AUTO WRECKERS	RCRA	S	40		
23579	EICHLER ST, UNIT J	HAYWARD	PACKAGE DELIVERY EXPRESS	RCRA	S	41	**76**	N
23579	EICHLER ST,UNIT J	HAYWARD	PACKAGE DELIVERY EXPRESS	HWIS		62	**76**	N
3142	DIABLO AVE	HAYWARD	MLH, INC.	UST	8798I	75	**77**	NE
3130	DEPOT RD	HAYWARD	CONTRACTORS CHEMICAL INC	HWIS		56	**79**	NE
23520	FOLEY ST,STE A	HAYWARD	AIR & TOOL ENGINEERING	HWIS		68	**81**	NW
23485	CONNECTICUT ST	HAYWARD	THOMAS S B INC	HWIS		54	**82**	N
			THOMAS S B INC	RCRA		39		
3127	DEPOT RD	HAYWARD	D & B MACHINE INC	HWIS		56	**86**	NE
3121	DIABLO AVE	HAYWARD	BEDFORD PROPERTY INC.	HWIS		60	**87**	E
3751	BREAKWATER AVE	HAYWARD	TRIMAC TRANSPORTATION	HWIS		51	**88**	SE
3535	BREAKWATER AVE	HAYWARD	COMPUGRAPHIC CORPORATION	HWIS		51	**91**	SE
			AGTA CORPORATION	RCRA	S	38		
3505	BREAKWATER AVE	HAYWARD	GEOBIOTICS INC	HWIS		51	**93**	SE
			THOMAS RESEARCH CORPORATION	HWIS		51		
26232	EXECUTIVE PL	HAYWARD	CAREMARK INC	HWIS		68	**98**	S
			HOME HEALTH CARE	HWIS		68		
			HOME HEALTH CARE	HWIS		68		
			HOME HEALTH CARE	RCRA	S	43		

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23449	FOLEY ST	HAYWARD	RICHARDSON RESEARCHES	HWIS		68	**99**	NW
3764	DEPOT RD	HAYWARD	AJAX AUTO	HWIS		59	**101**	NW
3124	DEPOT RD	HAYWARD	THERMIOHIES METAL PROCESSING I	HWIS		56	**102**	NE
			THERMIOHIES METAL PROCESSING I	RCRA	L	40		
3501	BREAKWATER AVE	HAYWARD	MINERLAB INC.	HWIS		51	**103**	SE
			MINERAL LAB	HWIS		51		
25803	CLAWITER RD	HAYWARD	PRUDENTIAL INSURANCE CO. OF AM	HWIS		53	**105**	E
25811	CLAWITER RD	HAYWARD	PRUDENTIAL PROPERTY CO	HWIS		53	**106**	E
25886	CLAWITER RD	HAYWARD	CALIFORNIA AERIAL EQUIP	HWIS		54	**109**	SE
			FLOOD CO THE	RCRA		39		
			V I P INDUSTRIES	HWIS		54		
3116	DIABLO AVE	HAYWARD	NELLCOR INC.	HWIS		60	**110**	E
26223	EXECUTIVE PL	HAYWARD	CLEAN AIR VEHICLE TEST CENTER	RCRA	S	43	**111**	S
			CLEAN AIR VEHICLE TEST CENTER	HWIS		68		
25880	CLAWITER RD	HAYWARD	GOODYEAR TRUCK TIRE CENTER	UST	87&93	73	**113**	E
25500	CLAWITER RD	HAYWARD	BERKELY FARMS	UST		73	**115**	E
3777	DEPOT RD, STE 408	HAYWARD	FORENSIC ANALYTICAL SPECIALTIE	FIFRA		48	**118**	NW
3777	DEPOT RD	HAYWARD	FORENSIC ANALYTICAL SPECIALTIE	HWIS		59	**118**	NW
3777	DEPOT RD,SUITE 406	HAYWARD	FORENSIC ANALYTICAL SPECIALTIE	HWIS		59	**118**	NW
3777	DEPOT RD, STE 408	HAYWARD	FORENSIC ANALYTICAL SPECIALTIE	FIFRA		48	**118**	NW
25858	CLAWITER RD	HAYWARD	WESTERN PAPER BOX DIVISION	HWIS		54	**119**	E
3117	DEPOT RD	HAYWARD	DON & TERRYS GM AUTO REPAIR	HWIS		56	**122**	NE
			DON/TERRY'S GM AUTO RPR	HWIS		56		
3810	DEPOT RD	HAYWARD	BAY AREA CONSTRUCTION FRAMERS	HWIS		59	**125**	NW
23842	CABOT BLVD	HAYWARD	MDC VACUUM PRODUCTS CORP.	SARA		45	**126**	NW
26102	EDEN LANDING RD , STE 4	HAYWARD	DECON ENVIRONMENTAL SERVICES	PCB		46	**129**	SE
			DECON ENVIRONMENTAL SERVICES	RCRA	T	41		
			DECON ENVIRONMENTAL SERVICES	FIFRA		48		

OPERATING PERMITS ONLY, WITHIN 1/2 - 3/4 MILE OF THE SUBJECT SITE

26034	EDEN LANDING RD, STE 2	HAYWARD	EDEN LANDING COMMERCE PARK	HWIS		61	**130**	SE

SITES WITH UNKNOWN OR NON-SPECIFIC LOCATION

	CABOT BLVD	HAYWARD	CITY OF HAYWARD-MARATHON PUMP	UST		72	
	CLAWITER RD	HAYWARD	OLIVER DE SILVA INC.	UST	8798A	72	
	PO BOX 5008	HAYWARD	LUCKY STORES INC	RCRA	L	43	
	PO BOX 57107	HAYWARD	ST FRANCIS ELECTRIC	RCRA	S	43	
	TRACT 4007	HAYWARD	THE PRESLEY COS	HWIS		70	

REFERENCED SOURCES

Date: 01-09-2001
Job: FWSF3406

FEDERAL SOURCES

NPL	NATIONAL PRIORITY LIST (10/03/00)
CERCLA	CERCLIS (10/00)
NFRAP	NFRAP (10/00)
FedFac	FEDERAL FACILITIES (10/00)
ERNS	EMERGENCY RESPONSE NOTIFICATION SYSTEM (1989-1999)
SETS	SITE ENFORCEMENT TRACKING SYSTEM (06/21/00)
CDETS	ENFORCEMENT DOCKET SYSTEM (DOCKET/CDETS)
CD	C-DOCKET (07/00)
RV	RCRA VIOLATORS LIST (09/00)
FD	FEDERAL ENFORCEMENT DOCKETS

CALIFORNIA STATE SOURCES

AnnWrk ANNUAL WORK PLAN (10/25/00)

BKLG	Backlog	DLST	Delisted from the AWP	AWP	Active AWP site
REFRW	Referred to the RWQB	COM	Certified, maint mode	REFRC	Referred to RCRA
CERT	Certified after remediation				

CalSite CALSITES (10/25/00)

PEARL	Prel Assmnt Low priority	NFA	No Further Action for DTSC	PEARM	Prel Assmnt Medium priority
EPA	EPA is the lead agency	PEARH	Prel Assmnt High priortiy	RCRA	Mitigated under the RCRA
SSR	Site Screening Required	RWQCB	Mitigated under RWQB	HRR	Hazard Ranking Required
CNTY	County lead	PRPR	PRP Search Required	OAL	Other Agency lead

CS-nfa CALSITES - NO FURTHER ACTION (10/25/00)

NFA	No Further Action	RED	Closed Case

CS CORTESE (01/00)

WRCBT	Tank leak	DHS3	Cont large well	DHS1	Abandoned haz waste site
DHS5	section 25356	DHS2	Cont small well	CWMB	Disposal site

LUST LEAKING UNDERGROUND STORAGE TANKS (10/00)

0	No action	3B	Prel site assmnt underway	7	Remedial action underway
1	Leak being confirmed	5C	Pollution characterization	8	Post remedial action monitoring
3A	Site workplan submitted	5R	Remediation plan	9	Case closed

SWIS	SOLID WASTE INFORMATION SYSTEM (09/00)
WIP	WELL INVESTIGATION PROGRAM
WQ	DRINKING WATER PROGRAM

REGIONAL SOURCES

NT	TOXIC RELEASES
TP	TOXIC PITS (01/99)
SR	SOLID WASTE ASSESSMENT TEST - REGIONAL (01/99)

OPERATING PERMITS

RCRA RCRA GENERATORS (09/00)

L	Large Generator	T	Transporter	S	Small Generator

TSD RCRA - TSD FACILITIES (09/00)

I	Incinerator	D	Land Disposal	T	Storage/Treatment

SARA	SARA TITLE III,SECTION 313 (TRIS) (01/00)
Nucl	NUCLEAR REGULATORY COMMISSION LICENSEES (01/00)
PCB	PCB WASTE HANDLERS DATABASE (01/00)
PCS	PERMIT COMPLIANCE SYSTEM (PCS) (01/00)
AFS	AIRS FACILITY SYSTEM (AFS) (01/00)
PE	SECTION SEVEN TRACKING SYSTEM (01/00)
FIFRA	FIFRA/TSCA TRACKING SYSTEM (01/00)
FIFS	FEDERAL FACILITIES INFORMATION SYSTEM (FFIS) (07/99)
CICIS	CHEMICALS IN COMMERCE INFORMATION SYSTEM (01/00)
FN	FINDS EPA FACILITY INDEX SYSTEM (01/00)
HWIS	HAZARDOUS WASTE INFORMATION SYSTEM (1984-1999)
UST	UNDERGROUND STORAGE TANKS

ENVIRONMENTAL RECORDS SEARCH

LISTED BY SOURCE

INTRODUCTION

BBL has used its best effort but makes no claims as to the completeness or accuracy of the referenced government sources or the completeness of the search. Our records are frequently updated but only as current as their publishing date and may not represent the entire field of known or potential hazardous waste or contaminated sites. To ensure complete coverage of the subject property and surrounding area, sites may be included in the list if there is any doubt as to the location because of discrepancies in map location, zip code, address, or other information in our sources. For additional information call 619 793-0641.

The following government sources have been searched for sites at the street address, unless otherwise stated, of the subject location.

FEDERAL SOURCES

NPL National Priority List

EPA has prioritized sites with significant risk to human health and the environment. These sites receive remedial funding under the Comprehensive Environmental Response Conservation and Liability Act (CERCLA).

No listings within 1 mile radius of the subject site.

CERCLIS Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS is a database used by the EPA to track activities conducted under the Comprehensive Environmental Response and Liability Act CERCLA (1980) and the amendment the Superfund Amendments and Reauthorization Act SARA (1986).

Sites to be included are identified primarily by the reporting requirements of hazardous substances Treatment, Storage and Disposal (TSD) facilities and releases larger than specific Reportable Quantities (RQ), established by EPA.

Using the National Oil and hazardous Substance Pollution Contingency Plan(National Contingency Plan) the EPA set priorities for cleanup.

The EPA rates National Contingency Plan sites according to a quantitative Hazard Ranking System (HRS) based on the potential health risk via any one or more pathways: groundwater, surface water, air, direct contact, and fire/explosion.

The EPA and state agencies seek to identify potentially responsible parties(PRP) and ultimately Responsible Parties (RP) who can be required to finance cleanup activities, either directly or through reimbursement of federal Superfund expenditures.

No listings within 1 mile radius of the subject site.

NFRAP No Further Remedial Action Planned sites (CERCLIS)

As of February 1995, CERCLIS sites designated 'No Further Remedial Action Planned' NFRAP have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the site being placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration.

EPA has removed these NFRAP sites from CERCLIS to lift unintended barriers to the redevelopment of these properties. This policy change is part of EPA's Brownfields Redevelopment Program to help cities, states, private investors and affected citizens promote economic redevelopment of unproductive urban sites.

This list has been researched within 1 mile radius of the subject site.

Site: THERMO-FUSION INC
Address: 2342 AMERICAN AVE
City: HAYWARD
Map Loc: 157 - within 3/4 - 1 mile N of the subject
Status: EPA ID#: CAD066569278

Discovery of this Hazardous Waste site was brought to EPA's attention on 06/01/80. An additional Preliminary Assesment was completed on 02/01/85.

Site: ARDEN ROAD PROPERTY
Address: ARDEN RD
City: HAYWARD
Status: EPA ID#: CAD982358608

Discovery of this Hazardous Waste site was brought to EPA's attention on 12/01/87. An additional Preliminary Assesment was completed on 06/13/89.

Site: BIG AL'S WASTE HAULING
Address: 4125 BREAKWATER AVE
City: HAYWARD
Map Loc: 69 - within 1/4 - 1/2 mile S of the subject
Status: EPA ID#: CAD980736664

Discovery of this Hazardous Waste site was brought to EPA's attention on 09/01/81. A numeric estimate of the relative severity of a hazardous substance release and its potential, computed using the Hazard Ranking System, was established on 10/01/81. On 10/01/81, a screening Site Inspection was completed, collecting site data and samples to characterize the severity of the hazard to support the ranking and enforcement of the clean-up required. An additional Preliminary Assesment was completed on 07/01/82. An additional Site Inspection on 02/23/90.

Site: CONTINENTAL WHITE CAP INC
Address: 24493 CLAWITER RD
City: HAYWARD
Map Loc: 143 - within 1/2 - 3/4 mile NE of the subject
Status: EPA ID#: CAD982358723

Discovery of this Hazardous Waste site was brought to EPA's attention on 12/01/87. An additional Preliminary Assesment was completed on 12/13/88.

Site: 26569-75 CORPORATE AVE PROPERT
Address: 26569 CORPORATE AVE
City: HAYWARD
Map Loc: 167 - within 3/4 - 1 mile SE of the subject
Status: EPA ID#: CAD982399735

Discovery of this Hazardous Waste site was brought to EPA's attention on 03/01/88. An additional Preliminary Assesment was completed on 11/16/88.

Site: EDEN ROCK PROPS

Address: 3146 CORPORATE PL
City: HAYWARD
Map Loc: 169 - within 3/4 - 1 mile SE of the subject
Status: EPA ID#: CAD982416687

Discovery of this Hazardous Waste site was brought to EPA's attention on 12/01/87. An additional Preliminary Assesment was completed on 03/15/89.

Site: SAMUEL CABOT INC
Address: 23284 EICHLER ST
City: HAYWARD
Map Loc: 120 - within 1/2 - 3/4 mile N of the subject
Status: EPA ID#: CAD122731904

Discovery of this Hazardous Waste site was brought to EPA's attention on 10/26/90. An additional Preliminary Assesment was completed on 06/11/92.

Site: EDEN PLAZA PROPS
Address: 3521 INVESTMENT BLVD
City: HAYWARD
Map Loc: 138 - within 1/2 - 3/4 mile SE of the subject
Status: EPA ID#: CAD982416661

Discovery of this Hazardous Waste site was brought to EPA's attention on 12/01/87. An additional Preliminary Assesment was completed on 04/27/89.

Site: ROHM & HAAS CA INC
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: EPA ID#: CAD020028072

Discovery of this Hazardous Waste site was brought to EPA's attention on 11/01/79. An additional Preliminary Assesment was completed on 02/01/82. On 09/01/84, a screening Site Inspection was completed, collecting site data and samples to characterize the severity of the hazard to support the ranking and enforcement of the clean-up required.

FEDFAC Federal Facilities

As part of the CERCLA program, federal facilities with known or suspected environmental problems, the Federal Facilities Hazardous Waste Compliance Docket is tracked separately to comply with a Federal Court order.

No listings within 1 mile radius of the subject site.

ERNS Emergency Response Notification System

The ERNS is a national computer database used to store information on unauthorized releases of oil and hazardous substances. The program is a cooperative effort of the Environmental Protection Agency, the Department of Transportation Research and Special Program Administration's John Volpe National Transportation System Center and the National Response Center.

There are primarily five Federal statutes that require release reporting the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) section 103; the Superfund Amendments and Reauthorization Act (SARA) Title III Section 304; the Clean Water Act of 1972(CWA) section 311(b)(3); and the Hazardous Material Transportation Act of 1974(HMTA section 1808(b).

This list has been researched within half of a mile radius of the subject site.

Site: UNKNOWN
Address: BREAKWATER ST & WHITESELL AVE
City: HAYWARD
Map Loc: 78 - within 1/4 - 1/2 mile SE of the subject
Status: 9000017158 30 GAL of DIESEL FUEL (03/23/1990)

BREAKWATER ST. AND WHITESELL AVENUEDIESEL TRUCK FLIPPED OVER SPILLING CONTENTS TO STORM DRAIN THAT FLOWS TO MARSH
19. PHONE: (415) 881-1833 X 3300

Site: UNK
Address: CABOT BLVD
City: HAYWARD
Status: 99 635182 04/08/99

WATERWAYS UNKNOWN SOURCE OR CAUSE, POSSIBLY FRMO A CULVERT. DISSAPATING, NON-RECOVERABLE. THE SHEEN IS 3 FEET BY 100 FEET.
OES NOTIFICATION:AA/CUPA,CC,DFG,EB PARKS,LANDS,P&R,WB,CG,FWS PREVIOUS CASE #:
CLEANUP BY: UNKNOWN

Site: UNK
Address: CABOT BLVD
City: HAYWARD
Status: 99 634663 04/08/99

WATERWAYS UNKNOWN SOURCE OR CAUSE, POSSIBLY FRMO A CULVERT. DISSAPATING, NON-RECOVERABLE. THE SHEEN IS 3 FEET BY 100 FEET.
OES NOTIFICATION:AA/CUPA,CC,DFG,EB PARKS,LANDS,P&R,WB,CG,FWS PREVIOUS CASE #:
CLEANUP BY: UNKNOWN

Site: UNK
Address: EDEN LANDING RD
City: HAYWARD
Status: 8900014705 10 GAL of FLAMMABLE LIQUID (07/02/1989)

INTERSECTION OF EDEN LANDING RD AND *87
SPILLED TO ROADWAY/UNK SOURCE
CAOES-89-06888/*CLAWITER RD

Site: CONTINENTAL DELIGHT
Address: 3366 ENTERPRISE AVE
City: HAYWARD
Map Loc: 72 - within 1/4 - 1/2 mile E of the subject
Status: 8900023623 500 LBS of AMMONIA (09/11/1989)

3366 ENTERPRISE AVE
3 CYLINDER RUPTURED/400 PSIECH CRANE DROPPED ON REGRIGERATION SYSTEM 700 PEOPLE EVACUATED FOR ABOUT 2 HRS/FD WATERED DOWN CLOUD
CHP CLOSED W B HWY 92 AT CLAWITER RD FOR 1 HOUR

Site: CITY OF HAYWARD PUBLIC WORKS
Address: 3700 ENTERPRISE AVE
City: HAYWARD
Map Loc: 5 - within 1/4 mile W of the subject
Status: 8900020189 10000 GAL of PRIMARY TREATED WASTEWATER

3700 ENTERPRISE AVE

MECHANICAL VALVE FAILURE ABOUT 600 GAL INTO STORM DRAIN/REMAINING CONTAINED ON PLANT GROUNDS
CLEANUP BY CITY CREWS
CAOES-89-07541

Site: QUANTEL BUSINESS SYSTEMS
Address: 4142 POINT EDEN WAY
City: HAYWARD
Map Loc: 89 - within 1/4 - 1/2 mile S of the subject
Status: 8900031514 300 GAL of METHYL ETHYL KETONE (10/27/

4142 POINT EDEN WAY
CAOES-89-8392

Site: ELECTROCHEM
Address: 25020 VIKING ST,(WASTE TREATMENT AREA)
City: HAYWARD
Map Loc: 50 - within 1/4 - 1/2 mile NE of the subject
Status: 96 497719 03/20/96

ACID WASTE PUT IN SLUDGE DRYING UNIT

25 PEOPLE WERE EVACUATED

Site: SOUTHERN PACIFIC R.R.
Address: WHITESELL DR
City: HAYWARD
Status: 9200000327 WHITE FOAMY SUBSTANCE (01/07/1992)

WHITESELL AVE
UNKNOWN/UNKNOWN
BLOCKED THE CHANNEL AND DIVERTED INTO SEWER SYSTEN
THE DRAINAGE DITCH EMPTIES INTO PROTECTED WETLANDS

Site: SOUTHERN PACIFIC R.R.
Address: WHITESELL DR
City: HAYWARD
Status: 9200006803 0WHITE FOAMY SUBSTANCE (01/07/1992)

WHITESELL AVE
UNKNOWN/UNKNOWN
BLOCKED THE CHANNEL AND DIVERTED INTO SEWER SYSTEN
THE DRAINAGE DITCH EMPTIES INTO PROTECTED WETLANDS. CONTACTED MANUEL (OR MAMIE) POLWALSKI, MSO ALAMEDA ADVISED SPRR, HAYWARD & OAKLAND FD'S H AVE SITUATION UNDER CONTROL.

Site: SOUTHERN PACIFIC RAILROAD
Address: WHITESELL DR
City: HAYWARD
Status: 9200006129 0WHITE FOAMY SUBSTANCE (01/07/1992)

WHITESELL AVE
SPRR DOING CLEANUP/ BLOCKED THE CHANNEL AND DIVERTED INTO SEWER SYSTEM

Site: SOUTHERN PACIFIC R.R.
Address: WHITESELL DR
City: HAYWARD
Status: WHITE FOAMY SUBSTANCE (01/07/1992)

Site: ROHM AND HAAS
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: 8900013864 UNKNOWN ODOR (07/10/1989)

UNK/UNK
ODOR IS IRRITATING AND CAUSES LIGHT HEADEDNESS

Site: ROHM AND HAAS
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: 8900032014 5000 GAL of METHYL METHACRYLATE (12/29

40,000 GAL ABOVEGROUND STORAGE TANK / TANK OVERFILLED DUE TO FAULTY GAUGE.
USING A VACUUM TRUCK TO REMOVE MATERIAL.
NO ACTION TAKEN

Site: ROHM AND HAAS
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: 9000020653 45000 LBS of ACRYLAMIDE (50% OR LESS)

25500 WHITESELL ST
ABOVEGROUND STORAGE TANK/OVERFILLEDCONTAINED IN CONTAINMENT VSL.

Site: ROHM AND HAAS
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: 8900002136 2000 GAL of STYRENE MONOMER (02/13/1989)

TANK/TANK WAS BEING FILLED AND OVERFLOWED DUE TO MECHANICAL FAILURE
PUMPING MATERIAL WITH A VACUUM TRUCK

Site: ROHM & HAAS
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: 9000022537 22500 LBS of ACRYLAMIDE (07/02/1990)

25500 WHITECELL ST.
VALVE MALFUNCTION, SPILLED TO SECONDARY CONTAINMENT ONLY.
CONTAINED BY RP, RECOVERY ASAP BY RP
REPORTER'S PHONE: (415)786-0100 X 305

Site: ROHM & HAAS
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: 98 622072 12/14/98

INDUSTRIAL PLANT IN THE PROCESS OF OFF LOADING A RAIL CAR - HAD A CRIMPED GASKET.
OES NOTIFICATION:AA/CUPA PREVIOUS CASE #: 98-5537
CLEANUP BY: REPORTING PARTY

SETS Site Enforcement Tracking System (SETS)

When expanding Superfund monies at a CERCLA (Comprehensive Environmental Response, Compensation and Liability Act) Site, EPA must conduct a search to identify parties with potential financial responsibility for remediation of uncontrolled hazardous waste sites. EPA regional Superfund Waste Management Staff issue a notice letter to the potentially responsible party (PRP). The status field contains the EPA ID number and name of the site where the actual pollution occurred.

This list has been researched within 1 mile radius of the subject site.

Site: ADHESIVE CONSULTANTS
Address: 25817 CLAWITER RD
City: HAYWARD
Map Loc: 116 - within 1/4 - 1/2 mile E of the subject
Status: 00466

CAD029295706 LORENTZ BARREL & DRUM notice date 3/23/89

DO Enforcement Docket System (DOCKET)/Consent Decree Tracking System (CDETS)

DOCKET tracks civil judicial cases against environmental polluters, while CDETS processes court settlements, called consent decrees.

No listings within half of a mile radius of the subject site.

CD Criminal Docket System (C-DOCKET)

The Criminal Docket System is a comprehensive automated system for tracking criminal enforcement actions. C-Docket handles data for all environmental statues and tracks enforcement actions from the initial stages of investigations through conclusion.

No listings within half of a mile radius of the subject site.

RCRA RCRA Violators List (CORRACTS)

The Resource Conservation and Recovery Act of 1976 provides for "cradle to grave" regulation of hazardous wastes. RCRA requires regulation of hazardous waste generators, transporters, and storage/treatment/disposal sites. Evaluation to potential violations, ranging from manifest requirements to hazardous waste discharges, is typically conducted by the US EPA. This database is also known as Corrective Action Report (CORRACTS)

If enforcement is required, it is typically delegated to a state agency.

This list has been researched within 1 mile radius of the subject site.

Site: GORMAN R H CO
Address: 3501 BREAKWATER CT
City: HAYWARD
Map Loc: 57 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAD043240779

CA PRIORITIZATION

Site: CONTINENTAL WHITE CAP PLT 144

Address: 24493 CLAWITER RD
City: HAYWARD
Map Loc: 143 - within 1/2 - 3/4 mile NE of the subject
Status: EPA ID#: CAD041837659

CA PRIORITIZATION

Site: ROHM & HAAS CA INC
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: EPA ID#: CAD020028072

CA PRIORITIZATION
STABILIZATION MEASURES EVALUATION

FD Federal Enforcement Dockets

The US EPA, Office of Enforcement, maintains a list of sites under enforcement by the US EPA.

No listings within 1 mile radius of the subject site.

CALIFORNIA STATE SOURCES

AW Annual Work Plan (previously known as Bond Expenditure Plan)

The California Health and Safety code, as amended by AB 129, requires the California Environmental Protection Agency to develop a site-specific expenditure plan as the basis for an appropriation of California Hazardous Substance Cleanup Bond Act of 1984 funds.

The Agency is also required to update the report annually and report any significant adjustments to the Legislature on an ongoing basis. The plan identifies California hazardous waste sites targeted for cleanup by responsible parties, the California and the Federal Environmental Protection Agency over the next five years.

Status Codes:	BKLG	Backlog, Potential Annual Work Plan Site
	AWP	Active Annual Work Plan site
	COM	Certified, but still in Operation & Maintenance mode
	CERT	Certified after remediation
	DLST	Delisted from the AWP
	REFRC	Former AWP site referred to RCRA
	REFRW	Former AWP site referred to the Regional Water Quality Board

No listings within 1 mile radius of the subject site.

CALS CALSITES

The Historical Abandoned Site Survey Program identified certain potential hazardous waste sites. The identification of these sites were generally not made via sampling and site characterization, they were made as

a result of file searches and windshield surveys. Some of the sites may have had a site inspection with sampling.

The information has been compiled into this database by the California Environmental Protection Agency, Department of Toxic Substance Control (DTSC) in accordance with Section 25359.6 of the California Health and Safety Code.

This database was previously known as The Abandoned Sites Program Information System ASPIS.

Status Codes:	PEARL	Preliminary Endangerment Assessment Required,Low priority
	PEARM	Preliminary Endangerment Assessment Required,Medium priority
	PEARH	Preliminary Endangerment Assessment Required,High priortiy
	SSR	Site Screening Required
	HRR	Hazard Ranking Required
	PRPR	Potential Responsible Party Search Required
	EPA	EPA is the lead agency
	RCRA	Mitigated under the RCRA permitting program
	RWQCB	Mitigated under the lead of the Regional Water Quality Boar
	CNTY	County lead
	OAL	Other Agency lead

This list has been researched within 1 mile radius of the subject site.

Site: NATURAL PROTEIN PRODUCTS
Address: 2034 AMERICAN AVE
City: HAYWARD
Map Loc: 166 - within 3/4 - 1 mile NE of the subject
Status: 01200006 072993 MANU - FOOD & KINDRED PRODUCTS

Contaminants: HYDROCARBON SOLVENTS, OXYGENATED SOLVENTS

RECEIVED QUESTIONNAIRE, NO PRIORITY. (11/05/80)
Site is located in Hayward on Americn Avenue, near the intersection of Clawiter Road and American Avenue. This site was screened in 1980 and a "No FurtherAction" determination was made by the Department based on the available information at that time. DTSC immediately arranged a preliminary at the site on 7/7/93 soon after the Department received a complaint from Ms. Crystal Osburn, owner of the proprety regardingsite contamination During our inspection, the current tenant of theproperty, Double 02 , a BMW auto salvage shop manager Marshall Howard stated that they moved in the property only 3 years ago. The underground tank was located under the paved parking lot side of the bulding which was used in the past for the storage of gasoline tank and was removed in February 1991 under the supervision of Hayward CityFire Department. The tank was found to contain 4.5 feel of liquid. The top 1/4 inch of the fluid was gasoline product and the rest was water. The groundwater is encountered at 12.3 feet below grade. The original excavation revealed total petroleum hy- drocarbon (TPH) 1100 ppm, benzene 41 ppb, toluene 1,500 ppb, ethyl benzene 3,200 ppb and xylene 50,000 ppb were found in soil and the maximum TPH 85 ppm,benzene 120 ppb, toluene 790 ppb, ethyl benzene 460 ppb. in groundwater. (07/29/93)

Site: BIG AL'S WASTE HAULING
Address: 4125 BREAKWATER AVE
City: HAYWARD
Map Loc: 69 - within 1/4 - 1/2 mile S of the subject
Status: 01420125 072994 TRUCKING & WAREHOUSING

Contaminants: HYDROCARBON SOLVENTS, CONTAMINATED SOIL

Actions:
DISCOVERY - completed on 02/23/90

FACILITY IDENTIFIED EPA FIT SITE INSPECTION EPA REASSESSED SCREENING SITE INSPECTION AND RECOMMEND NO FURTHER ACTION; RECOMMEND SITE SCREENING FOR STATE. (02/23/90)
This approximately 2 acre site, close to the waterfront in the city of Hayward had been a site of illegal storage and disposal of hazardous wastes. Early reports of site contamination with spilled petroleum, ink wastes and other chemicals inviolation of cleanup order issued by San Francisco Regional Water Quality Control Board (RWQCB) has been documented in January 1981. Subsequent testing of soils, sediments and liquid samples detected a high incidence of heavy metals and solvents. Site cleanup carried out under DTSC (Then TSCD of DHS) was

accomplished with co-operation of the generators. Correspondence dated March 8, 1984 indicates that adequate removal of hazardous wastes was attained to render the site suitable for the designated use of the site (zoned industrial) with a proposed 2-3 feet thick clean fill on a portion of the site where some removal levels of lead in soil still remained. (02/22/94)
The site was cleaned adequately for the designated zoning. (02/23/94)

Site: CONTINENTAL WHITE CAP INC
Address: 24493 CLAWITER RD
City: HAYWARD
Map Loc: 143 - within 1/2 - 3/4 mile NE of the subject
Status: 01280080 072994 MANU - CHEMICALS & ALLIED PRODUCTS

Contaminants: CONTAMINATED SOIL, HYDROCARBON SOLVENTS

Program: CERCLA II

Site Screening Done: Recommend Preliminary Assessment based on xylene isomers, ethyl benzene, mibk found in wells in- stalled near underground solvent tanks. Records Search: RWQCB inactive case; last activity 10/85. (06/23/87)
Preliminary Assessment Done: Recommend Site Inspection -- source and extent of contamination is unknown. (03/16/88)
Preliminary Assessment submitted to EPA: EPA recommendation is no further action -- no air or surface water has been documented as being contaminated; groundwater is shallow; site is not an NPL candidate. (06/13/88)

Site: 26569-75 CORPORATE AVENUE SITE
Address: 26569 CORPORATE AVE
City: HAYWARD
Map Loc: 167 - within 3/4 - 1 mile SE of the subject
Status: 01500103 031495 WHOLESALE TRADE - DURABLE GOODS

Contaminants: HYDROCARBON SOLVENTS, HALOGENATED SOLVENTS

Program: CERCLA II

Actions:
DISCOVERY - completed on 06/15/87

FACILITY IDENTIFIED ATTORNEY FOR THE UTAH STATE RETIREMENT FUND SENT RESULTS OF SITE INVESTIGATION TO RWQCB, DHS (06/15/87)
SITE SCREENING DONE TCE AT 140 PPM IN GROUNDWATER. LOWER LEVELS IN SOIL. SOURCEIS UNKNOWN, POSSIBLY OFF-SITE (10/19/87)
FACILITY DRIVE-BY SINGLESTORY BLDG SURROUNDED BY ASPHALT OPEN FIELD TO WEST (01/22/88)
PRELIM ASSESS DONE SI HIGH: NEED TO DETERMINE SOURCE AND EXTENT OF VOLITILE ORGANIC CONTMN (06/15/88)
SUBMIT TO EPA NFA FOR EPA: SITE NOT AN NPL CANDIDATE BASED ON AVAILABLE INFORMATION (08/18/88)

Site: SAMUAL CABOT INC. (SCI)
Address: 23284 EICHLER ST
City: HAYWARD
Map Loc: 120 - within 1/2 - 3/4 mile N of the subject
Status: 01280089 010185 MANU - CHEMICALS & ALLIED PRODUCTS

Actions:
CERTIFICATION - completed on 01/01/85

323 cubic yards of contaminated soil and 300 gallons of liquids were removed. This certification was confirmed by a report prepared by the Auditor General. The Auditor General conducted an audit of the Department's records to confirm a list of sites where the Departmentwas involved in the cleanup and the cleanup had been completed. This Auditor General list became the basis for our historical certification information. Many of the sites on this list were handled by our Surveillance and Enforcement Staff. Much of this work was in response to complaints from the public or reports from industry and theresponse action may have only addresed the immediate problem and not the entire facility. (01/01/85)

Our records do not indicate the actual date this site was certified. Our records show 01/1985. We have used the date 01/01/1985 because this gives us the earliest statute of limitations. (01/25/96)

Site: LES MCDONALD CONSTRUCTION COMP
Address: 3500 ENTERPRISE AVE
City: HAYWARD
Map Loc: 4 - within 1/4 mile E of the subject
Status: 01150001 031788 GENERAL BUILDING CONTRACTORS

Contaminants: WASTE POTENTIALLY CONTAINING DIOXINS, CONTAMINATED SOIL, HYDROCARBON SOLVENTS

RECEIVED QUESTIONNAIRE. NO PROBLEM. (05/29/80)
SITE SCREENING DONE DIESEL CONTAMINATION MAY HAVE OCCURRED FROM A BROKEN HOSE(FUEL) FROMHEAVY EQUIPMENT. CONCENTRATION(COMPOSITE A 1500 PPM, COMPOSITE B(540 PPM). SAMPLE RESULTS ALSO SHOW DDT/DDE/DDD AT BELOW THRESHOLD LEVELS (03/17/88)

Site: XEROX - HAYWARD
Address: 24500 INDUSTRIAL BLVD
City: HAYWARD
Map Loc: 141 - within 3/4 - 1 mile NE of the subject
Status: 01270023 012596 MANU - PRINTING & PUBLISHING

Contaminants: HALOGENATED SOLVENTS

SITE SCREENING DONE DOCUMENTED REPORTS OF SOIL CONTAMINATION W/ TOLUENE, PCE, TCA AND DCE. GROUNDWATR IS CONTAMINATED WITH DCE, TCA, DCA, CHLOROFORM AND FREON 113, ALTHOUGH NOT IN SIGNIFICANT QUANTITIES FORMER XEROX CORPORATION MANUFACTURING FACILITY. (06/15/88)
DTSC SENT A VOLUNTARY CLEANUP PROGRAM INVITATION LETTER BUT RECIEVED NO RESPONSE (06/19/95)
REGIONAL WATER QUALITY CONTROL BOARD IS ACTIVELY WORKING ON THE SITE (01/25/96)

Site: FOOD DEVELOPMENT CORPORATION
Address: 3563 INVESTMENT BLVD, STE 6
City: HAYWARD
Map Loc: 136 - within 1/2 - 3/4 mile SE of the subject
Status: 01730059 012596 BUSINESS SERVICES

Contaminants: CONTAMINATED SOIL, HALOGENATED ORGANIC COMPOUNDS

QUESTIONNAIRE RECEIVED. NO PROBLEM. (11/05/80)
SITE SCREENING DONE EPA COMPLETED PRELIMINARY ASSESSMENT ON EDEN VALLEY COMPLEX, LOCATEDAT 3521- 3583 INVESTMENT BLVD, AND RECOMMEND NO FURTHER ACTION. (03/17/89)
There are no known records of hazardous waste activities. The site is located at 3521-3583 Investment Blvd. in Hayward. It is an office/light-industrial use development approx. 9 acres in size. Eden Rock Company No. 2 owned the property from March 1973to March 1984. The Utah State Retirement Fund has owned the site since March 1984. In March/April, site investigations prior to sale of the property revealed soil and groundwater contamination by volatile organic compounds (VOC's). Trichloroethylene (TCE) was found in groundwater at 4.9 ppb and in soil at 220 ppb. Freon 113 (50 ppb) and trichlorofluoroethane (100 ppb) were also detected in groundwater. Adjacent sites have shown groundwater contamination with halogenated VOC's in the 140,000 ppb range. (09/24/92)
DTSC SENT VOLUNTARY CLEANUP PROGRAM INVITATION LETTER BUT HAS RECIEVED NO RESPONSE (06/21/95)
RWQCB INDICATES THEY ARE CURRENTLY WORKING ON THIS SITE (01/25/96)

Site: TRIDENT TRUCK LINE
Address: 23724 SAKLAN RD
City: HAYWARD
Map Loc: 161 - within 3/4 - 1 mile NE of the subject
Status: 01470002 062794 TRANSPORTATION SERVICES

SITE SCREENING DONE FACILITY PROPOSES TO CLOSE 3 UNDERGROUND STORAGE TANKS. THE TANKS MAY BE RE-USED IN FUTURE TO STORE FUEL OR H2O FOR AGRICULTURAL PURPOSES. NOT ENOUGH INFORMATION TO DETERMINE PRESENSE OF SOIL OR GROUND WATER CONTAM- INATION. PENDING-ALAMEDA CO. WILL BE LEAD AGENCY. (05/01/90)
COUNTY HEALTH SITE (06/10/91)

CALS CALSITES - No Further Action

This section includes the sites on the Calsite list, which have been flagged for no further action by the California Environmental Protection Agency, Department of Toxic Substance Control (DTSC) in accordance with Section 25359.6 of the California Health and Safety Code.

Status Codes: NFA No Further Action for DTSC
RED Closed Case marked for removal from list

This list has been researched within half of a mile radius of the subject site.

Site: QUANTEL CORPORATION
Address: 3525 BREAKWATER AVE
City: HAYWARD
Map Loc: 95 - within 1/4 - 1/2 mile SE of the subject
Status: 0135002808141980 35 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/14/80)

Site: RELOCATABB CONFINEMENT FACILIT
Address: 25571 CLAWITER RD
City: HAYWARD
Map Loc: 107 - within 1/4 - 1/2 mile E of the subject
Status: 0134008605291980 34 0 .00 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (05/29/80)

Site: BELL BRAND FOODS
Address: 23481 CONNECTICUT ST
City: HAYWARD
Map Loc: 84 - within 1/4 - 1/2 mile N of the subject
Status: 0120000908221980 20 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/22/80)

Site: JAY BEE TRUCKING INC
Address: 23521 CONNECTICUT ST
City: HAYWARD
Map Loc: 108 - within 1/4 - 1/2 mile N of the subject
Status: 0142007406241980 42 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (06/24/80)

Site: HORIZON PHOTOGRAPHIC LABORATOR
Address: 23673 CONNECTICUT ST
City: HAYWARD
Map Loc: 68 - within 1/4 - 1/2 mile N of the subject
Status: 0173004908281980 73 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/28/80)
QUESTIONNAIRE SENT (06/15/80)

Site: GENERAL MILL RIGHTS
Address: 23839 CONNECTICUT ST
City: HAYWARD
Map Loc: 55 - within 1/4 - 1/2 mile N of the subject
Status: 0135007808281980 35 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/28/80)
QUESTIONNAIRE SENT. (04/15/80)

Site: ASSOCIATED SCREW MACHINE PRODU
Address: 23978 CONNECTICUT ST
City: HAYWARD
Map Loc: 41 - within 1/4 - 1/2 mile NW of the subject
Status: 0134010308261980 34 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/26/80)
QUESTIONNAIRE SENT (05/15/80)

Site: JACK TURRENTINE CORPORATION
Address: 3025 DEPOT RD
City: HAYWARD
Map Loc: 133 - within 1/2 - 3/4 mile NE of the subject
Status: 0116001811051980 16 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (11/05/80)

Site: NIMCO
Address: 3110 DEPOT RD
City: HAYWARD
Map Loc: 127 - within 1/4 - 1/2 mile NE of the subject
Status: 0173007507231980 73 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (04/16/80)

Site: CONCISE CASTING
Address: 3197 DEPOT RD
City: HAYWARD
Map Loc: 83 - within 1/4 - 1/2 mile NE of the subject
Status: 0135001108191980 35 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/19/80)

Site: FORNI CORPORATION
Address: 3600 DEPOT RD
City: HAYWARD
Map Loc: 32 - within 1/4 - 1/2 mile N of the subject
Status: 0132002508281980 32 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/28/80)
QUESTIONNAIRE SENT (05/15/80)

Site: AVD METAL FAB INC
Address: 3190 DIABLO AVE
City: HAYWARD
Map Loc: 64 - within 1/4 - 1/2 mile NE of the subject
Status: 0136005608071980 36 0 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/07/80)

Site: P S W ASSOCIATES
Address: 26040 EDEN LANDING RD
City: HAYWARD
Map Loc: 131 - within 1/2 - 3/4 mile SE of the subject
Status: 0136004505291980 36 0 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (05/09/80)

Site: ARTEC ASSOCIATES INC
Address: 26046 EDEN LANDING RD
City: HAYWARD
Map Loc: 123 - within 1/4 - 1/2 mile SE of the subject
Status: 0173000912041980 73 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/26/80)
QUESTIONNAIRE SENT (05/15/80)

Site: Q C SERVICES INC
Address: 26062 EDEN LANDING RD, '2
City: HAYWARD
Map Loc: 128 - within 1/4 - 1/2 mile SE of the subject
Status: 0173007607231980 73 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (07/23/80)

Site: DANA CORPORATION
Address: 3390 ENTERPRISE AVE
City: HAYWARD
Map Loc: 54 - within 1/4 - 1/2 mile E of the subject
Status: 0137001708261980 37 0 .00 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/26/80)
QUESTIONNAIRE SENT (05/15/80)

Site: MIRACLE TRUCK PAINTING
Address: 3393 ENTERPRISE AVE
City: HAYWARD
Map Loc: 37 - within 1/4 mile E of the subject
Status: 0175000308251980 75 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/25/80)
QUESTIONNAIRE SENT. (07/15/80)

Site: BARBOSA - REBAR
Address: 3458 ENTERPRISE AVE
City: HAYWARD
Map Loc: 9 - within 1/4 mile E of the subject
Status: 0132002408261980 32 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/26/80)
QUESTIONNAIRE SENT (04/15/80)

Site: C E FREEMAN
Address: 3590 ENTERPRISE AVE
City: HAYWARD
Map Loc: 1 - the subject site
Status: 0128002406011981 28 0 0 0 0

FACILITY DRIVE-BY A.S.P. DRIVE BY. DISCOLORATION ON GROUND (05/08/FACILITY DRIVE-BY FOLLOW UP DRIVE BY-NO PROBLEM (05/11/81)
QUEST RECEIVED - RUNNELS INDUST (05/09/80)
80)

Site: ALLINGTON INDUSTRIES INC
Address: 25545 SEABOARD LN
City: HAYWARD
Map Loc: 15 - within 1/4 mile NE of the subject
Status: 0135007108071980 35 0 0 0 0

QUESTIONNAIRE RECEIVED. NO PROBLEM. (08/07/80)

Site: ROHM & HAAS
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: 0128005703141980 28 0 0 0 0

RECEIVED QUESTIONNAIRE. NO PROBLEM. (03/14/80)

CORTESE State of California Office of Planning and Research

This database is a consolidation of information from various sources. It is maintained by the State Office of Planning and Research and lists potential and confirmed hazardous waste or substances sites.

Facilities that have been reported elsewhere in this report will not be included in the listing below.

Status Codes:		
	WRCBT	Tank leaks. Compiled by Water Resource Control Board
	DHS1	Abandoned hazardous waste site. Compiled by Toxic Substance Control Div. of DHS
	DHS2	Contaminated public water drinking wells serving less than 200 connections. Compiled by Env. Health Div. of DHS
	DHS3	Contaminated public water drinking wells serving more than 200 connections
	DHS5	Sites pursuant to section 25356 of the Health and Safety Code (see BEP)
	CWMB	Solid waste disposal sites with known migration of hazardous waste

No listings within 1 mile radius of the subject site.

LUST Leaking Underground Storage Tanks - California State

The Leaking Underground Storage Tanks Information System is maintained by the State Water Resource Board pursuant to Section 25295 of the Health and Safety Code.

Status Codes:		
	0	No action
	1	Leak being confirmed
	3A	Prel site assessment workplan submitted
	3B	Prel site assessment underway
	5C	Pollution characterization
	5R	Remediation plan
	7	Remedial action underway
	8	Post remedial action monitoring
	9	Case closed
	P	Case purged from agency list

This list has been researched within 1 mile radius of the subject site.

Site: UNION BANK
Address: 2034 AMERICAN AVE
City: HAYWARD
Map Loc: 166 - within 3/4 - 1 mile NE of the subject
Status: 9 - Case Closed.

A release from a tank, of Gasoline was reported on 04/08/91. It was discovered during tank closure, and stopped on 04/08/91 by closing the tank. No remedial action has yet been taken at the site. The case, 01-1533, is managed by a Local agency, and was last reviewed on 03/16/94.

- The leak was confirmed on 05/17/91.
- Preliminary Site Assessment was started on 12/22/92.
- The case was closed 05/29/96.

QW MON 12/92. REQ CASE CLOSURE 5/21/96; CASE CLOSED!!

Site: OWEN PACIFIC ROOFING
Address: 2196 AMERICAN AVE
City: HAYWARD
Map Loc: 159 - within 3/4 - 1 mile N of the subject
Status: 3B - Prelim Site Assessment underway.

A release from a tank, of Gasoline was reported on 03/26/91. It was discovered during tank closure, and stopped on 03/26/91 by closing the tank. The contaminated soil has been excavated and disposed in an approved site. The case, 01-1104, is managed by a Local agency.

- The leak was confirmed on 04/26/91.
- Preliminary Site Assessment was started on 12/17/90.

400CYD REMOVED;LETTER OF REIMBURSEMENT-7/96

Site: FOODMAKER INC
Address: 2395 AMERICAN AVE
City: HAYWARD
Map Loc: 156 - within 3/4 - 1 mile N of the subject
Status: 9 - Case Closed.

Site: CONAGRA INC
Address: 3343 ARDEN RD
City: HAYWARD
Map Loc: 148 - within 3/4 - 1 mile SE of the subject
Status: 9 - Case Closed.

A release from a tank, of Gasoline was reported on 12/24/91. It was discovered during tank closure, and stopped on 12/24/91 by closing the tank. The contaminated soil has been excavated and disposed in an approved site. The case, 01-0444, is managed by a Local agency.

- The leak was confirmed on 01/29/92.
- Preliminary Site Assessment workplan was submitted on 12/06/91,and started on 05/22/92.
- The case was closed 09/24/96.

12/6 TKCR+WP;REQ CASE CLOSE 6/93;RECEIVED ADD. SITE CLOSURE SUMM-DATED. 8/15/96. CC 9/24/96 PER CITY OF HAYWARD.

Site: CALIFORNIA COURIERS INC
Address: 23510 BERNHARDT ST
City: HAYWARD

Map Loc: 139 - within 1/2 - 3/4 mile NW of the subject
Status: 9 - Case Closed.

A release from a tank, of Gasoline was reported on 11/03/93. It was discovered during tank closure, and stopped on 11/03/93 by closing the tank. The contaminated soil has been excavated and disposed in an approved site. The case, 01-1855, is managed by a Local agency, and was last reviewed on 08/01/97.

- The leak was confirmed on 11/03/93.
- Preliminary Site Assessment was started on 01/24/94.
- The case was closed 08/01/97.

CLOSED 08/01/97; VOC CONTAM FROM OFFSITE SOURCE. REQ. CASE CLOSURE JULY 97. CASE CLOSED 8/1/97..

Site: UNOCAL
Address: 3500 BREAKWATER AVE
City: HAYWARD
Map Loc: 94 - within 1/4 - 1/2 mile SE of the subject
Status: 1 - Leak being confirmed.

A release from a tank, of Gasoline was reported on 04/29/88. It was discovered during tank closure, and stopped on 04/29/88 by closing the tank. No remedial action has yet been taken at the site. The case, 01-1591, is managed by a Local agency.

- The leak was confirmed on 04/29/88.

PRIORITY CLASS ""D"" - 1/26/99.

Site: WEYERHAUSER COMPANY
Address: 3495 BREAKWATER CT
City: HAYWARD
Map Loc: 74 - within 1/4 - 1/2 mile SE of the subject
Status: 9 - Case Closed.

A release from a tank, of Gasoline was reported on 12/04/85. It was discovered during tank closure, and stopped on 12/04/85 by closing the tank. No remedial action has yet been taken at the site. The case, 01-1671, is managed by a Local agency.

- The leak was confirmed on 12/04/85.
- The case was closed 09/15/94.

NFAP

Site: EXCEL MOVERS
Address: 3503 BREAKWATER CT
City: HAYWARD
Map Loc: 60 - within 1/4 - 1/2 mile SE of the subject
Status: 1 - Leak being confirmed.

A release from a tank, of Gasoline was reported on 06/17/97. It was discovered during tank closure, and stopped on 06/17/97 by closing the tank. The case, 01-2234, is managed by a Local agency, and was last reviewed on 09/10/99.

- The leak was confirmed on 06/17/97.

PHASE 2 INVESTIGATION RECEIVED 9/2/99 WITH ADDENDUM.

Site: CG CONTRACTORS INC
Address: 23878 CLAWITER RD
City: HAYWARD
Map Loc: 164 - within 3/4 - 1 mile NE of the subject

Status: 9 - Case Closed.

A release from a tank, of Diesel was reported on 12/12/89. It was discovered during tank closure, and stopped on 12/12/89 by closing the tank. No remedial action has yet been taken at the site. The case, 01-0248, is managed by a Local agency, and was last reviewed on 03/10/99.

- The leak was confirmed on 02/16/90.
- The case was closed 08/23/96.

ARCHIVED 11/1/96 CONTROL NO 120-100 SRC 0904750

Site: SUPER STRUCTURES INC
Address: 24200 CLAWITER RD
City: HAYWARD
Map Loc: 155 - within 3/4 - 1 mile NE of the subject
Status: 9 - Case Closed.

A release from a tank, of Diesel was reported on 04/04/94. It was discovered during tank closure, and stopped on 04/04/94 by closing the tank. No remedial action has yet been taken at the site. The case, 01-1876, is managed by a Local agency, and was last reviewed on 05/09/95.

- The leak was confirmed on 04/04/94.
- The case was closed 05/10/95.

ARCHIVED 6/6/96 CONTROL NO 120-093 SRC 0904743

Site: PG & E HAYWARD SVCS CENTER
Address: 24300 CLAWITER RD
City: HAYWARD
Map Loc: 149 - within 3/4 - 1 mile NE of the subject
Status: 9 - Case Closed.

A release from a tank, of Gasoline was reported on 10/09/85. It was discovered during tank closure, and stopped on 10/09/85 by closing the tank. The contaminated soil has been excavated and treated, e.g. landfarming. The case, 01-1170, is managed by a Local agency, and was last reviewed on 01/20/98.

- The leak was confirmed on 10/09/85.
- Preliminary Site Assessment workplan was submitted on 12/17/86,and started on 09/30/87.
- Pollution characterization was started on 03/08/88.
- Remediation Plan was submitted on 08/03/94.
- The case was closed 11/21/97.

CASE CLOSED 11/21/97. 3/16/96 URF CASE CLOSED 11/21/97

Site: CONTINENTAL WHITE CAP INC
Address: 24493 CLAWITER RD
City: HAYWARD
Map Loc: 143 - within 1/2 - 3/4 mile NE of the subject
Status: 1 - Leak being confirmed.

A release from a tank, of Waste oil was reported on 11/30/88. It was discovered during tank closure, and stopped on 11/30/88 by closing the tank. No remedial action has yet been taken at the site. The case, 01-1877, is managed by the Regional Water Quality Board.

- The leak was confirmed on 08/30/96.

CASE PER HAYWARD FD 8/30/96

Site: CONTINENTAL WHITE CAP INC
Address: 24493 CLAWITER RD
City: HAYWARD

Map Loc: 143 - within 1/2 - 3/4 mile NE of the subject
Status: 9 - Case Closed.

Site: EPSTEIN INVESTMENTS
Address: 24785 CLAWITER RD
City: HAYWARD
Map Loc: 137 - within 1/2 - 3/4 mile NE of the subject
Status: 9 - Case Closed.

A release from a tank, of Diesel was reported on 02/28/92. It was discovered during tank closure, and stopped on 02/28/92 by closing the tank.Only the soil is impacted. The contaminated soil has been excavated and disposed in an approved site. The case, 01-0567, is managed by a Local agency, and was last reviewed on 09/17/96.

- The leak was confirmed on 07/14/92.
- The case was closed 08/14/96.

URF AND TKCR ONLY;CASE CLOSED!

Site: HERRICK CORPORATION
Address: 25450 CLAWITER RD
City: HAYWARD
Map Loc: 121 - within 1/4 - 1/2 mile E of the subject
Status: 9 - Case Closed.

A release from a tank, of Gasoline was reported on 05/07/86. It was discovered during tank closure, and stopped on 05/07/86 by closing the tank. The contaminated soil has been excavated and disposed in an approved site. The case, 01-0756, is managed by a Local agency, and was last reviewed on 03/17/94.

- The leak was confirmed on 01/01/87.
- Preliminary Site Assessment was started on 06/26/86.
- The case was closed 12/30/93.

ARCHIVED 6/6/96 CONTROL NO 120-080/095 SRC 0904730/745

Site: YELLOW FREIGHT SYSTEM INC
Address: 25555 CLAWITER RD
City: HAYWARD
Map Loc: 117 - within 1/4 - 1/2 mile E of the subject
Status: 3B - Prelim Site Assessment underway.

A release from a tank, of Waste oil was reported on 11/12/87. It was discovered during tank closure, and stopped on 11/12/87 by closing the tank. The contaminated soil has been excavated and disposed in an approved site. The case, 01-1688, is managed by the Regional Water Quality Board, and was last reviewed on 04/11/97.

- Preliminary Site Assessment workplan was submitted on 10/16/87,and started on 10/20/87.

NFA. SEE ALSO SLIC 01S0056

Site: GILLIG FACILITY
Address: 25800 CLAWITER RD
City: HAYWARD
Map Loc: 114 - within 1/4 - 1/2 mile E of the subject
Status: 1 - Leak being confirmed.

A release from a tank, of Diesel was reported on 03/06/92. It was discovered during tank closure, and stopped on 03/06/92 by closing the tank.Only the soil is impacted. No remedial action has yet been taken at the site. The case, 01-0701, is managed by a Local agency, and was last reviewed on 08/06/92.

- The leak was confirmed on 08/07/92.

Site: ALAMEDA MOSQUITO ABATEMENT
Address: 23187 CONNECTICUT ST
City: HAYWARD
Map Loc: 142 - within 3/4 - 1 mile N of the subject
Status: 1 - Leak being confirmed.

A release from a tank, of Gasoline was reported on 12/24/90. It was discovered during tank closure, and stopped on 12/24/90 by closing the tank. No remedial action has yet been taken at the site. The case, 01-0048, is managed by a Local agency, and was last reviewed on 06/03/91.

- The leak was confirmed on 06/06/91.

MAXGW = PIT WATER (AFTER PURGE)

Site: ST FRANCIS ELECTRIC
Address: 23294 CONNECTICUT ST
City: HAYWARD
Map Loc: 132 - within 1/2 - 3/4 mile N of the subject
Status: 3A - Prelim Site Assessment workplan submitted.

A release from a tank, of Gasoline was reported on 08/31/92. It was discovered during tank closure, and stopped on 08/31/92 by closing the tank. The free product floating on the water table will be removed. The case, 01-1829, is managed by a Local agency, and was last reviewed on 03/17/94.

- The leak was confirmed on 07/15/93.
- Preliminary Site Assessment workplan was submitted on 10/25/93.

LOCAL GW CONT.

Site: FIRE FAB INC
Address: 23315 CONNECTICUT ST
City: HAYWARD
Map Loc: 134 - within 1/2 - 3/4 mile N of the subject
Status: 1 - Leak being confirmed.

A release from a tank, of Gasoline was reported on 01/26/88. It was discovered during tank closure, and stopped on 01/26/88 by closing the tank.Only the soil is impacted. No remedial action has yet been taken at the site. The case, 01-0622, is managed by a Local agency, and was last reviewed on 05/24/90.

- The leak was confirmed on 05/25/90.

Site: LUSK METALS & PLASTICS
Address: 26587 CORPORATE AVE
City: HAYWARD
Map Loc: 168 - within 3/4 - 1 mile SE of the subject
Status: 9 - Case Closed.

A release from a tank, of Diesel was reported on 02/22/94. It was discovered during tank closure, and stopped on 02/22/94 by closing the tank. The contaminated soil has been excavated and disposed in an approved site. The case, 01-1906, is managed by a Local agency, and was last reviewed on 03/25/97.

- The leak was confirmed on 07/23/90.
- Preliminary Site Assessment workplan was submitted on 02/16/93.
- The case was closed 03/14/97.

MAXSOIL-GW TPH-D. REQUEST OF WELL ABANDONMENT WITHIN 21 DAYS

Site: HUNTER PROPERTY
Address: 2249 DAVIS CT
City: HAYWARD

Map Loc: 162 - within 3/4 - 1 mile N of the subject
Status: 9 - Case Closed.

A release from a tank, of Gasoline was reported on 11/30/92. It was discovered during tank closure, and stopped on 11/30/92 by closing the tank. No remedial action has yet been taken at the site. The case, 01-2128, is managed by a Local agency, and was last reviewed on 02/19/93.

- The leak was confirmed on 01/09/96.
- The case was closed 01/26/96.

ARCHIVED 6/6/96 CONTROL NO 120-094 SRC 0904744

Site: EAST BAY OIL COMPANY
Address: 3111 DEPOT RD
City: HAYWARD
Map Loc: 112 - within 1/4 - 1/2 mile NE of the subject
Status: 3B - Prelim Site Assessment underway.

A release from a tank, of Gasoline was reported on 04/05/90. It was discovered during tank closure, and stopped on 04/05/90 by closing the tank. No remedial action has yet been taken at the site. The case, 01-0532, is managed by the Regional Water Quality Board.

- Preliminary Site Assessment was started on 06/17/91.

NAPHTHA+ACETONE EXIST. POTENTIAL SLIC SITE IN THE FUTURE.. ALSO LISTED AS 3118 DEPOT ROAD.

Site: WESTLAND METAL INC
Address: 3149 DEPOT RD
City: HAYWARD
Map Loc: 100 - within 1/4 - 1/2 mile NE of the subject
Status: 1 - Leak being confirmed.

A release from a tank, of Gasoline was reported on 07/08/92. It was discovered during tank closure, and stopped on 07/08/92 by closing the tank. The contaminated soil has been excavated and treated, e.g. landfarming. The case, 01-1958, is managed by a Local agency, and was last reviewed on 08/30/96.

- The leak was confirmed on 08/30/96.

1992 URF ONLY, REM GAS, DIESEL TNKS; CASE PER HAYWARD FD 8/30/96

Site: CONCISE CASTING CORP
Address: 3197 DEPOT RD
City: HAYWARD
Map Loc: 83 - within 1/4 - 1/2 mile NE of the subject
Status: 9 - Case Closed.

Site: SIERRA PACIFIC STEEL
Address: 3200 DEPOT RD
City: HAYWARD
Map Loc: 67 - within 1/4 - 1/2 mile NE of the subject
Status: 3B - Prelim Site Assessment underway.

A release from a tank, of Gasoline was reported on 12/03/90. It was discovered during tank closure, and stopped on 12/03/90 by closing the tank.Only the soil is impacted. The contaminated soil has been excavated and disposed in an approved site. The case, 01-1389, is managed by a Local agency, and was last reviewed on 02/06/98.

- The leak was confirmed on 07/10/91.
- Preliminary Site Assessment workplan was submitted on 06/08/91.

3/31 SL REM RPT

Site: FORNI CORPORATION
Address: 3600 DEPOT RD
City: HAYWARD
Map Loc: 32 - within 1/4 - 1/2 mile N of the subject
Status: 3B - Prelim Site Assessment underway.

A release from a tank, of Gasoline was reported on 04/05/92. It was discovered during tank closure, and stopped on 04/05/92 by closing the tank.Only the soil is impacted. The contaminated soil has been excavated and treated, e.g. landfarming. The case, 01-0655, is managed by the Regional Water Quality Board.

- The leak was confirmed on 09/30/94.

TKCR ONLY. SW SMPLE. REQ. CASE CLOSURE 3-8-97à

Site: FORNI CORPORATION
Address: 3600 DEPOT RD
City: HAYWARD
Map Loc: 32 - within 1/4 - 1/2 mile N of the subject
Status: 9 - Case Closed.

Site: AMERICAN AUTO WRECKERS INC
Address: 3744 DEPOT RD
City: HAYWARD
Map Loc: 80 - within 1/4 - 1/2 mile NW of the subject
Status: 9 - Case Closed.

Site: AMERICAN AUTO WRECKERS INC
Address: 3744 DEPOT RD
City: HAYWARD
Map Loc: 80 - within 1/4 - 1/2 mile NW of the subject
Status: 3B - Prelim Site Assessment underway.

A release from a tank, of Gasoline was reported on 01/18/95. The case, 01-2091, is managed by a Local agency.

- The leak was confirmed on 07/01/95.

STID 2017. LANDOWNER NOT SENT 1/5/00. CHANGED FROM 01NCY0302 7/95

Site: J & M INC
Address: 3826 DEPOT RD
City: HAYWARD
Map Loc: 135 - within 1/2 - 3/4 mile NW of the subject
Status: 9 - Case Closed.

Site: J & M INC
Address: 3826 DEPOT RD
City: HAYWARD
Map Loc: 135 - within 1/2 - 3/4 mile NW of the subject
Status: 9 - Case Closed.

A release from a tank, of Diesel was reported on 08/20/90. It was discovered by subsurface monitoring, and stopped on 08/20/90 by closing the tank. No remedial action has yet been taken at the site. The case, 01-0805, is managed by a Local agency, and was last reviewed on 12/09/96.

- The leak was confirmed on 03/22/93.
- Preliminary Site Assessment workplan was submitted on 04/01/91.
- The case was closed 12/05/96.

LOP UPDATE--10/21/93. REQ CASE CLOSURE 4/16/96 CASE COLSED 12/05/96

Site: HERNING UNDERGROUND SUPPLY
Address: 3135 DIABLO AVE
City: HAYWARD
Map Loc: 85 - within 1/4 - 1/2 mile E of the subject
Status: 1 - Leak being confirmed.

A release, caused by overfilling, from a tank, of Gasoline was reported on 03/27/90. It was discovered during tank closure, and stopped on 03/27/90 by closing the tank. The contaminated soil has been excavated and disposed in an approved site. The case, 01-1957, is managed by a Local agency, and was last reviewed on 08/31/94.

- The leak was confirmed on 07/06/93.

CLORINATED SOLVENTS BUT FUEL TANKS PULLED

Site: HAYWARD SIGN FACTORY
Address: 3210 DIABLO AVE
City: HAYWARD
Map Loc: 51 - within 1/4 - 1/2 mile NE of the subject
Status: 9 - Case Closed.

A release from a tank, of Gasoline was reported on 07/06/95. It was discovered during tank closure, and stopped on 07/06/95 by closing the tank. The case, 01-2089, is managed by a Local agency, and was last reviewed on 07/06/95.

- The leak was confirmed on 07/06/95.
- The case was closed 07/11/95.

ARCHIVED 6/6/96 CONTROL NO 120-094 SRC 0904744

Site: ELDER & COMPANY
Address: 2148 DUNN RD
City: HAYWARD
Map Loc: 154 - within 3/4 - 1 mile NE of the subject
Status: 9 - Case Closed.

Site: VINCENT ROOFING COMPANY
Address: 2181 DUNN RD
City: HAYWARD
Map Loc: 150 - within 3/4 - 1 mile N of the subject
Status: 9 - Case Closed.

A release from a tank, of Gasoline was reported on 08/08/94. The case, 01-2116, is managed by a Local agency, and was last reviewed on 08/07/96.

- The leak was confirmed on 10/06/95.
- The case was closed 11/08/95.

ARCHIVED 6/6/96 CONTROL NO 120-094 SRC 0904744

Site: VINCENT ROOFING COMPANY
Address: 2181 DUNN RD
City: HAYWARD
Map Loc: 150 - within 3/4 - 1 mile N of the subject
Status: 9 - Case Closed.

Site: JARDINE PIPELINE
Address: 2315 DUNN RD

City: HAYWARD
Map Loc: 145 - within 3/4 - 1 mile N of the subject
Status: 3B - Prelim Site Assessment underway.

A release from a tank, of Diesel was reported on 08/22/91. It was discovered during tank closure, and stopped on 08/22/91 by closing the tank. No remedial action has yet been taken at the site. The case, 01-1764, is managed by a Local agency, and was last reviewed on 11/03/97.

Site: JARDINE PIPELINE
Address: 2315 DUNN RD
City: HAYWARD
Map Loc: 145 - within 3/4 - 1 mile N of the subject
Status: 9 - Case Closed.

Site: PANTHER LINES
Address: 23475 EICHLER ST
City: HAYWARD
Map Loc: 90 - within 1/4 - 1/2 mile N of the subject
Status: 3B - Prelim Site Assessment underway.

A release from a tank, of Diesel was reported on 06/10/92. It was discovered during tank closure, and stopped on 06/10/92 by closing the tank. No remedial action has yet been taken at the site. The case, 01-1134, is managed by a Local agency, and was last reviewed on 01/24/96.

- The leak was confirmed on 08/12/92.
- Preliminary Site Assessment was started on 06/10/92.

ONLY 1 MW,NO EVIDENCE OF CONTAMINATION SINCE 3/2/88

Site: HAMLIN PROPERTY
Address: ENTERPRISE AVE
City: HAYWARD
Status: 3B - Prelim Site Assessment underway.

A release from a tank, of Gasoline was reported on 10/26/89. It was discovered during tank closure, and stopped on 10/26/89 by closing the tank. The contaminated soil has been excavated and disposed in an approved site. The case, 01-0736, is managed by a Local agency, and was last reviewed on 05/30/90.

- The leak was confirmed on 08/07/90.
- Preliminary Site Assessment was started on 06/30/89.

Site: PRECISION METALS
Address: 3390 ENTERPRISE AVE
City: HAYWARD
Map Loc: 54 - within 1/4 - 1/2 mile E of the subject
Status: 9 - Case Closed.

A release from a tank, of Gasoline was reported on 01/12/95. It was discovered during tank closure, and stopped on 07/12/95 by closing the tank.Only the soil is impacted. The case, 01-2090, is managed by a Local agency.

- The leak was confirmed on 07/12/95.
- Post Remedial Action monitoring was started on 07/12/95.
- The case was closed 09/25/95.

CC 9/25/1995.

Site: PRECISION METALS
Address: 3402 ENTERPRISE AVE
City: HAYWARD

Map Loc: 22 - within 1/4 mile E of the subject
Status: 9 - Case Closed.

A release from a tank, of Gasoline was reported on 04/08/86. It was discovered during tank closure, and stopped on 04/08/86 by closing the tank.Only the soil is impacted. No remedial action has yet been taken at the site. The case, 01-1204, is managed by a Local agency, and was last reviewed on 03/17/94.

- The leak was confirmed on 12/08/90.
- Preliminary Site Assessment workplan was submitted on 12/18/87.
- The case was closed 09/28/95.

ARCHIVED 6/6/96 CONTROL NO 120-085 SRC 0904735

Site: STILES PAINT
Address: 3428 ENTERPRISE AVE
City: HAYWARD
Map Loc: 16 - within 1/4 mile E of the subject
Status: 9 - Case Closed.

A release from a tank, of Solvents was reported on 12/01/89. The case, 01-2036, is managed by a Local agency, and was last reviewed on 08/15/95.

- The leak was confirmed on 03/22/95.
- Preliminary Site Assessment workplan was submitted on 04/25/95.
- The case was closed 08/15/95.

ARCHIVED 6/6/96 CONTROL NO 120-094 SRC 0904744

Site: LAFAYETTE MANUFACTURING
Address: 3440 ENTERPRISE AVE
City: HAYWARD
Map Loc: 12 - within 1/4 mile E of the subject
Status: 9 - Case Closed.

A release from a tank, of Diesel was reported on 05/22/91. It was discovered during tank closure, and stopped on 05/22/91 by closing the tank. No remedial action has yet been taken at the site. The case, 01-0873, is managed by a Local agency, and was last reviewed on 10/13/94.

- The leak was confirmed on 06/21/91.
- Preliminary Site Assessment was started on 03/28/91.
- Pollution characterization was started on 06/20/91.
- The case was closed 07/20/97.

SHEEN MW-1;10/19 QTR RPT; REQ. CASE CLOSURE 7/97 CASE CLOSED 7/15/97..

Site: VANIER TRUCKING
Address: 3453 ENTERPRISE AVE
City: HAYWARD
Map Loc: 11 - within 1/4 mile E of the subject
Status: 9 - Case Closed.

A release from a tank, of Diesel was reported on 04/29/97. It was discovered during tank closure, and stopped on 04/29/96 by closing the tank. The case, 01-2222, is managed by a Local agency.

- The leak was confirmed on 04/29/97.
- The case was closed 05/07/97.

REQ. CASE CLOSURE 04/2/97..

Site: ALLGOOD INDUSTRIES
Address: 3466 ENTERPRISE AVE

City: HAYWARD
Map Loc: 8 - within 1/4 mile E of the subject
Status: 9 - Case Closed.

A release from a tank, of Diesel was reported on 08/05/85. It was discovered during tank closure, and stopped on 08/05/85 by closing the tank. No remedial action has yet been taken at the site. The case, 01-0062, is managed by a Local agency, and was last reviewed on 10/01/97.

- Preliminary Site Assessment workplan was submitted on 08/05/85.
- The case was closed 10/01/97.

CLOSED 2/19/97. REQ. CASE CLOSURE 02/11/97à

Site: MAG TRUCKING
Address: 3500 ENTERPRISE AVE
City: HAYWARD
Map Loc: 4 - within 1/4 mile E of the subject
Status: 9 - Case Closed.

A release from a tank, of Misc mvf was reported on 04/01/88. It was discovered during tank closure, and stopped on 04/01/88 by closing the tank. No remedial action has yet been taken at the site. The case, 01-0952, is managed by a Local agency.

- The leak was confirmed on 08/08/88.
- Preliminary Site Assessment workplan was submitted on 11/18/97.

Site: WASTE WATER TREATMENT PLANT
Address: 3700 ENTERPRISE AVE
City: HAYWARD
Map Loc: 5 - within 1/4 mile W of the subject
Status: 1 - Leak being confirmed.

A release from a tank, of Gasoline was reported on 03/05/90. It was discovered during tank closure, and stopped on 03/05/90 by closing the tank. No remedial action has yet been taken at the site. The case, 01-1650, is managed by a Local agency.

- The leak was confirmed on 07/13/90.

Site: FRANKLIN OPTICAL
Address: 26200 INDUSTRIAL BLVD
City: HAYWARD
Map Loc: 170 - within 3/4 - 1 mile E of the subject
Status: 1 - Leak being confirmed.

A release from a tank, of Gasoline was reported on 04/04/94. It was discovered during tank closure, and stopped on 04/04/94 by closing the tank. No remedial action has yet been taken at the site. The case, 01-1871, is managed by a Local agency, and was last reviewed on 01/25/96.

- The leak was confirmed on 01/25/96.

CASE PER CITY OF HAYWARD-AWAITING INFO

Site: FAIRBANKS SCALES
Address: 3494 INVESTMENT BLVD
City: HAYWARD
Map Loc: 140 - within 1/2 - 3/4 mile SE of the subject
Status: 9 - Case Closed.

A release from a tank, of Gasoline was reported on 03/21/85. It was discovered during tank closure, and stopped on 03/21/85 by closing the tank. No remedial action has yet been taken at the site. The case, 01-0609, is managed by a Local agency, and was last reviewed on 03/03/98.

- The case was closed 03/03/98.

WATER SAMPLE RESULT ONLY. CLOSED 10/12/97 BY ACHD; NO CASENO ON LETTER

Site: NATURE'S FARM
Address: 2707 MCCONE AVE
City: HAYWARD
Map Loc: 147 - within 3/4 - 1 mile N of the subject
Status: 9 - Case Closed.

A release from a tank, of Diesel was reported on 04/04/94. It was discovered during tank closure, and stopped on 04/04/94 by closing the tank.Only the soil is impacted. No remedial action has yet been taken at the site. The case, 01-1884, is managed by a Local agency, and was last reviewed on 01/05/99.

- The leak was confirmed on 01/25/96.
- The case was closed 01/05/98.

LOW RISK SOILS ONLY CASE. MAXSOIL=DIESEL. MTBE TESTING NOT REQ @ TIME OF UST PULL.. CASE CLOSED PER RWQCB - 1/5/98.

Site: PT EDEN BUSINESS PARK
Address: 3920 POINT EDEN WAY
City: HAYWARD
Map Loc: 92 - within 1/4 - 1/2 mile S of the subject
Status: 1 - Leak being confirmed.

A release from a tank, of Unlead gasoline was reported on 07/24/90. It was discovered during tank closure, and stopped on 07/24/90 by closing the tank.Only the soil is impacted. No remedial action has yet been taken at the site. The case, 01-1209, is managed by a Local agency, and was last reviewed on 10/18/90.

- The leak was confirmed on 10/19/90.

URF ONLY

Site: OLD OLIVER SALT PLANT
Address: 4150 POINT EDEN WAY
City: HAYWARD
Map Loc: 97 - within 1/4 - 1/2 mile S of the subject
Status: 1 - Leak being confirmed.

A release from a tank, of Gasoline was reported on 04/27/99. It was discovered during tank closure, and stopped on 04/27/99 by closing the tank. The case, 01-2465, is managed by a Local agency, and was last reviewed on 06/03/99.

- The leak was confirmed on 04/27/99.

CITY OF HAYWARD TRANSFERRED OVERSIGHT TO ACHD - 4/27/99.

Site: ROHM HAAS CALIFORNIA INC
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: 1 - Leak being confirmed.

A release from a tank, of Waste oil was reported on 03/27/85. It was discovered during tank closure, and stopped on 03/27/85 by closing the tank.Only the soil is impacted. No remedial action has yet been taken at the site. The case, 01-1257, is managed by a Local agency, and was last reviewed on 06/12/90.

- The leak was confirmed on 03/27/85.

NFAP--CASE? POSSIBLE CLOSURE?

SWIS Solid Waste Information System

As legislated under the Solid Waste Management and Resource Recovery Act of 1972, the California Waste Management Board maintains lists of certain facilities, i.e. Active solid waste disposal sites, Inactive or Closed solid waste disposal sites and Transfer facilities.

This list has been researched within 1 mile radius of the subject site.

Site: Lakin Tire West, Inc.--Hayward
Address: 3453 ENTERPRISE AVE
City: HAYWARD
Map Loc: 11 - within 1/4 mile E of the subject
Status: 01-TI-0968

Activity: Excluded Major Waste Tire Facility

Waste: Tires, Truck; Tires, Passenger

Permit Date: 19990511
Throughput: 36000 Tires permitted
Acreage: 3.00 permitted

Site: OLD WEST WINTON LANDFILL
Address: W WINTON AVE S SIDE OF W END
City: HAYWARD
Map Loc: 172 - within 3/4 - 1 mile NW of the subject
Status: 01-CR-0005

Activity: To Be Determined Solid Waste Disposal Site

WIP Well Investigation Program

The Well Investigation Program (AB1803) identifies groundwater that is already contaminated and empowers the California Department of Health Services and local health officers to order ongoing monitoring programs. The focus of this program is to monitor and protect drinking water.

No listings within 1 mile radius of the subject site.

WQ Drinking Water Program

The California Health and Safety Code section 116275-116300 stipulates that it is the intent of the Legislature to improve laws governing drinking water quality to improve upon the minimum requirements of the federal Safe Drinking Water Act Amendments of 1986, to establish primary drinking water standards that are at least as stringent as those established under the federal Safe Drinking Water Act, and to establish a program under this chapter that is more protective of public health than the minimum federal requirements.

In order to provide for the orderly and efficient delivery of safe drinking water the State Department of Health Services collect information on the quality of public drinking water wells under the California Drinking Program.

Below, the latest and maximum analysis of contaminants are reported (only positive reading are included). MCL is the Maximum Contaminant Level or enforceable drinking water standard. RPHL is the Recommended Public Health Level. Additional information is available from BBL upon request.

This list has been researched within 1 mile radius of the subject site.

Owner: MOHRLAND MUTUAL WATER SYSTEM/
Well: WELL 02 - STANDBY
WellNo:
Map Loc: 171 - within 3/4 - 1 mile NE of the subject
Status: SR - Standby Raw (sampled before treatment)

REGIONAL SOURCES

NT Toxic Releases

The California Regional Water Quality Control Boards or local Department of Health Services keeps track of toxic releases to the environment. These lists are known as Unauthorized Releases, Spill, Leaks, Investigations and Cleanups (SLIC), Non-Tank Releases, Toxics List or similar, depending on the local agency.

This list has been researched within 1 mile radius of the subject site.

Site: THERMOFUSION
Address: 2343 AMERICAN AVE
City: HAYWARD
Map Loc: 158 - within 3/4 - 1 mile N of the subject
Status: O - Active case

2-01S0415

0 municipal 0 private wells have been co e nearest well is about 0 feet away. feet by 0 deep, has not been started. Th ntaminated. Containment of the plume, 0

Site: HAYWARD GATEWAY CENTER
Address: ARDEN RD
City: HAYWARD
Status: I - Inactive case

2-01S0029

has not been started. The nearest well is about 0 feet away. rivate wells have been contaminated. Con tainment of the plume, 0 feet by 0 deep, VARIOUS LIGHT INDUSTRIAL
0 municipal 0 p

Site: ARDEN ROAD PROPERTY
Address: ARDEN RD
City: HAYWARD
Status: -

Site: CONAGRA INC
Address: 3343 ARDEN RD
City: HAYWARD
Map Loc: 148 - within 3/4 - 1 mile SE of the subject
Status: 9 - Case Closed.

02Z1327

Site: FORMER WHITE CAP FACILITY
Address: 24493 CLAWITER RD
City: HAYWARD
Map Loc: 143 - within 1/2 - 3/4 mile NE of the subject
Status: O - Active case

2-01S0534

Site: CONTINENTAL WHITE CAP INC
Address: 24493 CLAWITER RD
City: HAYWARD
Map Loc: 143 - within 1/2 - 3/4 mile NE of the subject
Status: I - Inactive case

2-01S0025

. Containment of the plume, 0 feet by 0 deep, has not been started. The nearest ered, from UNDERGROUND TANKS. 0 municipa l 0 private wells have been contaminated PAINT MANUFACTURE
Contaminant was discov well is about 0 feet away.

Site: YELLOW FREIGHT LINES
Address: 25555 CLAWITER RD
City: HAYWARD
Map Loc: 117 - within 1/4 - 1/2 mile E of the subject
Status: I - Inactive case

2-01S0056

arted. The nearest well is about 0 feet away. e been contaminated. Containment of the plume, 0 feet by 0 deep, has not been st SHIPPING
0 municipal 0 private wells hav

Site: YELLOW FRIEGHT LINES
Address: 25555 CLAWITER RD
City: HAYWARD
Map Loc: 117 - within 1/4 - 1/2 mile E of the subject
Status: -

Site: MILDRED BURNHAM PROPERTY
Address: 23481 CONNECTICUT ST
City: HAYWARD
Map Loc: 84 - within 1/4 - 1/2 mile N of the subject
Status: I - Inactive case

2-01S0416

GLASS&ALU
0 municipal 0 private wells h ave been contaminated. Containment of th e plume, 0 feet by 0 deep, has not been started. The nearest well is about 0 fee t away. TENANTS:23481 EZ GO 23493 ARCHITECTURAL

Site: ALUMTREAT NORTH
Address: 26415 CORPORATE AVE
City: HAYWARD
Map Loc: 165 - within 3/4 - 1 mile SE of the subject
Status: -

Site: ALUMTREAT NORTH
Address: 26415 CORPORATE AVE
City: HAYWARD
Map Loc: 165 - within 3/4 - 1 mile SE of the subject
Status: C - Case Closed

2-01S0182

wells have been contaminated. Containme CASE CLOSED 9/6/95
0 municipal 0 private nt of the plume, 0 feet by 0 deep, has n ot been started. The nearest well is abo ut 0 feet away.

Site: PERKIN ELMER PROPERTY
Address: 26460 CORPORATE AVE
City: HAYWARD
Map Loc: 160 - within 3/4 - 1 mile SE of the subject
Status: C - Case Closed

2-01S0280

the plume, 0 feet by 0 deep, has not be en started. The nearest well is about 0 feet away. MANUFACTURING
0 municipal 0 private well s have been contaminated. Containment of

Site: WACHOVIA BANK PROPERTY
Address: 26545 CORPORATE AVE
City: HAYWARD
Map Loc: 163 - within 3/4 - 1 mile SE of the subject
Status: O - Active case

2-01S0247

0 feet away. been started. The nearest well is about of the plume, 0 feet by 0 deep, has not ells have been contaminated. Containment gency is RWQCB.
0 municipal 0 private w OFFICE/INDUSTRIAL DEVELOPMENT
The lead a

Site: 26569-75 CORPORATE AVE
Address: 26569 CORPORATE AVE, THRU 26575
City: HAYWARD
Map Loc: 167 - within 3/4 - 1 mile SE of the subject
Status: -

Site: EDEN PLAZA & EDEN ROCK
Address: 3146 CORPORATE PL, EDEN ROCK BLVD, ET AL
City: HAYWARD
Map Loc: 169 - within 3/4 - 1 mile SE of the subject
Status: -

Site: SHELL PIPELINE LEAK
Address: DEPOT & CABOT
City: HAYWARD
Map Loc: 104 - within 1/4 - 1/2 mile NW of the subject
Status: C - Case Closed

2-01S0335

wells have been contaminated. Containme CASE CLOSED 5/3/93

0 municipal 0 private nt of the plume, 0 feet by 0 deep, has n ot been started. The nearest well is abo ut 0 feet away.

Site: EAST BAY OIL COMPANY
Address: 3111 DEPOT RD
City: HAYWARD
Map Loc: 112 - within 1/4 - 1/2 mile NE of the subject
Status: O - Active case

2-01S0529

MIXED SOLVENT AND PETRLEUM PLUME IN GROU NDWATER
TRANSFERRED TO SLIC FROM LUST

Site: THERMIONICS METAL PROCESSING I
Address: 3118 DEPOT RD
City: HAYWARD
Map Loc: 124 - within 1/4 - 1/2 mile NE of the subject
Status: O - Active case

2-01S0496

agency is RWQCB.
0 municipal 0 private wells have been contaminated. Containme 66 PPB PCE; SOIL 0.0086PPM TCE. The lead as discovered, from GW MAX 1700 PPB TCE CONTAM MAY BE FROM OFFSITE
Contaminant w nt of the plume, 0 feet by 0 deep, has n ot been started. The nearest well is abo ut 0 feet away.

Site: SIERRA PACIFIC STEEL FACILITY
Address: 3200 DEPOT RD
City: HAYWARD
Map Loc: 67 - within 1/4 - 1/2 mile NE of the subject
Status: C - Case Closed

2-01S0509

""COMFORT LETTER"" CLOSURE.
0 municipal 0 private wells have been contaminated. Containment of the plume, 0 feet by 0 de ep, has not been started. The nearest we ll is about 0 feet away.

Site: FORNI CORP
Address: 3600 DEPOT RD
City: HAYWARD
Map Loc: 32 - within 1/4 - 1/2 mile N of the subject
Status: I - Inactive case

2-01S0253

0 municipal 0 private wells have been co e nearest well is about 0 feet away. feet by 0 deep, has not been started. Th ntaminated. Containment of the plume, 0

Site: FORNI CORPORATION
Address: 3600 DEPOT RD
City: HAYWARD
Map Loc: 32 - within 1/4 - 1/2 mile N of the subject
Status: -

Site: HERNING UNDERGROUND SUPPLY
Address: 3135 DIABLO AVE
City: HAYWARD
Map Loc: 85 - within 1/4 - 1/2 mile E of the subject
Status: -

Site: HERNING UNDERGROUND SUPPLY
Address: 3135 DIABLO AVE
City: HAYWARD
Map Loc: 85 - within 1/4 - 1/2 mile E of the subject
Status: I - Inactive case

2-01S0230

0 municipal 0 private wells have been co e nearest well is about 0 feet away. feet by 0 deep, has not been started. Th ntaminated. Containment of the plume, 0

Site: MUELLER PROPERTY
Address: 2474 DUNN ST
City: HAYWARD
Map Loc: 146 - within 3/4 - 1 mile N of the subject
Status: I - Inactive case

2-01S0307

0 municipal 0 private wells have been co e nearest well is about 0 feet away. feet by 0 deep, has not been started. Th ntaminated. Containment of the plume, 0

Site: LINCOLN PROP CO/HAYWARD IND PK
Address: EICHLER & DEPOT RD
City: HAYWARD
Map Loc: 34 - within 1/4 - 1/2 mile N of the subject
Status: -

Site: I-CHEM RESEARCH FACILITY
Address: 23787 EICHLER ST
City: HAYWARD
Map Loc: 56 - within 1/4 - 1/2 mile N of the subject
Status: -

Site: ALLGOOD INDUSTRIES
Address: 3466 ENTERPRISE AVE
City: HAYWARD
Map Loc: 8 - within 1/4 mile E of the subject
Status: 9 - Case Closed.

02Z1121

Site: RUNNELS INDUSTRIES
Address: 3590 ENTERPRISE AVE
City: HAYWARD
Map Loc: 1 - the subject site
Status: I - Inactive case

2-01S0286

0 municipal 0 private wells have been co e nearest well is about 0 feet away. feet by 0 deep, has not been started. Th ntaminated. Containment of the plume, 0

Site: HWY 92 & CLAWITER

Address: HWY 92 & CLAWITER RD
City: HAYWARD
Map Loc: 96 - within 1/4 - 1/2 mile SE of the subject
Status: -

Site: HIGHWAY 92 & CLAWITER RD
Address: HWY 92 & CLAWITER RD
City: HAYWARD
Map Loc: 96 - within 1/4 - 1/2 mile SE of the subject
Status: -

Site: BREAKWATER BUSINESS PARK
Address: HWY 92 & CLAWITER RD
City: HAYWARD
Map Loc: 96 - within 1/4 - 1/2 mile SE of the subject
Status: I - Inactive case

2-01S0096

0 municipal 0 private wells have been co e nearest well is about 0 feet away. feet by 0 deep, has not been started. Th ntaminated. Containment of the plume, 0

Site: XEROX CORPORATION
Address: 24500 INDUSTRIAL BLVD
City: HAYWARD
Map Loc: 141 - within 3/4 - 1 mile NE of the subject
Status: -

Site: XEROX CORP
Address: 24500 INDUSTRIAL BLVD
City: HAYWARD
Map Loc: 141 - within 1/2 - 3/4 mile NE of the subject
Status: C - Case Closed

2-01S0106

CASE CLOSED 9/18/97
0 municipal 0 privat e wells have been contaminated. Containm ent of the plume, 0 feet by 0 deep, has not been started. The nearest well is ab out 0 feet away.

Site: WACHOVIA REAL ESTATE FUND
Address: 3200 INVESTMENT BLVD
City: HAYWARD
Map Loc: 152 - within 3/4 - 1 mile SE of the subject
Status: C - Case Closed

2-01S0390

NO FURTHER ACTION
0 municipal 0 private t 0 feet away. t been started. The nearest well is abou t of the plume, 0 feet by 0 deep, has no wells have been contaminated. Containmen

Site: LOVE PROPERTY
Address: 3201 INVESTMENT BLVD

City: HAYWARD
Map Loc: 151 - within 3/4 - 1 mile SE of the subject
Status: O - Active case
2-01S0440

0 municipal 0 private wells have been co e nearest well is about 0 feet away. feet by 0 deep, has not been started. Th ntaminated. Containment of the plume, 0

Site: WACHOVIA BANK
Address: 3392 INVESTMENT BLVD
City: HAYWARD
Map Loc: 144 - within 1/2 - 3/4 mile SE of the subject
Status: -

Site: EDEN PLAZA PROPERTY
Address: 3521 INVESTMENT BLVD
City: HAYWARD
Map Loc: 138 - within 1/2 - 3/4 mile SE of the subject
Status: I - Inactive case
2-01S0093

0 municipal 0 private wells have been co e nearest well is about 0 feet away. feet by 0 deep, has not been started. Th ntaminated. Containment of the plume, 0

Site: VOLVO GM HEAVY TRUCK
Address: SAKLAN RD
City: HAYWARD
Status: -

Site: VENTURA PROPERTIES
Address: 23836 SAKLAN RD
City: HAYWARD
Map Loc: 153 - within 3/4 - 1 mile NE of the subject
Status: -

Site: VENTURA PROPERTIES
Address: 23836 SAKLAN RD
City: HAYWARD
Map Loc: 153 - within 3/4 - 1 mile NE of the subject
Status: I - Inactive case
2-01S0240

0 municipal 0 private wells have been co e nearest well is about 0 feet away. feet by 0 deep, has not been started. Th ntaminated. Containment of the plume, 0

Site: DIABLO INDUSTRIAL PARK
Address: VIKING & DIABLO AVE
City: HAYWARD
Map Loc: 20 - within 1/4 mile NE of the subject
Status: C - Case Closed
2-01S0442

NO FURTHER ACTION
0 municipal 0 private t 0 feet away. t been started. The nearest well is abou t of the plume, 0 feet by 0 deep, has no wells have been contaminated. Containmen

Site: 25495 & 25503 WHITESELL ST
Address: 25495 WHITESELL DR, & 25503
City: HAYWARD
Map Loc: 6 - within 1/4 mile SE of the subject
Status: -

Site: ROHM & HAAS INC
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: I - Inactive case

2-01S0122

0 municipal 0 private wells have been co e nearest well is about 0 feet away. feet by 0 deep, has not been started. Th ntaminated. Containment of the plume, 0

Site: ROHM & HAAS INC
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: -

TPC Toxic Pits

The Toxic Pits Clean-Up Act (Katz Bill) places strict limitations on the discharge of liquid hazardous wastes into surface impoundment, toxic ponds, pits and lagoons. Regional Water Quality Control Boards are required to inspect all surface impoundment annually, in addition, every facility was required to file a Hydrogeological Assessment Report. Recent legislation allows the Department of Health Services to exempt facilities that closed on or before December 31, 1985, if a showing is made that no significant environmental risk remains (AB1046).

Special exemption provisions have been created for surface impoundment that receive mining wastes.

No listings within 1 mile radius of the subject site.

SWAT(R) Solid Waste Assessment Test - Regional

This program, provided for under the Calderon legislation (Section 13273 of the Water Code), requires that disposal sites with more than 50,000 cubic yards of waste provide sufficient information to the regional water quality control board to determine whether or not the site has discharged hazardous substances which will impact the environment.

Site operators are required to file Solid Waste Assessment Test reports on a staggered basis. Operators of the 150 highest ranking (Rank 1) sites were required to submit Solid Waste Assessment Tests by July 1, 1987, Rank 2 in 1988 and so on.

Operators submit water quality tests to the Regional Water Quality Control Board, describing surface and groundwater quality and supply; and the geology within 1 mile of the site. Air quality tests are submitted to the local Air Quality Management District or Air Pollution Control District.

This program is currently not funded and thus not updated.

Status Codes: Facilities or sites are ranked within each region on a scale 1-15 according to priority.

No listings within 1 mile radius of the subject site.

OPERATING PERMITS

Various agencies issue operating permits or regulate the handling, movements, storage and disposal of hazardous materials and require mandatory reporting. The inclusion in this section does not imply that an environmental problem exists presently or has in the past.

The sources referenced below have been searched at the street address, unless otherwise stated, of the subject site.

RCRA-G Resource Conservation and Recovery Information System - Generators

The Environmental Protection Agency regulates generators of hazardous material through the Resource Conservation and Recovery Act (RCRA). All hazardous waste generators are required to notify EPA of their existence by submitting the Federal Notification of Regulated Waste Activity Form (EPA Form 8700-12) or a state equivalent form. The notification form provides basic identification information and specific waste activities.

Status Codes: L - Generators who generate at least 1000 kg/mo of non-acutely hazardous waste (or 1 kg/mo of acutely hazardous waste).
S - Generators who generate 100 kg/mo but less than 1000 kg/mo of non-acutely hazardous waste.
T - Transporter.

This list has been researched within half of a mile radius of the subject site.

Site: LYNX THERAPEUTICS
Address: 3832 BAY CENTER PL
City: HAYWARD
Map Loc: 49 - within 1/4 - 1/2 mile SE of the subject
Status:
Permit id#: CA0000118596

Site: LYNX THERAPEUTICS
Address: 3832 BAY CENTER PL
City: HAYWARD
Map Loc: 49 - within 1/4 - 1/2 mile SE of the subject
Status:
Permit id#: CA0000118596

Site: LYNX THERAPEUTICS
Address: 3832 BAY CENTER PL
City: HAYWARD
Map Loc: 49 - within 1/4 - 1/2 mile SE of the subject
Status: S - Small Generator

Permit id#: CA0000118596

Site: AMERICAN EXTERIOR COATING
Address: 3852 BAY CENTER PL
City: HAYWARD
Map Loc: 44 - within 1/4 - 1/2 mile SE of the subject
Status: S - Small Generator

Permit id#: CA0000632034

Site: AMERICAN EXTERIOR COATING
Address: 3852 BAY CENTER PL
City: HAYWARD
Map Loc: 44 - within 1/4 - 1/2 mile SE of the subject
Status:

Permit id#: CA0000632034

Site: SOGETAL INC
Address: 3872 BAY CENTER PL
City: HAYWARD
Map Loc: 29 - within 1/4 mile SE of the subject
Status: S - Small Generator

Permit id#: CAD147087928

Site: UNOCAL SVC STA #6074
Address: 3500 BREAKWATER AVE
City: HAYWARD
Map Loc: 94 - within 1/4 - 1/2 mile SE of the subject
Status:

Permit id#: CAD982057333

Site: PERKIN ELMER ETEC
Address: 3525 BREAKWATER AVE
City: HAYWARD
Map Loc: 95 - within 1/4 - 1/2 mile SE of the subject
Status: S - Small Generator

Permit id#: CAD054393129
SIC Codes: 3674

Site: AGTA CORPORATION
Address: 3535 BREAKWATER AVE
City: HAYWARD
Map Loc: 91 - within 1/4 - 1/2 mile SE of the subject
Status: S - Small Generator

Permit id#: CAD981999659

Site: GORMAN R H CO
Address: 3501 BREAKWATER CT
City: HAYWARD
Map Loc: 57 - within 1/4 - 1/2 mile SE of the subject
Status: L - Large Generator

Permit id#: CAD043240779
SIC Codes: 3561

Site: YELLOW FREIGHT SYSTEM INC
Address: 25555 CLAWITER RD
City: HAYWARD
Map Loc: 117 - within 1/4 - 1/2 mile E of the subject
Status: S - Small Generator

Permit id#: CAD044182699

SIC Codes: 4213 4231

Site: GILLIG CORPORATION
Address: 25800 CLAWITER RD
City: HAYWARD
Map Loc: 114 - within 1/4 - 1/2 mile E of the subject
Status: L - Large Generator

Permit id#: CAD066557182
SIC Codes: 3713

WASTE GENERATED:
IGNITABLE SPENT SOLVENT FROM PAINTING OPERATION IN BUS MANUF ACTURING, MIXTURE OF XYLENE AND ACETONE, WASTE THINNERS AND PAINTS 27 ton(s)

Site: FLOOD CO THE
Address: 25886 CLAWITER RD
City: HAYWARD
Map Loc: 109 - within 1/4 - 1/2 mile SE of the subject
Status:

Permit id#: CAD980884803

Site: ABBLEY TRANSP INC
Address: 23481 CONNECTICUT ST
City: HAYWARD
Map Loc: 84 - within 1/4 - 1/2 mile N of the subject
Status: T - Transporter

Permit id#: CAD980895254
SIC Codes: 4212 4213 4225

Site: THOMAS S B INC
Address: 23485 CONNECTICUT ST
City: HAYWARD
Map Loc: 82 - within 1/4 - 1/2 mile N of the subject
Status:

Permit id#: CAD086164274

Site: GUARANTEED AUTO
Address: 23673 CONNECTICUT ST,UNIT 5
City: HAYWARD
Map Loc: 68 - within 1/4 - 1/2 mile N of the subject
Status: S - Small Generator

Permit id#: CA0000368043

Site: GUARANTEED AUTO
Address: 23673 CONNECTICUT ST, 5
City: HAYWARD
Map Loc: 68 - within 1/4 - 1/2 mile N of the subject
Status:

Permit id#: CA0000368043

Site: GUARANTEED AUTO
Address: 23673 CONNECTICUT ST,NUMBER 5
City: HAYWARD
Map Loc: 68 - within 1/4 - 1/2 mile N of the subject
Status:

Permit id#: CA0000368043

Site: ASSOCIATED SCREW MACHINE PROD
Address: 23978 CONNECTICUT ST
City: HAYWARD
Map Loc: 41 - within 1/4 - 1/2 mile NW of the subject
Status: S - Small Generator

Permit id#: CAD983657404
SIC Codes: 3451

Site: EAST BAY OIL COMPANY
Address: 3111 DEPOT RD
City: HAYWARD
Map Loc: 112 - within 1/4 - 1/2 mile NE of the subject
Status: T - Transporter

Permit id#: CAD982429714
SIC Codes: 5172 5169 2842

Site: THERMIOHIES METAL PROCESSING I
Address: 3124 DEPOT RD
City: HAYWARD
Map Loc: 102 - within 1/4 - 1/2 mile NE of the subject
Status: L - Large Generator

Permit id#: CAD982510745

Site: EXIDE CORPORATION SERVICE CTR
Address: 3470 DEPOT RD
City: HAYWARD
Map Loc: 42 - within 1/4 - 1/2 mile N of the subject
Status: S - Small Generator

Permit id#: CAD981641103
SIC Codes: 7699

Site: FORNI CORPORATION
Address: 3600 DEPOT RD
City: HAYWARD
Map Loc: 32 - within 1/4 - 1/2 mile N of the subject
Status: S - Small Generator

Permit id#: CAD009237413
SIC Codes: 3272

Site: NUBULK SERVICES INC
Address: 3643 DEPOT RD
City: HAYWARD
Map Loc: 39 - within 1/4 - 1/2 mile N of the subject
Status: L - Large Generator

Permit id#: CAD980895106
SIC Codes: 4231

Site: DORIS AUTO WRECKERS
Address: 3720 DEPOT RD
City: HAYWARD
Map Loc: 75 - within 1/4 - 1/2 mile NW of the subject
Status: S - Small Generator

Permit id#: CAD981443484
SIC Codes: 5093 5531

Site: AMERICAN AUTO WRECKERS
Address: 3744 DEPOT RD
City: HAYWARD
Map Loc: 80 - within 1/4 - 1/2 mile NW of the subject
Status: S - Small Generator

Permit id#: CAD981573751
SIC Codes: 5015

Site: ODYSSEY TRANSPORTATION INC
Address: 3826 DEPOT RD
City: HAYWARD
Map Loc: 135 - within 1/2 - 3/4 mile NW of the subject
Status: L - Large Generator

Permit id#: CAD087210019

Site: AVD METAL FAB INC
Address: 3190 DIABLO AVE
City: HAYWARD
Map Loc: 64 - within 1/4 - 1/2 mile NE of the subject
Status: S - Small Generator

Permit id#: CAD981626690

Site: KEM MIL CO
Address: 3468 DIABLO AVE
City: HAYWARD
Map Loc: 25 - within 1/4 mile NE of the subject
Status: S - Small Generator

Permit id#: CAD982485849
SIC Codes: 3599

Site: TRM COPY CENTERS CORP
Address: 3480 DIABLO AVE
City: HAYWARD
Map Loc: 21 - within 1/4 mile NE of the subject
Status: S - Small Generator

Permit id#: CAD983587171

Site: DECON ENVIRONMENTAL SERVICES
Address: 26102 EDEN LANDING RD , STE 4
City: HAYWARD
Map Loc: 129 - within 1/4 - 1/2 mile SE of the subject
Status: T - Transporter

Permit id#: CAD982468183
SIC Codes: 1799

Site: PACKAGE DELIVERY EXPRESS
Address: 23579 EICHLER ST, UNIT J
City: HAYWARD
Map Loc: 76 - within 1/4 - 1/2 mile N of the subject
Status: S - Small Generator

Permit id#: CAD981669724

Site: SENCO PRODUCTS
Address: 23783 EICHLER ST, UNIT D
City: HAYWARD
Map Loc: 63 - within 1/4 - 1/2 mile N of the subject
Status: S - Small Generator

Permit id#: CAD981634553
SIC Codes: 5072

Site: AMERICAN AUTOPIAN INC
Address: 23787 EICHLER ST
City: HAYWARD
Map Loc: 56 - within 1/4 - 1/2 mile N of the subject
Status: S - Small Generator

Permit id#: CAD983629288

Site: SPICER UNIVERSAL JOINT DIC RDC
Address: 3390 ENTERPRISE AVE
City: HAYWARD
Map Loc: 54 - within 1/4 - 1/2 mile E of the subject
Status: S - Small Generator

Permit id#: CAD079088407

Site: MIRACLE TRUCK PAINTING
Address: 3393 ENTERPRISE AVE
City: HAYWARD
Map Loc: 37 - within 1/4 mile E of the subject
Status: S - Small Generator

Permit id#: CAD981573280
SIC Codes: 7532

Site: PRECISION METAL FABRICATORS
Address: 3402 ENTERPRISE AVE
City: HAYWARD
Map Loc: 22 - within 1/4 mile E of the subject
Status: S - Small Generator

Permit id#: CAD009169830

Site: PERRY TOOL & RESEARCH COMPANY
Address: 3415 ENTERPRISE AVE
City: HAYWARD
Map Loc: 46 - within 1/4 mile E of the subject
Status: S - Small Generator

Permit id#: CAD041320748
SIC Codes: 3399

Site: MICROSIL CORP
Address: 3434 ENTERPRISE AVE
City: HAYWARD
Map Loc: 36 - within 1/4 mile E of the subject
Status: S - Small Generator

Permit id#: CAR000020180

Site: WELLS ELECTROPLATING
Address: 3435 ENTERPRISE AVE
City: HAYWARD
Map Loc: 23 - within 1/4 mile E of the subject
Status: S - Small Generator

Permit id#: CAD980736680

Site: J NORDHAVEN & SONS, INC
Address: 3435 ENTERPRISE AVE
City: HAYWARD
Map Loc: 23 - within 1/4 mile E of the subject
Status: S - Small Generator

Permit id#: CAD981385388
SIC Codes: 3471

Site: LAFAYETTE MANUFACTURING INC
Address: 3440 ENTERPRISE AVE
City: HAYWARD
Map Loc: 12 - within 1/4 mile E of the subject

Status: S - Small Generator

Permit id#: CAD981965759
SIC Codes: 3272

Site: LES MC DONALD CONSTRUCTION CO
Address: 3500 ENTERPRISE AVE
City: HAYWARD
Map Loc: 4 - within 1/4 mile E of the subject
Status: S - Small Generator

Permit id#: CAD982471971
SIC Codes: 1611

Site: VS TIRE SALES
Address: 3680 ENTERPRISE AVE
City: HAYWARD
Map Loc: 3 - within 1/4 mile NW of the subject
Status: S - Small Generator

Permit id#: CAD982459786

Site: HAYWARD CITY OF TREATMENT PLNT
Address: 3700 ENTERPRISE AVE
City: HAYWARD
Map Loc: 5 - within 1/4 mile W of the subject
Status: S - Small Generator

Permit id#: CAD981667868
SIC Codes: 4952

Site: CLEAN AIR VEHICLE TEST CENTER
Address: 26223 EXECUTIVE PL
City: HAYWARD
Map Loc: 111 - within 1/4 - 1/2 mile S of the subject
Status: S - Small Generator

Permit id#: CAD983629304

Site: HOME HEALTH CARE
Address: 26232 EXECUTIVE PL
City: HAYWARD
Map Loc: 98 - within 1/4 - 1/2 mile S of the subject
Status: S - Small Generator

Permit id#: CAD981626047

Site: AUTO AND TRUCK BUMPER RECYCLIN
Address: 23986 FOLEY ST
City: HAYWARD
Map Loc: 58 - within 1/4 - 1/2 mile NW of the subject
Status: S - Small Generator

Permit id#: CAD983665977

Site: LUCKY STORES INC
Address: PO BOX 5008
City: HAYWARD
Status: L - Large Generator

Permit id#: CAD983617036
SIC Codes: 4225 5141

Site: ST FRANCIS ELECTRIC
Address: PO BOX 57107

City: HAYWARD
Status: S - Small Generator

Permit id#: CAD983608803
SIC Codes: 1731

Site: QMECT INC DBA ELECTROCHEM
Address: 25020 VIKING ST
City: HAYWARD
Map Loc: 50 - within 1/4 - 1/2 mile NE of the subject
Status: L - Large Generator

Permit id#: CAD982017394
SIC Codes: 3471

WASTE GENERATED:
HAZARDOUS WASTE LIQUID, RINSE WATERS, FROM PLATING PROCESSES. 4680000 gal
HAZARDOUS WASTE SOLID, SPENT FILTERS FROM FILTERING OF PLATING BATHS. 2758 lbs
HAZARDOUS WASTE LIQUID, TRICHLOROTRIFLUOROETHANE, FROM DRYING OPERATIONS. 121 gal
HAZARDOUS WASTE LIQUID, SODIUM HYDROXIDE, FROM THE REMOVAL OF SPENT PROCESS SOLUTIONS. 770 gal
HAZARDOUS WASTE SOLID, METAL HYDROXIDE FILTER CAKE, FROM WASTEWATER TREATMENT OPERATIONS. 11 ton(s)
CORROSIVE LIQUID, RACK STRIP SOLUTION, FROM THE REMOVAL OF SPENT PROCESS SOLUTIONS. 40160 lbs
POISONOUS LIQUID, CYANIDE PLATING AND STRIPPING BATHS, FROM THE REMOVAL OF SPENT PROCESS SOLUTIONS. 973 gal

Site: SIGNET TESTING LABORATORIES IN
Address: 25064 VIKING ST
City: HAYWARD
Map Loc: 26 - within 1/4 mile NE of the subject
Status:

Permit id#: CAD071691877
SIC Codes: 7389 8734

Site: NELLCOR INC
Address: 25495 WHITESELL DR
City: HAYWARD
Map Loc: 6 - within 1/4 mile SE of the subject
Status: S - Small Generator

Permit id#: CAD982336166
SIC Codes: 3845

Site: ROHM & HAAS CA INC
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: S - Small Generator

Permit id#: CAD020028072
SIC Codes: 2821 4225

WASTE GENERATED:
DISCARDED LABORATORY WASTES AND SUPPLIES 532 lbs
ABSORBENT AND DEBRIS CONTAMINATED WITH IGNITABLE OR CORROSIV E LIQUID FROM CLEANUP AND REPACKAGING OF ACCIDENTAL SPILLS 1719 lbs
COMBUSTIBLE LIQUID (PETROLEUM NAPHTHA) USED IN DEGREASING OP ERATIONS 651 lbs
SPENT INSTRUMENT MERCURY 50 lbs
COMBUSTIBLE LIQUID (PETROLEUM OIL) USED IN CRANKCASE LUBRICA TION 6682 lbs
REACTIVE ORGANIC LIQUID FROM STORAGE TANK CLEAN-OUT 110 lbs
REACTIVE ORGANIC SLUDGE FROM STORAGE TANK CLEAN-OUT 4140 lbs

RCRA-D Resource Conservation and Recovery Information System - Treatment, Storage & Disposal

The Environmental Protection Agency regulates the treatment, storage and disposal of hazardous material through the Resource Conservation and Recovery Act (RCRA). All hazardous waste TSD facilities are required to notify EPA of their existence by submitting the Federal Notification of Regulated Waste Activity Form (EPA Form 8700-12) or a state equivalent form as well as part A (EPA form 8700-23) and Part B of their Hazardous Waste Permit Application.

Status Codes:	I	Incinerator
	T	Storage/Treatment facility other than Incinerator
	D	Land Disposal Facility

No listings within 1 mile radius of the subject site.

SARA SARA Title III,section 313 (TRIS)

Title III of the Superfund Amendments and Reauthorization Act,Section 313, also known as Emergency Planning and Community Right-to-Know Act of 1986 requires owners or operators of facilities with more than 10 employees and are listed under Standard Industrial Classification(SIC) Codes 20 through 39 to report the manufacturing, processing or use of more than a threshold of certain chemical or chemical categories listed under section 313. This data base is also known as Toxic Release Information System (TRIS).

Below summary information for the last five year period is reported grouping the releases into air, water, underground injection, land, public offsite treatment (potw) and transportation offsite.

This list has been researched within half of a mile radius of the subject site.

Site: MDC VACUUM PRODUCTS CORP.
Address: 23842 CABOT BLVD
City: HAYWARD
Map Loc: 126 - within 1/4 - 1/2 mile NW of the subject
Status:
1,1,1-TRICHLOROETHANE air: 28800 tran: 4600

Site: HERRICK CORP.
Address: 25450 CLAWITER RD
City: HAYWARD
Map Loc: 121 - within 1/4 - 1/2 mile E of the subject
Status:
PROPYLENE air: 250

Site: HENKEL ADHESIVES CORP.
Address: 25817 CLAWITER RD
City: HAYWARD
Map Loc: 116 - within 1/4 - 1/2 mile E of the subject
Status:
1,1,1-TRICHLOROETHANE air: 5000 potw: 27900
SODIUM HYDROXIDE (SOLUTION) potw: 9503
BUTYL BENZYL PHTHALATE air: 1500 potw: 35600

Site: I-CHEM RESEARCH INC.
Address: 23787 EICHLER ST
City: HAYWARD
Map Loc: 56 - within 1/4 - 1/2 mile N of the subject
Status:
DICHLOROMETHANE air: 40153
NITRIC ACID
SODIUM HYDROXIDE (SOLUTION)

Site: ROHM & HAAS CALIFORNIA INC.
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status:

ETHYL ACRYLATE air: 2040 potw: 39 tran: 254
FORMALDEHYDE air: 428 potw: 303 tran: 440
ASBESTOS (FRIABLE) tran: 942
METHYL METHACRYLATE air: 5141 potw: 103 tran: 1612
ACRYLIC ACID
ACRYLAMIDE air: 298 tran: 37542
ACRYLONITRILE air: 966 potw: 43 tran: 12
AMMONIA air: 719 tran: 19
BUTYL ACRYLATE air: 5787 potw: 90 tran: 1414
SODIUM HYDROXIDE (SOLUTION) land: 50
STYRENE air: 5951 potw: 59 tran: 214
SULFURIC ACID air: 220
VINYL ACETATE air: 599 potw: 21 tran: 102
ZINC COMPOUNDS potw: 406 tran: 6517

NC Nuclear Regulatory Commission Licensees

The Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards has been mandated (10 CFR Ch 1.42) to protect the public health and safety, the common defense and security, and the environment by licensing, inspection, and environmental impact assessment for all nuclear facilities and activities, and for the import and export of special nuclear material.

No listings within half of a mile radius of the subject site.

PCB PCB Waste Handlers Database

The U.S. Environmental Protection Agency tracks generators, transporters, commercial stores and/or brokers and disposers of PCB's in accordance with the Toxic Substance Control Act.

This list has been researched within half of a mile radius of the subject site.

Site: DECON ENVIRONMENTAL SERVICES
Address: 26102 EDEN LANDING RD , STE 4
City: HAYWARD
Map Loc: 129 - within 1/4 - 1/2 mile SE of the subject
Status:

Permit id#: CAD982468183
SIC Codes: 1799

PCS Permit Compliance System

PCS is a database which contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS was developed by The U.S. Environmental Protection Agency to meet the information needs of the NPDES program under the Clean Water Act. PCS tracks permit, compliance, and enforcement states of NPDES facilities.

This list has been researched within half of a mile radius of the subject site.

Site: HAYWARD CITY OF TREATMENT PLNT
Address: 3700 ENTERPRISE AVE

City: HAYWARD
Map Loc: 5 - within 1/4 mile W of the subject
Status:
Permit id#: CAD981667868
SIC Codes: 4952

AFS AIRS Facility System

AFS contains emissions and compliance data on air pollution point sources tracked by the U.S. EPA and state and local environmental regulatory agencies. There are seven "criteria pollutants" for which data must be reported to EPA and stored in AIRS: PM10 (particulate matters less than 10 microns in size), carbon monoxide, sulfur dioxide, nitrogen dioxide, lead, reactive volatile organic compounds (VOC), and ozone.

AFS replaces the former Compliance Data System (CDS), the National Emission Data System (NEDS), and the Storage and Retrieval of Aeromatic Data (SAROAD).

This list has been researched within half of a mile radius of the subject site.

Site: STILES PAINT MANUFACTURING
Address: 3428 ENTERPRISE AVE
City: HAYWARD
Map Loc: 16 - within 1/4 mile E of the subject
Status:
Permit id#: CAD057508145
SIC Codes: 2851

Site: LAFAYETTE MANUFACTURING INC
Address: 3440 ENTERPRISE AVE
City: HAYWARD
Map Loc: 12 - within 1/4 mile E of the subject
Status:
Permit id#: CAD981965759
SIC Codes: 3272

Site: ROHM & HAAS CA INC
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status:
Permit id#: CAD020028072
SIC Codes: 2821 4225

PE Section Seven Tracking System (SSTS)

SSTS evolved from the FIFRA and TSCA Enforcement System (FATES). SSTS tracks the registration of all pesticide producing establishments and tracks annually the types and amounts of pesticides, active ingredients, and devices that are produced, sold or distributed each year.

This list has been researched within half of a mile radius of the subject site.

Site: GRAYOX CORP
Address: 3428 ENTERPRISE AVE
City: HAYWARD
Map Loc: 16 - within 1/4 mile E of the subject
Status:
Permit id#: CA0000648709
SIC Codes: 2834 2869 2842

Site: CHEMMARK OF SAN FRANCISCO
Address: 25023 VIKING ST
City: HAYWARD
Map Loc: 40 - within 1/4 - 1/2 mile NE of the subject
Status:
Permit id#: CA0000610154
SIC Codes: 5161 2842 2841

Site: ROHM & HAAS CA INC
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status:
Permit id#: CAD020028072
SIC Codes: 2821 4225

FIFRA FIFRA/TSCA Tracking System/ National Compliance Database (FTTS/NCDB)

NCDB supports implementation of the Federal Insecticide, Funguside and Rodenticide Control Act (FIFRA) and the Toxic Substance Control Act (TSCA).

This list has been researched within half of a mile radius of the subject site.

Site: ADHESIVES CONSULTANTS
Address: 25817 CLAWITER RD
City: HAYWARD
Map Loc: 116 - within 1/4 - 1/2 mile E of the subject
Status:
Permit id#: CAD983566829
SIC Codes: 2891

Site: SOLVOIL CO
Address: 3111 DEPOT RD
City: HAYWARD
Map Loc: 112 - within 1/4 - 1/2 mile NE of the subject
Status:
Permit id#: CA0000326124

Site: SOLVOIL CO
Address: 3111 DEPOT RD
City: HAYWARD
Map Loc: 112 - within 1/4 - 1/2 mile NE of the subject
Status:
Permit id#: CA0000326124

Site: FORENSIC ANALYTICAL SPECIALTIE
Address: 3777 DEPOT RD, STE 408
City: HAYWARD
Map Loc: 118 - within 1/4 - 1/2 mile NW of the subject
Status:
Permit id#: CA0000322909

Site: FORENSIC ANALYTICAL SPECIALTIE
Address: 3777 DEPOT RD, STE 408
City: HAYWARD
Map Loc: 118 - within 1/4 - 1/2 mile NW of the subject
Status:
Permit id#: CA0000322909

Site: DECON ENVIRONMENTAL SERVICES
Address: 26102 EDEN LANDING RD , STE 4

City: HAYWARD
Map Loc: 129 - within 1/4 - 1/2 mile SE of the subject
Status:
Permit id#: CAD982468183
SIC Codes: 1799

Site: CLYDE ROBIN SEED CO
Address: 3670 ENTERPRISE AVE
City: HAYWARD
Map Loc: 2 - within 1/4 mile NW of the subject
Status:
Permit id#: CA0000914630

FFIS Federal Facilities Information System (FFIS)

Federal Faclities Informaton System (FFIS) contains a list of all Treatment Storage and Disposal Faclities (TSDs) owned and operated by federal agencies.

No listings within half of a mile radius of the subject site.

CICIS Chemicals in Commerce Information System (CICIS)

Chemicals in Commerce Information System contains an inventory of chemicals manufactured in commerce or imported for Toxic Substances Control Act regulated commercial purposes. CICIS allows EPA to maintain a comprehensive listing of over 70,000 chemical substances that are manufactured or imported and are regulated under TSCA.

This list has been researched within half of a mile radius of the subject site.

Site: ROHM & HAAS CA INC
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status:
Permit id#: CAD020028072
SIC Codes: 2821 4225

FINDS FINDS EPA Facility Index System

The U.S. Environmental Protection Agency maintains an index system of all facilities which are regulated or have been assigned an identification number for other purposes.

Facilities that have been reported elsewhere in this report will not be included in the listing below.

This list has been researched within half of a mile radius of the subject site.

Site: HERRICK CORP THE
Address: 25450 CLAWITER RD
City: HAYWARD
Map Loc: 121 - within 1/4 - 1/2 mile E of the subject
Status:
Permit id#: CAD983577388
SIC Codes: 1791

Site: I-CHEM RESEARCH INC.
Address: 23787 EICHLER ST,F
City: HAYWARD

Map Loc: 56 - within 1/4 - 1/2 mile N of the subject
Status:
Permit id#: CAD983575994
SIC Codes: 3085 3221

HWIS Hazardous Waste Information System

The Department of Toxic Substance Control, California Environmental Protection Agency, maintains a a data base keeping track of the movement and disposal of hazardous waste. The data is used to support the Tanner legislation, AB 2948.

Status Codes: EPA Facility Permit Number

This list has been researched within half of a mile radius of the subject site.

Site: NORTH AMERICAN COMPLIANCE
Address: 3864 BAY CENTER PL
City: HAYWARD
Map Loc: 38 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAL000019639

Site: SOGETAL INC
Address: 3872 BAY CENTER PL
City: HAYWARD
Map Loc: 29 - within 1/4 mile SE of the subject
Status: EPA ID#: CAD147087928

Organics:
Hydrocarbon solvents(89: .1 91: .12 ton)
Unspecified solvent mixture(89: .61 91: .22 ton)
Miscellaneous:
Laboratory waste chemicals(91: .38 ton)

Site: METABOLEX INC
Address: 3876 BAY CENTER PL
City: HAYWARD
Map Loc: 27 - within 1/4 mile SE of the subject
Status: EPA ID#: CAL000094498

Site: UNOCAL SVC STA #6074
Address: 3500 BREAKWATER AVE
City: HAYWARD
Map Loc: 94 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAL000058403

Site: RICKS 76 CENTER
Address: 3500 BREAKWATER AVE
City: HAYWARD
Map Loc: 94 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAL000023824

Site: MINERLAB INC.
Address: 3501 BREAKWATER AVE
City: HAYWARD
Map Loc: 103 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAD076542760

Site: MINERAL LAB
Address: 3501 BREAKWATER AVE
City: HAYWARD
Map Loc: 103 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAX000238147

Site: GEOBIOTICS INC
Address: 3505 BREAKWATER AVE
City: HAYWARD
Map Loc: 93 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAL000060423

Site: THOMAS RESEARCH CORPORATION
Address: 3505 BREAKWATER AVE
City: HAYWARD
Map Loc: 93 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAL000001992

Site: PERKIN ELMER ETEC
Address: 3525 BREAKWATER AVE
City: HAYWARD
Map Loc: 95 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAD054393129

Site: COMPUGRAPHIC CORPORATION
Address: 3535 BREAKWATER AVE
City: HAYWARD
Map Loc: 91 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAD981999659

Miscellaneous:
Photochemical waste(89: .91 91: 1.36 ton)

Site: TRIMAC TRANSPORTATION
Address: 3751 BREAKWATER AVE
City: HAYWARD
Map Loc: 88 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAL922524137

Site: BIG AL'S SUPER SERVICE
Address: 4125 BREAKWATER AVE
City: HAYWARD
Map Loc: 69 - within 1/4 - 1/2 mile S of the subject
Status: EPA ID#: CAX000017343

Site: D & E STEELPLATE RENTAL INC
Address: 4125 BREAKWATER AVE
City: HAYWARD
Map Loc: 69 - within 1/4 - 1/2 mile S of the subject
Status: EPA ID#: CAL923005519

Site: GOLDEN BAY EQUIPMENT CO
Address: 3053 BREAKWATER CT
City: HAYWARD
Map Loc: 66 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAD131593741

Organics:
Unspecified organic liquid mixture(91: .74 ton)

Site: WEYERHAEUSER BLDG MAT
Address: 3495 BREAKWATER CT
City: HAYWARD
Map Loc: 74 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAC000652168

Miscellaneous:
Empty non-pesticide containers > 30 gallons(91: 5 ton)

Site: GORMAN, R. H. CO
Address: 3501 BREAKWATER CT
City: HAYWARD
Map Loc: 57 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAD043240779

Inorganics:
Aqeous solution with metals above restricted levels(89: .22 91: .2 ton)
Organics:
Waste oil and mixed oil(89: 1.72 91: 1.91 ton)

Site: HERRICK CORPORATION, THE
Address: 25450 CLAWITER RD
City: HAYWARD
Map Loc: 121 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAD009137126

Organics:
Hydrocarbon solvents(89: .9 ton)
Unspecified solvent mixture(89: .45 ton)

Unspecified organic liquid mixture(89: .68 ton)
California Restricted Wastes:
Liquids with pH<2(89: .91 ton)

Site: YELLOW FREIGHT SYSTEM INC
Address: 25555 CLAWITER RD
City: HAYWARD
Map Loc: 117 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAD044182699

Site: YELLOW FREIGHT SYSTEMS
Address: 25555 CLAWITER RD
City: HAYWARD
Map Loc: 117 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAC000261233

Site: GILLIG CORPORATION
Address: 25800 CLAWITER RD
City: HAYWARD
Map Loc: 114 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAD066557182

Organics:
Oxygenated solvents(91: .47 ton)
Unspecified solvent mixture(89: 28.41 91: 27.27 ton)
Waste oil and mixed oil(89: 4.58 91: 9.16 ton)
Off-specification, aged or surplus organics(91: 1.13 ton)
Other organic solids(91: 2.17 ton)
California Restricted Wastes:
Liquids with halogenated org > 1000 mg/l(91: .22 ton)

Site: PRUDENTIAL INSURANCE CO. OF AM
Address: 25803 CLAWITER RD
City: HAYWARD
Map Loc: 105 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAC000830128

Site: PRUDENTIAL PROPERTY CO
Address: 25811 CLAWITER RD
City: HAYWARD
Map Loc: 106 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAC000304321

Site: ADHESIVES CONSULTANTS CORP
Address: 25817 CLAWITER RD
City: HAYWARD
Map Loc: 116 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAD076562925

Organics:
Adhesives(89: 34.14 91: 66.88 ton)

Site: WESTERN PAPER BOX DIVISION
Address: 25858 CLAWITER RD
City: HAYWARD
Map Loc: 119 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAL000082356

Site: CALIFORNIA AERIAL EQUIP
Address: 25886 CLAWITER RD
City: HAYWARD
Map Loc: 109 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAL000019392

Organics:
Waste oil and mixed oil(91: .62 ton)
Oil/water separation sludge(91: 5.21 ton)

Site: V I P INDUSTRIES
Address: 25886 CLAWITER RD
City: HAYWARD
Map Loc: 109 - within 1/4 - 1/2 mile SE of the subject
Status: EPA ID#: CAD980884803

Site: ABBLEY TRANSPORT INC
Address: 23481 CONNECTICUT ST
City: HAYWARD
Map Loc: 84 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAD980895254

Site: E-Z-GO TEXTRON
Address: 23481 CONNECTICUT ST
City: HAYWARD
Map Loc: 84 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAL000035089

Site: THOMAS S B INC
Address: 23485 CONNECTICUT ST
City: HAYWARD
Map Loc: 82 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAD086164274

Site: DECON ENVIRONMENTAL SERVICES
Address: 23490 CONNECTICUT ST
City: HAYWARD
Map Loc: 73 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAD982468183

Site: SCHMALZ & NELSON PIANO SERVICE
Address: 23673 CONNECTICUT ST,# 7
City: HAYWARD
Map Loc: 68 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAX000081091

Site: GUARANTEED AUTO SERVICE
Address: 23673 CONNECTICUT ST, 3 5# 1
City: HAYWARD
Map Loc: 68 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAL000001481

Organics:
Unspecified organic liquid mixture(91: 1.25 ton)

Site: AIR & TOOL ENGINEERING
Address: 23782 CONNECTICUT ST,UNIT 5
City: HAYWARD
Map Loc: 62 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAL000064402

Site: DAVE'S EQUIPMENT REPAIR
Address: 23839 CONNECTICUT ST,SUITE 7
City: HAYWARD
Map Loc: 55 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAL000025896

Site: ALL STAR BODY SHOP
Address: 23888 CONNECTICUT ST,# 2
City: HAYWARD
Map Loc: 48 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAL000049025

Site: CONNECTICUT DEPOT PRINT CO
Address: 23978 CONNECTICUT ST
City: HAYWARD
Map Loc: 41 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAL000095538

Site: SCHENKHUIZEN, MIKE
Address: 23978 CONNECTICUT ST
City: HAYWARD
Map Loc: 41 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAC000288529

Site: ASSOCIATED SCREW MACHINE PROD
Address: 23978 CONNECTICUT ST
City: HAYWARD
Map Loc: 41 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAD983657404

Site: A-Y SUPPLY INC
Address: 3110 DEPOT RD
City: HAYWARD
Map Loc: 127 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAL912673590

Site: EAST BAY OIL COMPANY
Address: 3111 DEPOT RD
City: HAYWARD
Map Loc: 112 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAD982429714

Site: DON & TERRYS GM AUTO REPAIR
Address: 3117 DEPOT RD
City: HAYWARD
Map Loc: 122 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAL000081458

Site: DON/TERRY'S GM AUTO RPR
Address: 3117 DEPOT RD
City: HAYWARD
Map Loc: 122 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAL921082637

Site: THERMIOHIES METAL PROCESSING I
Address: 3124 DEPOT RD
City: HAYWARD
Map Loc: 102 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAD982510745

Site: D & B MACHINE INC
Address: 3127 DEPOT RD
City: HAYWARD
Map Loc: 86 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAL000084543

Site: CONTRACTORS CHEMICAL INC
Address: 3130 DEPOT RD

City: HAYWARD
Map Loc: 79 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAL000013434

Organics:
Oxygenated solvents(89: 2.06 91: .43 ton)
Polymeric resin waste(89: 2.75 91: 1.01 ton)
Unspecified organic liquid mixture(89: .12 ton)

Site: WESTLAND METAL INC
Address: 3149 DEPOT RD
City: HAYWARD
Map Loc: 100 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAC000692576

Site: CONCISE CASTING CORP
Address: 3197 DEPOT RD
City: HAYWARD
Map Loc: 83 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAD009156746

Site: MARLEICH MECHANICAL CO
Address: 3197 DEPOT RD
City: HAYWARD
Map Loc: 83 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAH777000378

Site: SECURITY SERVICES CO
Address: 3197 DEPOT RD
City: HAYWARD
Map Loc: 83 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAC000255985

Site: SIERRA PACIFIC STEEL
Address: 3200 DEPOT RD
City: HAYWARD
Map Loc: 67 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAC000536072

Site: CALIFORNIA COURIER
Address: 3295 DEPOT RD
City: HAYWARD
Map Loc: 61 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAC000521232

Site: YUASA-EXIDE INC

Address: 3470 DEPOT RD
City: HAYWARD
Map Loc: 42 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAL000062318

Site: EXIDE CORPORATION SERVICE CTR
Address: 3470 DEPOT RD
City: HAYWARD
Map Loc: 42 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAD981641103

Site: CHEMICAL LEAMAN TANK LINES, IN
Address: 3530 DEPOT RD
City: HAYWARD
Map Loc: 30 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAL000113614

Site: NU-BULK SERVICES
Address: 3530 DEPOT RD
City: HAYWARD
Map Loc: 30 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAC000576592

Organics:
Unspecified oil containing waste(91: 4.17 ton)
Other organic solids(91: .37 ton)

Site: FORNI CORPORATION
Address: 3600 DEPOT RD
City: HAYWARD
Map Loc: 32 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAL000019770

Site: R & W TRUCKING
Address: 3643 DEPOT RD
City: HAYWARD
Map Loc: 39 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAX000051581

Site: NUBULK SERVICES INC
Address: 3643 DEPOT RD
City: HAYWARD
Map Loc: 39 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAD980895106

Inorganics:

Site: DORIS AUTO WRECKERS
Address: 3720 DEPOT RD
City: HAYWARD
Map Loc: 75 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAD981443484

Site: AMERICAN AUTO WRECKERS
Address: 3744 DEPOT RD
City: HAYWARD
Map Loc: 80 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAD981573751

Site: AJAX AUTO
Address: 3764 DEPOT RD
City: HAYWARD
Map Loc: 101 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAL000000399

Site: FORENSIC ANALYTICAL SPECIALTIE
Address: 3777 DEPOT RD
City: HAYWARD
Map Loc: 118 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAC000153229

Inorganics:
Asbestos containing waste(89: 2.52 91: 10.1 ton)

Site: FORENSIC ANALYTICAL SPECIALTIE
Address: 3777 DEPOT RD,SUITE 406
City: HAYWARD
Map Loc: 118 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAL000022621

Organics:
Unspecified organic liquid mixture(91: .22 ton)

Site: BAY AREA CONSTRUCTION FRAMERS
Address: 3810 DEPOT RD
City: HAYWARD
Map Loc: 125 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAL000120095

Site: J & M INC
Address: 3826 DEPOT RD
City: HAYWARD
Map Loc: 135 - within 1/2 - 3/4 mile NW of the subject
Status: EPA ID#: CAL912472836

Site: NELLCOR INC.
Address: 3116 DIABLO AVE
City: HAYWARD
Map Loc: 110 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAX000072090

Site: BEDFORD PROPERTY INC.
Address: 3121 DIABLO AVE
City: HAYWARD
Map Loc: 87 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAC000543183

Inorganics:
Asbestos containing waste(91: 25.28 ton)

Site: HERNING UNDERGROUND SUPPLY
Address: 3135 DIABLO AVE
City: HAYWARD
Map Loc: 85 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAC000255025

Site: JML INC.
Address: 3146 DIABLO AVE
City: HAYWARD
Map Loc: 65 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAC000547144

Site: HAYWARD ELECTRIC
Address: 3150 DIABLO AVE
City: HAYWARD
Map Loc: 59 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAL000064440

Site: ADVANCED LIGHTWEIGHT CONCRE
Address: 3156 DIABLO AVE
City: HAYWARD
Map Loc: 52 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAC000658424

Miscellaneous:
Empty non-pesticide containers > 30 gallons(91: 6 ton)

Site: A V D METAL FABRICATION
Address: 3190 DIABLO AVE
City: HAYWARD
Map Loc: 64 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAX000140426

Site: AVD METAL FAB INC
Address: 3190 DIABLO AVE
City: HAYWARD
Map Loc: 64 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAD981626690

Site: UC PLASTIC
Address: 3202 DIABLO AVE
City: HAYWARD
Map Loc: 45 - within 1/4 mile NE of the subject
Status: EPA ID#: CAC000831472

Site: WALLNER, WALTER
Address: 3210 DIABLO AVE
City: HAYWARD
Map Loc: 51 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAC000299057

Site: KEM MIL CO
Address: 3468 DIABLO AVE
City: HAYWARD
Map Loc: 25 - within 1/4 mile NE of the subject
Status: EPA ID#: CAD982485849

Inorganics:
Restricted Metal Sludge(91: 1.2 ton)
Miscellaneous:
Empty non-pesticide containers > 30 gallons(91: .15 ton)
California Restricted Wastes:
Liquids with pH<2 and restricted metals(91: 4.8 ton)

Site: TRM COPY CENTERS CORPORATION
Address: 3480 DIABLO AVE
City: HAYWARD
Map Loc: 21 - within 1/4 mile NE of the subject
Status: EPA ID#: CAD983587171

Site: EDEN LANDING COMMERCE PARK
Address: 26034 EDEN LANDING RD, STE 2
City: HAYWARD
Map Loc: 130 - within 1/2 - 3/4 mile SE of the subject
Status: EPA ID#: CAL000020548

Inorganics:
Asbestos containing waste(91: 12.79 ton)

Site: PANTHER LINES INC
Address: 23475 EICHLER ST

City: HAYWARD
Map Loc: 90 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAL000064181

Site: PACKAGE DELIVERY EXPRESS
Address: 23579 EICHLER ST,UNIT J
City: HAYWARD
Map Loc: 76 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAD981669724

Site: DIABLO MOVING SERVICE
Address: 23783 EICHLER ST
City: HAYWARD
Map Loc: 63 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAL000019398

Site: SENCO PRODUCTS
Address: 23783 EICHLER ST, UNIT D
City: HAYWARD
Map Loc: 63 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAD981634553

Organics:
Oxygenated solvents(91: .16 ton)

Site: I-CHEM RESEARCH
Address: 23787 EICHLER ST, F
City: HAYWARD
Map Loc: 56 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAD982470817

Site: I-CHEM RESEARCH
Address: 23787 EICHLER ST
City: HAYWARD
Map Loc: 56 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAL000045212

Miscellaneous:
Laboratory waste chemicals(91: .66 ton)
California Restricted Wastes:
Liquids with halogenated org > 1000 mg/l(91: .26 ton)

Site: AMERICAN AUTOPIAN INC
Address: 23787 EICHLER ST, G1
City: HAYWARD
Map Loc: 56 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAD983629288

Site: CURRY GRAPHICS INC
Address: 24835 EICHLER ST
City: HAYWARD
Map Loc: 47 - within 1/4 - 1/2 mile N of the subject
Status: EPA ID#: CAL920285547

Site: CITI CORP SAVINGS
Address: 3366 ENTERPRISE AVE
City: HAYWARD
Map Loc: 72 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAL000014667

Organics:
Other organic solids(91: .3 ton)
Miscellaneous:
Empty non-pesticide containers > 30 gallons(89: .05 ton)
Photochemical waste(89: .22 ton)
California Restricted Wastes:
Liquids with halogenated org > 1000 mg/l(89: .22 91: .08 ton)

Site: BENNETT AUTO MANUFACTURING
Address: 3385 ENTERPRISE AVE
City: HAYWARD
Map Loc: 53 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAL000019663

Site: DANA CORPORATION
Address: 3390 ENTERPRISE AVE
City: HAYWARD
Map Loc: 54 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAX000249714

Site: CONTINENTAL DELIGHTS
Address: 3390 ENTERPRISE AVE
City: HAYWARD
Map Loc: 54 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAL912463349

Site: SPICER UNIVERSAL JOINT DIC RDC
Address: 3390 ENTERPRISE AVE
City: HAYWARD
Map Loc: 54 - within 1/4 - 1/2 mile E of the subject
Status: EPA ID#: CAD079088407

Site: MIRACLE TRUCK PAINTING
Address: 3393 ENTERPRISE AVE
City: HAYWARD
Map Loc: 37 - within 1/4 mile E of the subject

Status: EPA ID#: CAD981573280

Organics:
Oxygenated solvents(89: .3 91: .26 ton)
Unspecified solvent mixture(89: 1.12 ton)

Site: LAWSON DRAYAGE
Address: 3402 ENTERPRISE AVE
City: HAYWARD
Map Loc: 22 - within 1/4 mile E of the subject
Status: EPA ID#: CAL000064354

Site: PRECISION METAL FABRICATORS
Address: 3402 ENTERPRISE AVE
City: HAYWARD
Map Loc: 22 - within 1/4 mile E of the subject
Status: EPA ID#: CAD009169830

Inorganics:
Off-specification,aged or surplus inorganics(89: .61 ton)

Site: PERRY TOOL & RESEARCH COMPANY
Address: 3415 ENTERPRISE AVE
City: HAYWARD
Map Loc: 46 - within 1/4 mile E of the subject
Status: EPA ID#: CAD041320748

Organics:
Halogenated solvents(89: .4 91: .6 ton)
Waste oil and mixed oil(91: .56 ton)

Site: PERRY TOOL & RESEARCH COMPANY
Address: 3415 ENTERPRISE AVE
City: HAYWARD
Map Loc: 46 - within 1/4 mile E of the subject
Status: EPA ID#: CAD041320748

Organics:
Halogenated solvents(89: .4 91: .6 ton)
Waste oil and mixed oil(91: .56 ton)

Site: RES ROOFING EQUP SUC
Address: 3428 ENTERPRISE AVE
City: HAYWARD
Map Loc: 16 - within 1/4 mile E of the subject
Status: EPA ID#: CAL000060801

Site: STILES PAINT MANUFACTURING
Address: 3428 ENTERPRISE AVE
City: HAYWARD
Map Loc: 16 - within 1/4 mile E of the subject
Status: EPA ID#: CAC000232697

Miscellaneous:
Empty non-pesticide containers > 30 gallons(89: 3 ton)

Site: STYLE MANUFACTURING
Address: 3428 ENTERPRISE AVE
City: HAYWARD
Map Loc: 16 - within 1/4 mile E of the subject
Status: EPA ID#: CAX000041327

Site: 3BJ LEASING
Address: 3435 ENTERPRISE AVE
City: HAYWARD
Map Loc: 23 - within 1/4 mile E of the subject
Status: EPA ID#: CAX000076830

Site: J NORDHAVEN & SONS, INC
Address: 3435 ENTERPRISE AVE
City: HAYWARD
Map Loc: 23 - within 1/4 mile E of the subject
Status: EPA ID#: CAD981385388

Site: WELLS ELECTROPLATING INC
Address: 3435 ENTERPRISE AVE
City: HAYWARD
Map Loc: 23 - within 1/4 mile E of the subject
Status: EPA ID#: CAD980736680

Site: LAFAYETTE MFG. INC.
Address: 3440 ENTERPRISE AVE
City: HAYWARD
Map Loc: 12 - within 1/4 mile E of the subject
Status: EPA ID#: CAD981965759

Site: PAK/CON CO
Address: 3449 ENTERPRISE AVE
City: HAYWARD
Map Loc: 19 - within 1/4 mile E of the subject
Status: EPA ID#: CAX000238378

Site: TRIMAC TRANSPORATATION
Address: 3453 ENTERPRISE AVE
City: HAYWARD
Map Loc: 11 - within 1/4 mile E of the subject
Status: EPA ID#: CAL922684878

Site: ROBERT VANIER
Address: 3453 ENTERPRISE AVE
City: HAYWARD
Map Loc: 11 - within 1/4 mile E of the subject
Status: EPA ID#: CAC001016600

Site: VANIER TRUCKING
Address: 3453 ENTERPRISE AVE
City: HAYWARD
Map Loc: 11 - within 1/4 mile E of the subject
Status: EPA ID#: CAL000012100

Site: MAZLACK INC
Address: 3453 ENTERPRISE AVE
City: HAYWARD
Map Loc: 11 - within 1/4 mile E of the subject
Status: EPA ID#: CAL000023829

Site: ALLGOOD INDUSTRIES
Address: 3466 ENTERPRISE AVE
City: HAYWARD
Map Loc: 8 - within 1/4 mile E of the subject
Status: EPA ID#: CAL000001898

Miscellaneous:
Contaminated soil(91: .9 ton)

Site: ASPHALT CULTIVATORS
Address: 3472 ENTERPRISE AVE
City: HAYWARD
Map Loc: 13 - within 1/4 mile E of the subject
Status: EPA ID#: CAL000000095

Site: J&L PAVING & SEALCOATING INC
Address: 3472 ENTERPRISE AVE
City: HAYWARD
Map Loc: 13 - within 1/4 mile E of the subject
Status: EPA ID#: CAL000035255

Site: LES MC DONALD CONSTRUCTION CO
Address: 3500 ENTERPRISE AVE
City: HAYWARD
Map Loc: 4 - within 1/4 mile E of the subject
Status: EPA ID#: CAD982471971

Site: MCDONALD CONSTUCTION
Address: 3500 ENTERPRISE AVE
City: HAYWARD
Map Loc: 4 - within 1/4 mile E of the subject
Status: EPA ID#: CAC000067525

Site: VANDERA, DENNIS
Address: 3500 ENTERPRISE AVE
City: HAYWARD
Map Loc: 4 - within 1/4 mile E of the subject
Status: EPA ID#: CAC000786592

Site: MAG TRUCKING
Address: 3500 ENTERPRISE AVE
City: HAYWARD
Map Loc: 4 - within 1/4 mile E of the subject
Status: EPA ID#: CAL000019651

Site: MAG TRUCKING
Address: 3500 ENTERPRISE AVE
City: HAYWARD
Map Loc: 4 - within 1/4 mile E of the subject
Status: EPA ID#: CAC000893672

Site: RUNNELS IND
Address: 3590 ENTERPRISE AVE
City: HAYWARD
Map Loc: 1 - the subject site
Status: EPA ID#: CAC000790824

Site: VS TIRE SALES
Address: 3680 ENTERPRISE AVE
City: HAYWARD
Map Loc: 3 - within 1/4 mile NW of the subject
Status: EPA ID#: CAD982459786

Organics:
Oxygenated solvents(91: .91 ton)

Site: HAYWARD CITY OF TREATMENT PLNT
Address: 3700 ENTERPRISE AVE
City: HAYWARD
Map Loc: 5 - within 1/4 mile W of the subject
Status: EPA ID#: CAD981667868

Organics:
Waste oil and mixed oil(91: 1.87 ton)
California Restricted Wastes:
Liquids with halogenated org > 1000 mg/l(91: .45 ton)

Site: MINTER & FAHY CONSTRUCTION
Address: 3850 ENTERPRISE AVE
City: HAYWARD
Map Loc: 7 - within 1/4 mile W of the subject
Status: EPA ID#: CAD000306878

Site: CLEAN AIR VEHICLE TEST CENTER
Address: 26223 EXECUTIVE PL
City: HAYWARD
Map Loc: 111 - within 1/4 - 1/2 mile S of the subject
Status: EPA ID#: CAD983629304

Site: CAREMARK INC
Address: 26232 EXECUTIVE PL
City: HAYWARD
Map Loc: 98 - within 1/4 - 1/2 mile S of the subject
Status: EPA ID#: CAL000036420

Site: HOME HEALTH CARE
Address: 26232 EXECUTIVE PL
City: HAYWARD
Map Loc: 98 - within 1/4 - 1/2 mile S of the subject
Status: EPA ID#: CAD981626047

Site: HOME HEALTH CARE
Address: 26232 EXECUTIVE PL
City: HAYWARD
Map Loc: 98 - within 1/4 - 1/2 mile S of the subject
Status: EPA ID#: CAD981626047

Site: RICHARDSON RESEARCHES
Address: 23449 FOLEY ST
City: HAYWARD
Map Loc: 99 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAL000078431

Site: AIR & TOOL ENGINEERING
Address: 23520 FOLEY ST,STE A
City: HAYWARD
Map Loc: 81 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAL000069198

Site: CELEBRITY T'S
Address: 23762 FOLEY ST
City: HAYWARD
Map Loc: 71 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAL000087812

Site: AUTO AND TRUCK BUMPER RECYCLIN
Address: 23986 FOLEY ST
City: HAYWARD
Map Loc: 58 - within 1/4 - 1/2 mile NW of the subject
Status: EPA ID#: CAD983665977

Site: WESTERN STATE DESIGN
Address: 25616 NICKEL PL
City: HAYWARD
Map Loc: 17 - within 1/4 mile E of the subject
Status: EPA ID#: CAL000066820

Site: QUALITY PRECISION FINISHING
Address: 25637 NICKEL PL
City: HAYWARD
Map Loc: 18 - within 1/4 mile E of the subject
Status: EPA ID#: CAL000080031

Site: QUANTEL
Address: 4142 POINT EDEN WAY
City: HAYWARD
Map Loc: 89 - within 1/4 - 1/2 mile S of the subject
Status: EPA ID#: CAL000004157

Site: ALLINGTON INDUSTRIES
Address: 25545 SEABOARD LN
City: HAYWARD
Map Loc: 15 - within 1/4 mile NE of the subject
Status: EPA ID#: CAL000032369

Site: DETENTION DEVICE SYSTEMS
Address: 25545 SEABOARD LN
City: HAYWARD
Map Loc: 15 - within 1/4 mile NE of the subject
Status: EPA ID#: CAC000972768

Site: Q I P
Address: 25546 SEABOARD LN
City: HAYWARD
Map Loc: 14 - within 1/4 mile NE of the subject
Status: EPA ID#: CAD980813737

Site: THE PRESLEY COS
Address: TRACT 4007
City: HAYWARD
Status: EPA ID#: CAC000676832

Site: BIG JOE CALIFORNIA INC
Address: 25008 VIKING ST
City: HAYWARD
Map Loc: 43 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAL000064411

Site: ELECTROCHEM
Address: 25020 VIKING ST
City: HAYWARD
Map Loc: 50 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAX000108464

Site: QMECT INC DBA ELECTROCHEM
Address: 25020 VIKING ST
City: HAYWARD
Map Loc: 50 - within 1/4 - 1/2 mile NE of the subject
Status: EPA ID#: CAD982017394

Inorganics:
Restricted Metal Sludge(91: 3 ton)

Site: GARLOCK WEST EQUIP
Address: 25024 VIKING ST
City: HAYWARD
Map Loc: 33 - within 1/4 mile NE of the subject
Status: EPA ID#: CAL000003028

Site: INDUSTRIAL TRUCK SERVICES INC
Address: 25026 VIKING ST
City: HAYWARD
Map Loc: 28 - within 1/4 mile NE of the subject
Status: EPA ID#: CAL000045211

Site: SIGNET TESTING LABORATORIES IN

Address: 25064 VIKING ST
City: HAYWARD
Map Loc: 26 - within 1/4 mile NE of the subject
Status: EPA ID#: CAD071691877

Site: ABB SERVICE COMPANY
Address: 25073 VIKING ST
City: HAYWARD
Map Loc: 24 - within 1/4 mile NE of the subject
Status: EPA ID#: CAC000531944

Site: NELLCOR INC
Address: 25495 WHITESELL DR
City: HAYWARD
Map Loc: 6 - within 1/4 mile SE of the subject
Status: EPA ID#: CAD982336166

Organics:
Waste oil and mixed oil(91: .08 ton)
Miscellaneous:
Laboratory waste chemicals(91: 2.16 ton)

Site: CROW-SPEAKER-SINGLETON #87&115
Address: 25495 WHITESELL DR
City: HAYWARD
Map Loc: 6 - within 1/4 mile SE of the subject
Status: EPA ID#: CAC000097021

Site: ROHM AND HAAS CALIFORNIA INCOR
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: EPA ID#: CAD020028072

Organics:
Unspecified organic liquid mixture(89: 6.71 ton)
California Restricted Wastes:
Liquids with PCB > 50 mg/l(89: 4.95 ton)

UST Permitted Underground Storage Tanks - State Water Quality Control Board

The Corteses Bill (AB2013), enacted in 1983, required registration of all underground storage tanks (UST) with the State Water Quality Control Board by July 1, 1984. About 176,000 tanks and surface impounds were registered between 1984 and 1987. An amendment (AB 1413) was passed in 1987, effectively removing the State Board from the registration process starting January 1, 1988. The data reflects the information collected by the state between 1984 and 1987 as well as recent time and includes all tanks and surface impounds in use or closed after 1974.

Home and farm heating fuel tanks with capacities of 1,100 gallons or less and "structures such as sumps, separators, storm drains, catch basins, oil field gathering lines, refinery pipelines, lagoons, evaporation ponds,

well cellars, separation sumps, lined and unlined pits, sumps and lagoons" except those defined as UST under HSWA or may be regulated to protect water quality under the Porter-Cologne Water Quality Control Act are excluded.

This list has been researched within half of a mile radius of the subject site.

Site: KEEBLER COMPANY
Address: 3875 BAY CENTER PL
City: HAYWARD
Map Loc: 35 - within 1/4 - 1/2 mile SE of the subject
Status: 00000065510 (198798A)

Activity: DISTRIBUTION
10000 gallon, double-walled, glass lined tank (waste oil), installed in 1985

Site: UNION OIL SS #6074
Address: 3500 BREAKWATER AVE
City: HAYWARD
Map Loc: 94 - within 1/4 - 1/2 mile SE of the subject
Status: 00000060781 (1987&93)

Activity: GAS STATION
single-walled, unlined, concrete tank

Site: UNOCAL SS #6074
Address: 3500 BREAKWATER AVE
City: HAYWARD
Map Loc: 94 - within 1/4 - 1/2 mile SE of the subject
Status: 00000021152 (1987&99)

Activity: GAS STATION
10000 gallon, single-walled, carbon steel tank (unleaded), installed in 1973
10000 gallon, single-walled, carbon steel tank (premium), installed in 1973
10000 gallon, single-walled, fiberglass tank (waste oil), installed in 1980
550 gallon, single-walled, carbon steel tank (waste oil)
10000 gallon, single-walled, carbon steel tank (unleaded), installed in 1973
10000 gallon, single-walled, carbon steel tank (premium), installed in 1973
10000 gallon, single-walled, fiberglass tank (waste oil), installed in 1980
550 gallon, single-walled, carbon steel tank (waste oil)

Site: WEYERHAEUSER BUILDING MATERIAL
Address: 3495 BREAKWATER CT
City: HAYWARD
Map Loc: 74 - within 1/4 - 1/2 mile SE of the subject
Status: 00000043986 (198798I)

Activity: BUILDING MATERIALS
10000 gallon, single-walled, unlined, carbon steel tank (waste oil), installed in 1975

Site: CITY OF HAYWARD-MARATHON PUMP
Address: CABOT BLVD
City: HAYWARD
Status: (19)

Site: OLIVER DE SILVA INC.
Address: CLAWITER RD
City: HAYWARD
Status: 00000037402 (198798A)

Activity: GEN CONTRACTOR
12500 gallon, unlined, carbon steel tank (waste oil), installed in 1971
12500 gallon, unlined, carbon steel tank (unleaded), installed in 1971

Site: THE HERRICK CORPORATION
Address: 25450 CLAWITER RD
City: HAYWARD
Map Loc: 121 - within 1/4 - 1/2 mile E of the subject
Status: 00000012687 (198798I)

Activity: STRUCTURAL STEEL &
2000 gallon tank (unleaded), installed in 1960

Site: BERKELY FARMS
Address: 25500 CLAWITER RD
City: HAYWARD
Map Loc: 115 - within 1/4 - 1/2 mile E of the subject
Status: (19)

Site: YELLOW FREIGHT SYSTEM, INC.
Address: 25555 CLAWITER RD
City: HAYWARD
Map Loc: 117 - within 1/4 - 1/2 mile E of the subject
Status: 00000045714 (1987&99)

Activity: TRUCKING
10000 gallon, carbon steel tank (waste oil), installed in 1969
carbon steel tank (waste oil), installed in 1969
carbon steel tank (waste oil), installed in 1969
carbon steel tank (waste oil), installed in 1969
10000 gallon, carbon steel tank (unleaded), installed in 1969
1000 gallon, carbon steel tank (waste oil), installed in 1969

Site: GILLIG CORPORATION
Address: 25800 CLAWITER RD
City: HAYWARD
Map Loc: 114 - within 1/4 - 1/2 mile E of the subject
Status: 00000010267 (1987&99)

Activity: MANUFACTURER
10000 gallon, single-walled, unlined, carbon steel tank (waste oil), installed in 1968
1000 gallon, single-walled, unlined, carbon steel tank (unleaded), installed in 1968
1000 gallon, single-walled, unlined, carbon steel tank (waste oil), installed in 1968

Site: GOODYEAR TRUCK TIRE CENTER
Address: 25880 CLAWITER RD
City: HAYWARD
Map Loc: 113 - within 1/4 - 1/2 mile E of the subject
Status: 00000027303 (1987&93)

Activity: TIRE WAREHOUSE
tank

Site: EAST BAY OIL CO.
Address: 3111 DEPOT RD
City: HAYWARD
Map Loc: 112 - within 1/4 - 1/2 mile NE of the subject
Status: 00000032219 (198798I)

Activity: DISTRIBUTION PLANT

10000 gallon, single-walled, unlined, carbon steel tank , installed in 1970
10000 gallon, single-walled, epoxy lined, carbon steel tank , installed in 1970
10000 gallon, single-walled, unlined, carbon steel tank , installed in 1970
10000 gallon, single-walled, unlined, carbon steel tank , installed in 1970
10000 gallon, single-walled, unlined, carbon steel tank , installed in 1970
10000 gallon, single-walled, unlined, carbon steel tank , installed in 1970
8000 gallon, single-walled, unlined, carbon steel tank , installed in 1974
8000 gallon, single-walled, unlined, carbon steel tank , installed in 1974
6000 gallon, single-walled, unlined, carbon steel tank , installed in 1974
5000 gallon, single-walled, unlined, carbon steel tank , installed in 1974
5000 gallon, single-walled, unlined, carbon steel tank , installed in 1974
12000 gallon, single-walled, unlined, carbon steel tank , installed in 1978
2000 gallon, single-walled, unlined, carbon steel tank , installed in 178
12000 gallon, single-walled, unlined, carbon steel tank , installed in 1978
10000 gallon, single-walled, unlined, carbon steel tank , installed in 1978
10000 gallon, single-walled, unlined, carbon steel tank , installed in 1978
10000 gallon, single-walled, unlined, carbon steel tank , installed in 1978
2000 gallon, single-walled, unlined, carbon steel tank (unleaded), installed in 1970

Site: WESTLAND METAL INC
Address: 3149 DEPOT RD
City: HAYWARD
Map Loc: 100 - within 1/4 - 1/2 mile NE of the subject
Status: 000692576 (191995I)

Site: OLYMPIAN OIL COMPANY
Address: 3152 DEPOT RD
City: HAYWARD
Map Loc: 70 - within 1/4 - 1/2 mile NE of the subject
Status: 00000039102 (1987&99)

Activity: GAS STATION
10000 gallon, double-walled, glass lined, carbon steel tank (regular), installed in 1984
10000 gallon, double-walled, glass lined, carbon steel tank (regular), installed in 1984
10000 gallon, double-walled, glass lined, carbon steel tank (regular), installed in 1984
10000 gallon, double-walled, glass lined, carbon steel tank (regular), installed in 1984

Site: CONCISE CASTING CORPORATION
Address: 3197 DEPOT RD
City: HAYWARD
Map Loc: 83 - within 1/4 - 1/2 mile NE of the subject
Status: 00000012659 (198798I)

Activity: ALUMINUM FOUNDRY
1000 gallon, single-walled, unlined, carbon steel tank (unleaded), installed in 1979

Site: CALIFORNIA COURIERS
Address: 3295 DEPOT RD
City: HAYWARD
Map Loc: 61 - within 1/4 - 1/2 mile NE of the subject
Status: 521232 (191998I)

Site: FORNI CORPORATION
Address: 3600 DEPOT RD
City: HAYWARD
Map Loc: 32 - within 1/4 - 1/2 mile N of the subject
Status: (191998I)

Site: CLARENCE J. PERRY TRUCK YARD

Address: 3639 DEPOT RD
City: HAYWARD
Map Loc: 31 - within 1/4 - 1/2 mile N of the subject
Status: 00000045105 (198798A)

8000 gallon, steel clad tank (waste oil)
1000 gallon, steel clad tank (waste oil)

Site: DORRIS AUTO WRECKERS INC
Address: 3720 DEPOT RD
City: HAYWARD
Map Loc: 75 - within 1/4 - 1/2 mile NW of the subject
Status: (191998I)

Site: MLH, INC.
Address: 3142 DIABLO AVE
City: HAYWARD
Map Loc: 77 - within 1/4 - 1/2 mile NE of the subject
Status: 00000065143 (198798I)

Activity: INTERIOR PARTITION
4000 gallon, carbon steel tank (regular), installed in 1979

Site: JML, INC.
Address: 3146 DIABLO AVE
City: HAYWARD
Map Loc: 65 - within 1/4 - 1/2 mile NE of the subject
Status: 00065143 (191995I)

Site: HAYWARD ELECTRIC
Address: 3150 DIABLO AVE
City: HAYWARD
Map Loc: 59 - within 1/4 - 1/2 mile NE of the subject
Status: 00000068480 (198798I)

Activity: ELECTRICAL CONTRACT
4000 gallon, carbon steel tank , installed in 1979

Site: ADVANCED LIGHTWEIGHT CONCRETE
Address: 3156 DIABLO AVE
City: HAYWARD
Map Loc: 52 - within 1/4 - 1/2 mile NE of the subject
Status: 000658424 (191998I)

Site: DIABLO INDUSTRIAL PARK
Address: 3210 DIABLO AVE
City: HAYWARD
Map Loc: 51 - within 1/4 - 1/2 mile NE of the subject
Status: 01008975999 (199598I)

Site: PRECISION METAL FABRICATORS
Address: 3402 ENTERPRISE AVE
City: HAYWARD
Map Loc: 22 - within 1/4 mile E of the subject

Status: 00000043401 (198798I)

Activity: SHEETMETAL SHOP
1000 gallon tank (unleaded)
1000 gallon tank (waste oil)

Site: STILES PAINT MFG. INC.
Address: 3428 ENTERPRISE AVE
City: HAYWARD
Map Loc: 16 - within 1/4 mile E of the subject
Status: 00000047895 (198798I)

Activity: PAINT MANUFACTURER
6000 gallon tank , installed in 1981

Site: LAFAYETTE MANUFACTURING INC
Address: 3440 ENTERPRISE AVE
City: HAYWARD
Map Loc: 12 - within 1/4 mile E of the subject
Status: 00000068707 (198798I)

Activity: CONSTRUCTION/MFG.
10000 gallon tank , installed in 1972
10000 gallon tank (regular), installed in 1972

Site: ALLGOOD INDUSTRIES
Address: 3466 ENTERPRISE AVE
City: HAYWARD
Map Loc: 8 - within 1/4 mile E of the subject
Status: 00000066029 (198798I)

Activity: IND. PACKING
2500 gallon, unlined tank
7500 gallon tank (waste oil)

Site: LES MCDONALD CONSTRUCTION CO.
Address: 3500 ENTERPRISE AVE
City: HAYWARD
Map Loc: 4 - within 1/4 mile E of the subject
Status: 00046304 (191995I)

Site: MAG TRUCKING
Address: 3500 ENTERPRISE AVE
City: HAYWARD
Map Loc: 4 - within 1/4 mile E of the subject
Status: 00000060331 (1987&99)

Activity: BUSINESS
tank
500 gallon tank
550 gallon tank

Site: RUNNELS INDUSTRIES, INC.
Address: 3590 ENTERPRISE AVE
City: HAYWARD
Map Loc: 1 - the subject site
Status: 00000019375 (198798A)

Activity: CONTRACTOR
1000 gallon, single-walled, unlined, carbon steel tank (unleaded), installed in 1979
500 gallon, single-walled, unlined, carbon steel tank (regular), installed in 1979
1000 gallon, unlined, carbon steel tank , installed in 1981

Site: WASTEWATER TREATMENT PLANT
Address: 3700 ENTERPRISE AVE
City: HAYWARD
Map Loc: 5 - within 1/4 mile W of the subject
Status: 00000009319 (1987&99)

Activity: GASOLINE FOR PLANT
1000 gallon, single-walled, unlined, carbon steel tank (unleaded), installed in 1971
2000 gallon, single-walled, unlined, fiberglass tank (waste oil), installed in 1977
550 gallon, single-walled, unlined, fiberglass tank (waste oil), installed in 1977
550 gallon, single-walled, unlined, fiberglass tank (waste oil), installed in 1977

Site: PT EDEN BUSINESS PARK
Address: 3920 POINT EDEN WAY
City: HAYWARD
Map Loc: 92 - within 1/4 - 1/2 mile S of the subject
Status: 01008050959 (199598I)

Site: ROHM & HAAS CALIFORNIA INC.
Address: 25500 WHITESELL DR
City: HAYWARD
Map Loc: 10 - within 1/4 mile SE of the subject
Status: 00000000700 (198798I)

7150 gallon, single-walled, unlined, carbon steel tank , installed in 1977
9800 gallon, single-walled, unlined, concrete tank , installed in 1971
7150 gallon, single-walled, unlined, carbon steel tank , installed in 1977
20000 gallon, single-walled, unlined, carbon steel tank (waste oil), installed in 1977

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APPENDIX

FIRE INSURANCE MAP REVIEW

FIRE INSURANCE MAP REVIEW

Fire insurance maps are large-scale maps that depict the commercial, industrial and residential sections of some twelve thousand cities and towns in the United States.

These specialized maps were first prepared for the exclusive use of fire insurance companies and underwriters to provide accurate, current and detailed information about the buildings they were insuring. Information relied upon in place of personal examinations of property.

Fire insurance maps show the size, shape and construction of dwellings, commercial buildings and factories, as well as indicate widths and names of streets, property boundaries, and house and block numbers.

The primary benefit of reviewing fire insurance maps is to analyze historical land use of a subject property and its immediate area. In this review, special emphasis is given to the existence and location of fuel storage tanks, flammable or other potentially hazardous substances, as well as the nature of businesses located on site.

No Fire Insurance Maps are available for the area surrounding the subject site. Lack of coverage of the site indicates an area of little commercial development prior to 1950.

APPENDIX

AERIAL PHOTOGRAPH SEARCH

AERIAL PHOTOGRAPH SEARCH

Aerial photos first emerged in the 1840's when the first pictures of the earth's surface were taken from balloons. By the first World War, cameras mounted on airplanes provided aerial photos used for reconnaissance. From then until today, aerial photographs have been used in the making of maps, land surveys and for a wide variety of other purposes.

Aerial photos can provide different information depending on the type and class of the photo. The major classes of photos are black and white, color, and color infared photos. Generally, color photos provide the most information, however are expensive to produce. For that reason, black and white photos are the most common. Color infared photos can detect vegetation other photos miss. These photos are generally taken in more rural areas for agricultural purposes.

The type of photo refers to the camera angle at the time of the flyover. There are 2 major types -vertical and oblique. Vertical photos are taken while directly overhead, and give the effect of looking straight down on the area. Oblique photos are taken at a 30 to 60 degree angle. The camera angle creates a 3-D effect so height and depth of structures are more easily discernible.

Vertical photos are taken by either 1 or 2 cameras. One camera flyovers produce vertical recon photos. Vertical carto photos are taken with 2 cameras offset horizontally. When the photos are viewed side by side through stereophonic lenses the photos create a 3-D effect.

Photo collections are compiled by both private and government agencies. Many collections date back to the 1940's and sometimes even earlier. BBL has searched over 600 collections for coverage of the USGS quadrangle of the subject site. The percentage of the quadrangle that the photo covers is noted as a % under æquadcovÆ. The list that follows includes all known photos with a resolution greater than 1:12,000. Photos with lower resolution have been excluded from the listing as they provide less detail than generally required.

If additional site investigation is necessary, historical photos can be helpful in determining prior land use. These photos can help track the development of the area as well as provide you with details of long gone buildings, tanks, waste storage areas, marshlands and vegetation.

year	*project*	*scale*	*type*	*classquadcov*	*comments*
Aerial Viewpoint 10200 Richmond Ave., Suite 140 Houston, TX 77042 713-784-5801					
1974		6000	Vertical Carto		B-W 10BAY AREA, CA
1974		6000	Vertical Carto		B-W 10BAY AREA, CA
1963		12000	Vertical Carto		B-W 10BAY AREA, CA
1963		12000	Vertical Carto		B-W 10BAY AREA, CA
Aero-Geodetic Corp. 1180 Coleman Ave. San Jose, CA 95110-113 408-298-3660					
1984	842516	36000	Vertical Carto		B-W 10EAST BAY AREA
Agricultural Stabilization and Aerial Photography Field Offic P.O. Box 30010 Salt Lake City, UT 841 801-975-3503					
1959	BUT	20000	Vertical Carto		B-W 1006
1950	BUT	20000	Vertical Carto		B-W 1006
Air Flight Service 2220 Calle de Luna Santa Clara, CA 95054 408-988-0107					
1978	ALAMED	36000	Vertical Recon		B-W 10ALAMEDA CO.
1976	ALAMED	36000	Vertical Recon		B-W 10ALAMEDA CO.
1974	ALAMED	36000	Vertical Recon		B-W 10ALAMEDA CO.
1971	ALAMED	36000	Vertical Recon		B-W 10ALAMEDA CO.
1969	SFBCDC	30000	Vertical Recon		B-W 30SF BAY SHORELINE
1969	ALAMED	36000	Vertical Recon		B-W 10ALAMEDA CO.
1968	ALAMED	36000	Vertical Recon		B-W 10ALAMEDA CO.
1967	ALAMED	36000	Vertical Recon		B-W 10ALAMEDA CO.

California Dept. of Transporta Division of Highways Geometronics Branch Sacramento, CA 95814 916-654-4614

1984	840714	3000	Vertical Carto	B-W 20HWY-17 ALA CO.
1981	78-4	24000	Vertical Carto	B-W 70SF BY VAR CO
1965	65-130	12000	Vertical Carto	B-W 10ALAMEDA CO

California Dept. of Water Reso P.O. Box 942836 1416 Ninth St., Rm. 150 Sacramento, CA 94236-0 916-653-2698

1993	CSLBCQ	12000	Vertical Carto	Color 70SN FRAN-SN PAB
1993	CSLBCQ	12000	Vertical Carto	Color 70SN FRAN-SN PAB
1986	NASAU2	32000	Vertical Carto	B-W 70N0 CA 1986 FLOOD
1986	NASAU2	32000	Vertical Carto	Color 70N0 CA 1986 FLOOD
1986	NASAU2	32000	Vertical Carto	Color 70NO CA 1986 FLOOD
1981	CDFDWR	24000	Vertical Carto	B-W 80
1977	SEC 0	12000	Vertical Carto	Color 30SFO BAY 8OF27

Fairchild National, Inc. 413 Azalea Way Birmingham, AL 35215 205-853-3641

1978	ALAM78	27600	Vertical Recon	B-W 60ALAMEDA CO
1978	ALAM78	27600	Vertical Recon	B-W 60ALAMEDA CO

Jim Fashinell Photography 10950 East 14th St., Studio 2 Oakland, CA 94603 510-568-9000

1987	EBAY87	2750	Oblique Color 20	SAN LEANDRO

National Aeronautics and Space Ames Research Center Contact U.S. Geological Survey 800-USA-MAPS

1994	04781	23000	Vertical Recon	Color 20594004781 4432 4433 0512 0350
1994	04781	27000	Vertical Recon	Color 20594004781 4435 4435 0512 0353
1991	04363	15000	Vertical Recon	Color 30591004363 0003 0004 0000 0000
1991	04363	15490	Vertical Recon	Color 20591004363 0006 0006 0000 0000
1991	04363	15740	Vertical Recon	Color 20591004363 0007 0008 0000 0000
1991	04363	32000	Vertical Recon	Color 40591004363 0198 0199 0000 0000
1991	04363	32000	Vertical Recon	Color 20591004363 0196 0197 0000 0000
1991	04363	32840	Vertical Recon	Color 30591004363 0125 0125 0000 0000
1991	04363	32890	Vertical Recon	Color 40591004363 0124 0124 0000 0000
1991	04363	33000	Vertical Recon	Color 60591004363 0122 0123 0000 0000
1991	04365	31500	Vertical Recon	Color 80591004365 0009 0010 0000 0000
1991	04365	32000	Vertical Recon	Color 50591004365 0006 0008 0000 0000
1982	03073	24580	Vertical Recon	Color 20582003073 0298 0309 0232 0673
1982	03073	24660	Vertical Recon	Color 40582003073 0295 0297 0232 0670
1982	03073	24830	Vertical Recon	Color 30582003073 0059 0064 0232 0434
1982	03073	25000	Vertical Recon	Color 40582003073 0056 0058 0232 0431
1982	03073	25420	Vertical Recon	Color 30582003073 0288 0294 0232 0663
1982	03138	41000	Vertical Recon	Color 20582003138 3071 3071 0322 0591
1976	02370	32000	Vertical Recon	Color 20576002370 0052 0053 0213 0439
1976	02371	32000	Vertical Recon	Color 20576002371 0052 0053 0213 0532
1976	02372	32000	Vertical Recon	B-W 20576002372 0052 0053 0188 0334
1975	02157	29000	Vertical Recon	B-W 40575002157 0026 0029 0187 0088
1975	02117	34000	Vertical Recon	Color 20575002117 0074 0076 0208 0314
1975	02117	34000	Vertical Recon	Color 80575002117 0068 0073 0208 0308
1975	02118	34000	Vertical Recon	Color 20575002118 0068 0070 0208 0545
1975	02118	34000	Vertical Recon	Color 80575002118 0062 0067 0208 0539
1975	02119	34000	Vertical Recon	Color 20575002119 0068 0070 0208 0621
1975	02119	34000	Vertical Recon	Color 80575002119 0062 0067 0208 0615
1975	02123	32000	Vertical Recon	Color 50575002123 0021 0026 0209 0190
1975	02123	32000	Vertical Recon	Color 60575002123 0133 0135 0209 0302
1975	02123	33000	Vertical Recon	Color 20575002123 0004 0020 0209 0173
1975	02123	33000	Vertical Recon	Color 50575002123 0128 0132 0209 0297
1974	01886	21660	Oblique Color 20	574001886 0058 0058 0204 0059
1974	01886	21660	Oblique Color 20	574001886 0067 0067 0204 0068
1974	01886	21660	Oblique Color 30	574001886 0064 0064 0204 0065
1974	01886	21660	Oblique Color 40	574001886 0061 0061 0204 0062
1974	01887	21660	Oblique Color 30	574001887 0058 0058 0204 0260
1974	01887	21660	Oblique Color 30	574001887 0061 0061 0204 0263
1974	01887	21660	Oblique Color 30	574001887 0064 0064 0204 0266
1974	01888	21660	Oblique Color 20	574001888 0062 0062 0204 0451
1974	01888	22000	Vertical Recon	Color 20574001888 0103 0103 0204 0491
1974	01888	22000	Vertical Recon	Color 20574001888 0109 0109 0204 0497
1974	01888	23000	Vertical Recon	Color 20574001888 0106 0106 0204 0494
1974	01889	21660	Oblique Color 20	574001889 0101 0101 0204 0619
1974	01889	21660	Oblique Color 40	574001889 0059 0059 0204 0578
1974	01889	21660	Oblique Color 30	574001889 0062 0062 0204 0581
1974	01889	21660	Oblique Color 40	574001889 0104 0104 0204 0622
1974	01615	24000	Vertical Recon	B-W 40574001615 0030 0037 0001 8400
1974	01615	25000	Vertical Recon	B-W 40574001615 0038 0042 0001 8400
1974	01616	24000	Vertical Recon	Color 40574001616 0030 0037 0001 9900

1974	01616	25000	Vertical Recon	Color 40574001616 0038 0042 0001 9900
1974	2680	12070	Vertical Recon	Color 20626800370 0162 0168 1313 0406
1974	2680	12430	Vertical Recon	Color 20626800400 0088 0099 1313 0819
1974	2680	12580	Vertical Recon	Color 20626800390 0088 0099 1313 0577
1974	2800	13000	Vertical Recon	Color 20628000430 0156 0184 2803 0322
1974	2800	13000	Vertical Recon	Color 20628000440 0156 0184 2803 0563
1973	00996	32000	Vertical Recon	Color 70573000996 0353 0357 0191 0708
1973	00996	33000	Vertical Recon	Color 30573000996 0358 0358 0191 0713
1973	00856	32500	Vertical Recon	B-W 30573000856 0076 0076 0183 0078
1973	00856	32500	Vertical Recon	B-W 50573000856 0079 0079 0183 0081
1973	00856	32500	Vertical Recon	B-W 70573000856 0082 0082 0183 0084
1973	00856	32500	Vertical Recon	B-W 80573000856 0085 0085 0183 0087
1973	2530	12190	Vertical Recon	Color 20625300870 0116 0122 0691 1360
1972	00275	33000	Vertical Recon	Color 20572000275 0053 0055 0190 0294
1972	00275	33000	Vertical Recon	Color 80572000275 0056 0067 0190 0297
1972	00854	32000	Vertical Recon	B-W 40572000854 0082 0085 0181 0466
1972	00854	32000	Vertical Recon	B-W 70572000854 0075 0081 0181 0459
1972	00855	32000	Vertical Recon	Color 40572000855 0082 0085 0190 0868
1972	00855	32000	Vertical Recon	Color 70572000855 0075 0081 0190 0861
1972	00713	33000	Vertical Recon	Color 50572000713 0036 0039 0190 0775

National Ocean Service NOAA/Coast and Geodetic Survey Support Sec. N/CG236 Silver Spring, MD 2091 410-713-2692

1983	83 ZC	30000	Vertical Carto	Color 5057-A4-5550-5564
1983	83 ZC	40000	Vertical Carto	Color 6057-A4-5437-5456
1981	81EP-2	15000	Vertical Carto	B-W 2057-A 1398-1408
1981	81EP-1	40000	Vertical Carto	B-W 8057-A 1551-1559
1981	81EP-4	40000	Vertical Carto	B-W 7057-A 1524-1538
1977	77B-1	36000	Vertical Carto	B-W 3057-A11 6487-6495
1977	77B-1	36000	Vertical Carto	B-W 3057A-11 6487-6495
1977	77B-2	36000	Vertical Carto	B-W 3057-A11 6474-6477
1977	77B-2	36000	Vertical Carto	B-W 6057-A11 6497-6506
1977	77B-2	36000	Vertical Carto	B-W 6057A-11 6475-6480
1977	77B-2	36000	Vertical Carto	B-W 6057A-11 6497-6506
1977	77B-3	36000	Vertical Carto	B-W 3057-A11 6478-6481
1977	77B-1	30000	Vertical Carto	B-W 4057-A11 2538-2551
1977	77B-1	30000	Vertical Carto	B-W 5057A-11 2538-2551
1977	77B-2	30000	Vertical Carto	B-W 2057-A11 2553-2563
1977	77B-2	30000	Vertical Carto	B-W 2057A-11 2553-2557
1977	77B-10	30000	Vertical Carto	B-W 5057A-09 2834-2840
1977	77B-2	40000	Vertical Carto	B-W 2057A-09 2866-2871
1977	77B-2	40000	Vertical Carto	Color 2057-A9 2866-2875
1977	77B-3	40000	Vertical Carto	B-W 6057A-09 2909-2925
1977	77B-4	30000	Vertical Carto	Color 3057-A9 2815-2817
1977	77B-4	40000	Vertical Carto	B-W 5057-A9 2909-2924
1977	77B-6	30000	Vertical Carto	B-W 3057A-09 2815-2817
1977	77B-7	30000	Vertical Carto	Color 4057-A9 2827-2840
1977	77B-3	30000	Vertical Carto	Color 3057-A8 3082-3086
1977	77B-4	30000	Vertical Carto	B-W 4057A-08 3082-3086
1977	77B-5	30000	Vertical Carto	Color 5057-A8 3095-3107
1977	77B-7	30000	Vertical Carto	B-W 5057A-08 3100-3107
1977	77B-2	30000	Vertical Carto	B-W 5057A-08 3253-3260
1977	77B-2	30000	Vertical Carto	Color 4057-A8 3253-3260
1977	77B-1	30000	Vertical Carto	B-W 3057-A11 3690-3703
1977	77B-1	30000	Vertical Carto	B-W 3057A-11 3690-3703
1977	77B-1	30000	Vertical Carto	B-W 4057-A9 3424-3430
1977	77B-1	30000	Vertical Carto	B-W 4057A-09 3424-3428
1977	77B-2	30000	Vertical Carto	B-W 5057A-11 3705-3722
1977	77B-2	30000	Vertical Carto	B-W 7057-A11 3705-3722
1977	77B-4	30000	Vertical Carto	B-W 5057-A11 3500-3507
1977	77B-4	30000	Vertical Carto	B-W 5057A-11 3500-3507
1977	77B-5	30000	Vertical Carto	B-W 2057-A11 3508-3514
1977	77B-5	30000	Vertical Carto	B-W 2057A-11 3508-3515
1977	77B-2	40000	Vertical Carto	Color 7057-A8 3911-3923
1977	77B-3	40000	Vertical Carto	B-W 7057A-08 3911-3923
1976	76B	30000	Vertical Carto	B-W 3057-A7 7031-7040
1976	76B-2	30000	Vertical Carto	B-W 5057A-07 7037-7040
1973	73L-1	36000	Vertical Carto	B-W 2057-A6 5448-5453
1973	73L-2	36000	Vertical Carto	B-W 5057-A6 5454-5455
1973	73L-3	36000	Vertical Carto	B-W 5057-A6 5456-5459
1973	73L-8	36000	Vertical Carto	B-W 4057-A6 5479-5483
1973	73L-9	36000	Vertical Carto	B-W 3057-A6 5484-5488

1973	73L-3	40000	Vertical Carto	Color 6057-A3 5674-5680
1972	72L	30000	Vertical Carto	B-W 5057-A-6 3368-3380
1969	69L-10	30000	Vertical Carto	B-W 3057-A-6 0598-0600
1969	69L-4	30000	Vertical Carto	B-W 3057-A-2 0575-0578
1969	69L-5	30000	Vertical Carto	B-W 5057-A-2 0579-0583
1969	69L-9	30000	Vertical Carto	B-W 3057-A-2 0596-0597
1969	69E-2	20000	Vertical Carto	Color 2057-A3 2757-2765
1966	66S	24000	Vertical Carto	B-W 2057-A5 3763-3774
1966	66S-1	24000	Vertical Carto	B-W 6057-A5 3733-3744
1966	66S-1	30000	Vertical Carto	B-W 2057-A5 3797-3803
1966	66S-2	30000	Vertical Carto	B-W 2057-A5 3776-3784
1966	66S-2	30000	Vertical Carto	B-W 3057-A5 3804-3808
1966	66S-3	30000	Vertical Carto	B-W 3057-A5 3785-3789
1964	64K-2	40000	Vertical Carto	B-W 7057-A4 2118-2125
1964	64S-4	20000	Vertical Carto	Color 2057-A 8535-8536
1964	64S-5	20000	Vertical Carto	Color 4057-A 8537-8544
1963	63M-1	36000	Vertical Carto	B-W 6057-A3 2501-2504
1963	63M-2	36000	Vertical Carto	B-W 3057-A3 2505-2511
1963	63W-4	20000	Vertical Carto	Color 4057-A 9459-9466
1961	61W	36000	Vertical Carto	B-W 6057-A3 1406-1428
1961	61W-1	36000	Vertical Carto	B-W 3057-A3 1360-1381
1961	61W-2	36000	Vertical Carto	B-W 6057-A3 1383-1398
1960	60S-3	36000	Vertical Carto	B-W 5057-A2 2288-2294
1960	60S	38000	Vertical Carto	B-W 3057-A2 6080-6082
1959	59S-1	20000	Vertical Carto	B-W 2057-A2 7389-7393
1959	59S-2	20000	Vertical Carto	B-W 4057-A2 7394-7409
1959	59S-1	20000	Vertical Carto	B-W 2057-A2 7482-7488
1956	56W-2	30000	Vertical Carto	B-W 4057-A 2509-2512
1956	56W-3	30000	Vertical Carto	B-W 2057-A 2513-2514
1951	51O-1	24000	Vertical Carto	B-W 2057-A 7547-7549

Pacific Aerial Surveys 8407 Edgewater Dr. Oakland, CA 94621 510-632-2020

1990	AV3817	36000	Vertical Carto	B-W 10ALAMEDA CO.
1990	AV3845	12000	Vertical Carto	B-W 10ALAMEDA CO.
1988	AV3268	12000	Vertical Carto	B-W 50EAST BAY-HILLS
1988	AV3292	36000	Vertical Carto	B-W 10ALAMEDA CO.
1985	AV2640	12000	Vertical Carto	B-W 70EAST BAY AREA
1985	AV2655	36000	Vertical Carto	B-W 10ALAMEDA CO.
1985	AV2640	12000	Vertical Carto	B-W 50EAST BAY-HILLS
1984	C19A36	7500	Oblique Color 10	OAKLAND-ALA. CO.
1983	AV2300	12000	Vertical Carto	B-W 70EAST BAY AREA
1983	AV2300	12000	Vertical Carto	B-W 50EAST BAY-HILLS
1981	AV2040	12000	Vertical Carto	B-W 50EAST BAY-HILLS
1979	AV1750	12000	Vertical Carto	B-W 50EAST BAY-HILLS
1977	AV1377	12000	Vertical Carto	B-W 10AVBLE SINCE 1963
1977	AV1377	12000	Vertical Carto	B-W 50EAST BAY-HILLS
1975	AV1193	12000	Vertical Carto	B-W 50EAST BAY-HILLS
1973	AV1100	12000	Vertical Carto	B-W 50EAST BAY-HILLS
1971	AV-995	12000	Vertical Carto	B-W 50EAST BAY-HILLS
1969	AV-902	12000	Vertical Carto	B-W 50EAST BAY-HILLS
1968	AV-847	24000	Vertical Carto	B-W 50SF L TIDE STRIPS
1968	AV-844	24000	Vertical Carto	B-W 10ALAMEDA CO.
1968	AV-844	24000	Vertical Carto	B-W 10SAN MATEO CO.
1966	AV-710	36000	Vertical Carto	B-W 10ALAMEDA CO.
1966	AV-710	36000	Vertical Carto	B-W 10SAN MATEO CO.
1963	AV-550	36000	Vertical Carto	B-W 10ALAMEDA CO.
1963	AV-550	36000	Vertical Carto	B-W 10SAN MATEO CO.
1959	AV-337	9600	Vertical Carto	B-W 50EAST BAY-HILLS
1957	AV253	12000	Vertical Carto	B-W 10ALAMEDA CO.
1953	AV-119	9960	Vertical Carto	B-W 50EAST BAY-HILLS
1949	AV--28	7200	Vertical Carto	B-W 50EAST BAY-HILLS
1947	AV--11	19990	Vertical Carto	B-W 50EAST BAY-HILLS
1927	HST-4	2000	Oblique B-W 20	OAKLAND AIRPORT

Radman Aerial Surveys 6220 24th St. Sacramento, CA 95822 916-391-1651

1972	2705	12000	Vertical Carto	B-W 10ALAMEDA CO

U.S. Army Corps of Engineers, Attn: CENPA-EN-G SY Pouch 898 Anchorage, AK 99506-08 907-552-2207

1983	SFB	12000	Vertical Carto	B-W 70SFO BAY AREA
1983	SFB	12000	Vertical Carto	Color 70SFO BAY AREA
1982	SFB	24000	Vertical Carto	B-W 70SFO BAY AREA
1981	SFB	24000	Vertical Carto	B-W 70SFO BAY AREA

1980	SF BAY	24000	Vertical Carto	B-W 10SAN LEANDRO
1980	SF BAY	12000	Vertical Carto	Color 10SAN LEANDRO
1979	SFB	24000	Vertical Carto	B-W 70SFO BAY AREA
1978	SF BAY	24000	Vertical Carto	B-W 10SAN LEANDRO
1977	SF BAY	24000	Vertical Carto	B-W 10SAN LEANDRO
1977	SF BAY	24000	Vertical Carto	B-W 10SAN LEANDRO

U.S. Geological Survey Anchorage ESIC 4230 University Dr., Rm. 101 Anchorage, AK 99508-4 907-786-7011

1993	NP9317	40000	Vertical Carto	B-W 50NAPP-LEAF ON
1993	NP9317	40000	Vertical Carto	B-W 60NAPP-LEAF ON
1991	VFNZC	24000	Vertical Carto	Color 100071 0925
1987	NP8721	40000	Vertical Carto	Color 10NAPP-LEAF ON
1981	VEZR	24000	Vertical Carto	B-W 100066 1145
1980	VEZR-6	24000	Vertical Carto	B-W 10
1974	SFB	28680	Vertical Carto	Color 100013 0030
1968	VBZJ	30000	Vertical Carto	B-W 100027 0765
1958	VUO	29990	Vertical Carto	B-W 100038 0502
1946	CP	23600	Vertical Carto	B-W 100091 0724

WAC Corp. 520 Conger St. Eugene, OR 97402-2795 503-342-5169

1989	WAC-89	15840	Vertical Carto	Color 20SAN LEANDRO
1989	WAC-89	15840	Vertical Carto	Color 20SAN LORENZO
1989	SFO89	15840	Vertical Carto	Color 10SF89 EARTHQUAKE
1989	SFO89	15840	Vertical Carto	Color 10SF89 EARTHQUAKE
1988	WAC-88	31680	Vertical Carto	B-W 10ALAMEDA CO.
1984	WAC84C	31680	Vertical Carto	B-W 10ALAMEDA CO

Whittier College Dept. of Geology Attn: Dallas Rhodes/Air Photo- Whittier, CA 90608 310-907-4220

1954	C20500	39990	Vertical Carto	B-W 10FAIRCHILDAS,INDX

Russell City Energy Center

Appendix 10-A
Civil Engineering Design Criteria

May 2001

Russell City Energy Center AFC

May 2001

APPENDIX 10A

CIVIL ENGINEERING DESIGN CRITERIA

10 A1 INTRODUCTION

This appendix summarizes the codes, standards, criteria, and practices that will be generally used in the design and construction of civil engineering systems for the Russell City Energy Center (RCEC). Information that is more specific will be developed during execution of the project to support detailed design, engineering, material procurement specifications, and construction specifications as required by the California Energy Commission.

10 A2 CODES AND STANDARDS

The design of RCEC civil engineering systems will be in accordance with laws and regulations of the federal government, the State of California, the County of Alameda, the City of Hayward, and industry standards. The current issue or edition of the documents at the time of filing of this Application for Certification (AFC) will apply, unless otherwise noted. In cases where conflicts between the cited documents exist, requirements of the more conservative document will be used.

10 A2.1 Civil Engineering Codes and Standards

The following codes and standards have been identified as applicable, in whole or in part, to civil engineering design and construction of power plants:

- American Association of State Highway and Transportation Officials (AASHTO) - Standards and Specifications
- American Concrete Institute (ACI) - Standards and Recommended Practices
- American Institute of Steel Construction (AISC) - Standards and Specifications
- American National Standards Institute (ANSI) - Standards
- American Society of Testing and Materials (ASTM) - Standards, Specifications and Recommended Practices
- American Water Works association (AWWA) - Standards and Specifications
- American Welding Society (AWS) - Codes and Standards
- Asphalt Institute (AI) - Asphalt Handbook
- California Energy Commission - Recommended Seismic Design Criteria for Non-Nuclear Generating Facilities in California, 1989
- Concrete Reinforcing Steel Institute (CRSI) - Standards
- Factory Mutual (FM) - Standards
- National Fire Protection Association (NFPA) - Standards
- International Conference of Building Officials (ICBO) - Uniform Building Code (UBC), 1997
- Steel Structures Painting Council (SSPC) - Standards and Specifications

10 A2.2 Engineering Geology Codes, Standards and Certifications

Engineering geology activities will conform to the applicable federal, state, and local laws, regulations, ordinances, and industry codes and standards.

10 A2.2.1 Federal

None are applicable.

10 A2.2.2 State

The Warren-Alquist Act, PRC, Section 25000 et seq. and the California Energy Commission (CEC) Code of Regulations (CCR), Siting Regulations, Title 20 CCR, Chapter 2, require that an Application for Certification (AFC) address geologic and seismic aspects.

The California Environmental Quality Act (CEQA), PRC 21000 et seq. and the CEQA Guidelines require those potentially significant effects, including geologic hazards, be identified and a determination made as to whether they can be substantially reduced.

10 A2.2.3 City

California State Planning Law, Government Code Section 65302, requires each city and county to adopt a general plan, consisting of nine mandatory elements, to guide its physical development. Section 65302(f) requires that a seismic safety element be included in the general plan.

RCEC development activities will require certification by a Professional Geotechnical Engineer and a Professional Engineering Geologist during and following construction, in accordance with the Uniform Building Code UBC), Chapter 70. The Professional Geotechnical Engineer and the Professional Engineering Geologist will certify the placement of earthen fills and the adequacy of the site for structural improvements, as follows:

- Both the Professional Geotechnical Engineer and the Professional Engineer will address UBC Chapter 70, Sections 7006 (Grading Plans), 7009 (Cuts), 7012 (Terraces), 7013 (Erosion Control), and 7015 (Final Report).
- The Professional Geotechnical Engineer will also address UBC Chapter 70, Sections 7011 (Cuts) and 7012 (Terraces).

Additionally, the Professional Engineering Geologist will present findings and conclusions pursuant to PRC, Section 25523 (a) and (c); and 20 CCR, Section 1752 (b) and (c).

Russell City Energy Center

Appendix 10-B
Structural Engineering Design Criteria

May 2001

Russell City Energy Center AFC

May 2001

APPENDIX 10B

STRUCTURAL ENGINEERING DESIGN CRITERIA

10 B1.0 INTRODUCTION

The purpose of this appendix is to summarize the codes, standards, and practices, and the standard design criteria that will be used in the design and construction of the structural engineering portions of the Russell City Energy Center (RCEC). These criteria form the basis of the design for the structural components and systems of RCEC. More specific design information will be developed during detailed design to support equipment procurement and construction specifications. Section 10B2.0 summarizes the applicable codes and standards and Section 10B3.0 includes the general criteria for natural phenomena, design loads, architectural features, concrete, steel, and seismic design. Section 10B4.0 describes the structural design methodology for structures and equipment. Section 10B5.0 describes the hazard mitigation for RCEC.

10 B2.0 DESIGN CODES AND STANDARDS

The design and specification of work shall be in accordance with all applicable laws and regulations of the federal government, the State of California, and the applicable local codes and ordinances. A summary of the codes and industry standards to be used in the design and construction follows.

- Specifications for materials will generally follow the standard specifications of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI).
- Field and laboratory testing procedures for materials will follow standard ASTM specifications.
- Design and placement of structural concrete will follow recommended practices and the latest version of the American Concrete Institute (ACI), the International Conference of Building Officials, Uniform Building Code, 1997 Edition (UBC 1997), and the Concrete Reinforcing Steel Institute (CRSI).
- Design, fabrication, and erection of structural steel will follow the recommended practices and the latest version of the American Institute of Steel Construction Code (AISC) and UBC 1997.
- Steel components for metal wall panels and roof decking will conform to the American Iron and Steel Institute (AISI) Specification for the Design of Light Gage Cold-Formed Structural Members.
- Welding procedures and qualifications for welders will follow recommended practices and codes of the American Welding Society (AWS).
- Preparation of metal surfaces for coating systems will follow the specifications and standard practices of the Steel Structures Painting Council (SSPC), National Association for Corrosion Engineers (NACE), and specific instructions of the coatings manufacturer.
- Fabrication and erection of grating will follow applicable standards of the National Association of Architectural Metals Manufacturers (NAAMM).
- Design and erection of masonry materials will follow recommended practices and codes of the latest revision of the ACI Concrete Masonry Structures Design and Construction Manual

and the International Conference of Building Officials, Uniform Building Code, 1997 Edition (UBC).

- Plumbing will conform to the Uniform Plumbing Code, 1994 Edition (UPC).
- Design will conform to requirements of the Federal and California Occupational Safety and Health Administration (OSHA and CALOSHA).
- Design of roof coverings will conform to requirements of the National Fire Protection Association (NFPA) and Factory Mutual (FM).

Other recognized standards will be used where required to serve as guidelines for design, fabrication, and construction.

The following laws, ordinances, codes, and standards have been identified as applying to structural design and construction. In cases where conflicts between cited codes (or standards) exist, the requirements of the more conservative code will be met.

10 B2.1 Federal

- Title 29 Code of Federal Regulations, Part 1910, Occupational Safety and Health Standards.
- Walsh-Healy Public Contracts Act (P.L. 50-204.10).

10 B2.2 State

- Business and Professions Code Section 6704, et seq.; Section 6730 and 6736. Requires state registration to practice as a Civil Engineer or Structural Engineer in California.
- Labor Code Section 6500, et seq. Requires a permit for construction of trenches or excavations 5 feet or deeper where personnel have to descend. This also applies to construction or demolition of any building, structure, false work, or scaffolding which is more than three stories high or equivalent.
- Title 24 California Code of Regulations (CCR). Adopts current edition of UBC as minimum legal building standards.
- State of California Department of Transportation, Standard Specifications.
- Title 8 CCR Sections 1500, et seq.; Sections 2300, et seq.; and Sections 3200, et seq. Describes general construction safety orders, industrial safety orders, and work safety requirements and procedures.
- Regulations of the following state agencies as applicable.
  - Department of Labor and Industry Regulations.
  - Bureau of Fire Protection.
  - Department of Public Health.
  - Water and Power Resources
- Title 8 CCR Section 450, et seq. and Section 750, et seq. adopts American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASMEB and PVC) and other requirements for unfired and fired boilers.

10 B2.3 Industry Codes and Standards

- California Energy Commission, "Recommended Seismic Design Criteria for Non-Nuclear Power Generating Facilities in California," June 1989.

- International Conference of Building Officials, "Uniform Building Code" (UBC), 1997 Edition.
- Structural Engineers Association of California, "Recommended Lateral Force Requirements and Tentative Commentary," 1988 Recommendation and Commentary.
- Applied Technology Council, "Tentative Provision for the Development of Seismic Regulations for Buildings," (ATC-3-06), Amended December 1982.
- American Institute of Steel Construction (AISC).
  - Specification for Structural Steel Buildings-Allowable Stress Design and Plastic Design, June 1, 1989.
  - "Code of Standard Practice for Steel Buildings and Bridges."
  - "Allowable Stress Design Specifications for Structural Joints Using ASTM A325 or A490 Bolts."
  - Manual of Steel Construction Allowable Stress Design, ninth Edition.
- American Iron and Steel Institute (AISI) "Specification for the Design of Cold-Formed Steel Structural Members," August 19, 1986, Edition Cold-Formed Steel Design Manual Parts I-VII."
- American Welding Society (AWS) "Structural Welding Code-Steel Twelfth Edition" (AWS D1.1-92).
- American Concrete Institute (ACI).
  - "Building Code Requirements for Reinforced Concrete" (ACI 318/318R-99).
  - "Building Code Requirement for Structural Plain Concrete" (ACI 318.1/318.1R-99).
  - "Code Requirements for Nuclear Safety Related Structures," Appendix B (Steel Embedments only) (ACI 349-90), except that anchor bolts will be embedded to develop their yield strength.
  - ACI 530-92 "Building Code Requirements for Concrete Masonry Structures".
  - ACI 212.3R-91--Chemical Admixtures for Concrete.
  - ACI 302.IR-89--Guide for Concrete Floor and Slab Construction.
  - ACI 350R-89--Environmental Engineering Concrete Structures
- Structural and Miscellaneous Steel.
  - ASTM A569/A569M-91a Specifications for Steel Carbon (0.15 maximum percent) Hot-Rolled Sheet and Strip, Commercial Quality.
  - ASME/ANSI STS-1-1986--Steel stacks, except for circumferential stiffening which shall be in accordance with British Standard 4076--1978 and except that seismic design shall be in accordance with UBC 1997.
- American Society for Testing and Materials (ASTM). The following codes and standards shall be included as a minimum.
  - ASTM A36/A36M-96--Standard Specification for Carbon Structural Steel.
  - ASTM A53-96--Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
  - ASTM A276 96--Specification for Stainless Steel Bars and Shapes.
  - ASTM A500-93--Specification for Cold-formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

  - ASTM B695-91--Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
  - ASTM A307-94--Specification for Carbon Steel Bolts and Studs.
  - ASTM A123 - 89a—Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
  - ASTM A153-95--Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - ASTM A82-A-95--Specification for Steel Wire, Plain, for Concrete Reinforcement.
  - ASTM A185-94--Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
  - ASTM A 615/A615 M-96-Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- Masonry Institute of America, "Reinforced Masonry Engineering Handbook."
- American Water Works Association (AWWA).
  - "Standards for Welding Steel Tanks," (AWWA D100-84).
  - "Standards for Prestressed Concrete Pressure Pipe, Steel Cylinder Type for Water and Other Liquids" (AWWA C301-84).
  - "Standards for Reinforced Concrete Water Pipe—Noncylinder Type, Not Prestressed"(AWWA C302-87).
- American Association of State Highway and Transportation Officials—(GDHS-2), "A Policy on Geometric Design of Highways and Streets."
- Heating, Ventilating, and Air Conditioning Guide by American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE).
- Uniform Plumbing Code (UPC), 1994 Edition.
- International Association of Plumbing and Mechanical Officials.
- National Fire Protection Association Standards (NFPA).
- Steel Structures Painting Council Standards (SSPC).
- American Society of Nondestructive Testing (SNT-TC-1A).
- International Standard Organization (ISO) 3945-85 "Mechanical Vibration of Large Rotating Machines with Speed Range from 10 to 200 revs/sec—Measurement and Evaluation of Vibration Severity In Situ."

The codes and industry standards used for design, fabrication, and construction will be the codes and industry standards, including all addenda, in effect as stated in equipment and construction purchase or contract documents. Where no other standard or code governs, the UBC will be used.

10 B3 STRUCTURAL DESIGN CRITERIA

10 B3.1 Natural Phenomena

10 B3.1.1 Datum

Site topographic elevations will be based on the elevation survey conducted using the National Geodetic Vertical Datum (NGVD) of 1929 elevation benchmarks. The finished grade of the facility will be approximately 10.0 feet.

10 B3.1.2 Wind Speed

Design wind speed will be 70 miles per hour based on UBC 1997 edition for a 50-year recurrence interval. This design wind speed will be used to determine wind loads for all structures as discussed in Subsection B3.2.3 Wind Loads.

10 B3.1.3 Temperature

Design basis temperatures for civil and structural systems will be as follows:

Maximum	94 Degrees, F
Minimum	34 Degrees, F

10 B3.1.4 Frost Penetration

The site is located in an area free of frost penetration. Bottom elevation of all foundations for structures and equipment, however, will be maintained at a minimum of 12" below the finished grade.

10 B3.1.5 Seismicity

The plant site is located in Seismic Zone 4, as determined from Figure No.16-2, "Seismic Zone Map of the United States," UBC 1997.

10 B3.1.6 Snow

The plant site is located in a zero ground snow load area, as determined from Figure No. A-16-1 of UBC 1997.

10 B3.2 Design Loads

Design loads for all structures will be determined according to the criteria described below, unless the applicable building code requires more severe design conditions.

10 B3.2.1 Dead Loads

Dead loads will consist of the weights of the structure and all equipment of a permanent or semi-permanent nature including tanks, bins, wall panels, partitions, roofing, piping, drains, electrical trays, bus ducts, and the contents of tanks and bins measured at full operating capacity. The contents of tanks and bins shall not be considered as effective in resisting column uplift due to wind forces but shall be considered effective for seismic forces.

10 B3.2.2 Live Loads

Live loads will consist of uniform live loads and equipment live loads. Uniform live loads are assumed unit loads which are sufficient to provide for movable and transitory loads, such as the weight of people, portable equipment and tools, planking and small equipment, or parts which may be moved over or placed on floors during maintenance operations. These uniform live loads shall not be applied to floor areas, which will be permanently occupied by equipment.

Equipment live loads are calculated loads based upon the actual weight and size of the equipment and parts to be placed on floors during dismantling and maintenance or to be temporarily placed on or moved over floors during installation.

Uniform live loads will be in accordance with ASCE Standard 7, but will not be less than the following:

a. Roofs 20 psf

All roof areas will be designed for wind loads as indicated in Subsection B3.2.3, Wind Loads. Ponding loading effect due to roof deck and framing deflections will be investigated in accordance with AISC Specification Article K2. All roof areas will be designed for a minimum of 20 psf live load in addition to calculated dead loads.

b. Floors and Platforms (Steel Grating and Checkered Plate) 100 psf

In addition, a uniform load of 50 psf will be used to account for piping and cable tray, except where the piping and cable tray loads exceed 50 psf, in which case the actual loads will be used. Pipe hanger loads for the major piping systems will be specifically determined and located. Piping expansion and dynamic loads will be considered on an individual basis for their effect on the structural systems. Loads imposed on perimeter beams around pipe chase areas will also be considered on an individual basis.

c. Floors (Elevated Concrete Floors) 100 psf

In addition, elevated concrete slabs will be designed to support an alternate concentrated load of 2 kips in lieu of the uniform loads, whichever governs. The concentrated load will be treated as a uniformly distributed load acting over an area of 2.5 square feet, and will be located in a manner to produce the maximum stress conditions in the slab.

d. Control Room Floor 150 psf

e. Stairs, Landings and Walkways 100 psf

In addition, a concentrated load of 2 kips will be applied concurrently to the supporting beams for the walkways to maximize the stresses in the members, but the reactions from the concentrated loads will not be carried to the columns.

f. Pipe Racks 100 psf

Where the piping and cable tray loads exceed the design uniform load, the actual loads will be used. In addition, a concentrated load of 15 kips will be applied concurrently to the supporting beams for the walkways to maximize the stresses in the members, but the reactions from the concentrated loads will not be carried to the columns.

g. Hand Railings

Hand railings will be designed for either a uniform horizontal force of 50 plf applied simultaneously with a uniform vertical live load of 100 plf, or a 200 pound concentrated load applied at any point and in any direction, whichever governs.

h. Slabs on Grade 250 psf

Consideration will be given to designing appropriate areas of the ground floor for support of heavy equipment such as construction and maintenance cranes.

i. Truck Loading Surcharge Adjacent to Structures 250 psf

j. Truck Support Structures AASHTO-HS-20-44

k. Special Loading Conditions Actual loadings

Laydown loads from equipment components during maintenance and floor areas where trucks, forklifts, or other transports will have access will be considered in the design live load.

Live loads may be reduced in accordance with the provisions of UBC Section 1606.

Posted floor load capacity signs for all roofs, elevated floors, platforms and walkways will be in compliance with the OSHA Occupational Safety and Health Standard, Walking and Working Surfaces, Subpart D. Floor load capacity for slabs on grade will not be posted.

10 B3.2.3 Wind Loads

Wind loads for all structures will be based on UBC 1997. Basic wind speed shall be 70 miles per hour and wind stagnation pressure (qs) 12.6 psf. A step function of pressure with height under Exposure C conditions will be used. The Importance Factor shall equal 1.0. Height brackets and velocity pressures will be as follows.

Height Aboveground Feet	**Velocity Pressure** Pounds-force per square foot
Grade to 20	13.9
20 to 40	15.4
40 to 60	17.3
60 to 100	19.13
100 to 160	21.44
160 to 200	23.05

The above velocity pressures are average values for the indicated height brackets. Design wind pressures will be determined by multiplying the velocity pressures by the appropriate pressure coefficients given in UBC Table No. 16-H using Method 1.

If wind design governs, the detailing requirements and limitations in the UBC 1997 seismic provisions will also be followed.

10 B3.2.4 Steel Stack

The steel stack and supports shall be capable of enduring specified normal and abnormal design operating conditions in combination with high wind or seismic event for the design life of the facility. Effects of wind will include along-wind and across-wind response. The RCEC will address the design considerations, meet the requirements, and utilize the design methods of Steel Stacks, ASME/ANSI STS-1-1986, and AISC Manual of Steel Construction Allowable Stress Design, Ninth Edition, except that increased allowable stresses for wind will not be used. Design values for yield strength and modulus of elasticity of the stack material will depend on the composition of the material and the maximum temperature of the metal at design operating conditions, and will be as prescribed by the ASME Pressure Vessel Code, Section VIII, Division 2, Part AM. Seismic loads shall be in accordance with UBC 1997.

10 B3.2.5 Seismic Loads

Seismic loads will be determined in accordance with the requirements specified in Section 10B3.6 - Seismic Design Criteria.

10 B3.2.6 Construction Loads

Structural integrity will be maintained without use of temporary framing struts or ties and cable bracing insofar as possible. However, construction or crane access considerations may dictate the use of temporary structural systems.

10 B3.2.7 Earth Pressures

Earth pressures will be in accordance with the recommendations contained in the project-specific "Final Subsurface Investigations and Foundation Report."

10 B3.2.8 Groundwater Pressures

Hydrostatic pressures due to groundwater or temporary water loads will be considered.

10 B3.2.9 Special Considerations for Structures and Loads during Construction

For temporary structures, or permanent structures left temporarily incomplete to facilitate equipment installations, or temporary loads imposed on permanent structures during construction, the allowable stresses may be increased by 33 percent.

Structural backfill may be placed against walls, retaining walls, and similar structures when the concrete strength attains 80 percent of the design compressive strength (f'c), as determined by sample cylinder tests. Restrictions on structural backfill, if any, will be shown on the engineering design drawings.

Metal decking used as forms for elevated concrete slabs will be evaluated to adequately support the weight of concrete plus a uniform construction load of 50 psf, without an increase in allowable stresses.

10 B3.2.10 Load Combinations

At a minimum, the following load combinations will be considered. Applicable code-prescribed load combinations will also be considered.

- Dead load
- Dead load plus live load plus all loads associated with normal operation of the equipment, e.g., temperature and pressure loads, piping loads, normal torque loads, impact loads, etc.
- Dead load plus live load plus all loads associated with normal operation plus wind load
- Dead load plus live load plus all loads associated with normal operation plus seismic load
- Dead load plus construction loads
- Dead load plus live load plus emergency loads
- Dead load plus wind load
- Dead load plus seismic load

Every building component shall be provided with the strength adequate to resist the most critical effect resulting from the following combination of loads.

- Dead plus floor live plus roof live
- Dead plus floor live plus wind
- Dead plus floor live plus seismic

- Dead plus floor live plus wind plus roof live/2
- Dead plus floor live plus roof live plus wind/2
- Dead plus floor live plus roof live plus seismic

Note: Use live load only where required by UBC 1997 in combination with seismic.

10 B3.2.11 Allowable Stresses

Each load combination shall not exceed the allowable stress permitted by the appropriate code for that combination.

The 1997 UBC/1998 CBC allows a 33% stress increase for seismic and wind design in Section 1612.3.2l, which specifies loading combinations to be used for design of structures and portions thereof when using the allowable stress design method. These combinations are permitted a one-third increase in allowable stresses for all combinations including wind or seismic. Steel structural design will utilize these combinations along with the special seismic load combinations specified in Section 1612.4. Section 1612.3.1, which does not allow a 33% stress increase for seismic and wind design of structures, and specifies loading combinations to be used for the design of structures and portions thereof, will not be used. Therefore, the load combinations of section B3.2.11.2 (steel design) will comply with the UBC/CBC design requirements. Additionally, welded, bolted, or other intermittent connections such as inserts for anchorage of nonstructural components will not use the 1/3 increase in allowable stress when considering wind and seismic forces.

10 B3.2.11.1 Concrete Structures

For reinforced concrete structures and equipment supports, using the strength method, the load factors and load combinations will be in accordance with UBC Section 1909.

The required strength (U) shall be at least equal to the following.

- U = 1.4 Dead + 1.7 Live
- U = 0.75 (1.4 Dead + 1.7 Live + 1.7 Wind)
- U = 0.9 Dead + 1.3 Wind
- U = 1.4 (Dead + Live + Seismic)
- U = 0.9 Dead + 1.43 Seismic
- U = 1.4 Dead + 1.7 Live + 1.7 Earth Pressure
- U = 0.9 Dead + 1.7 Earth Pressure

10 B3.2.11.2 Steel Structures

The required strength (S) based on the elastic design methods and the allowable stresses (Fs) defined in Part 1 of the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings is as follows.

- S = Dead + Live + (Roof Live Load) = 1.0 Fs.
- S = Dead + Live + (Wind or Earthquake) = 1.4
- S = Dead + Live + Wind = 2
- S = Dead + Live + Wind = 2
- S = Dead + Live + Earthquake = 1.4

- S = 0.9 Dead + Earthquake = 1.4

Frame members and connections will conform to the additional requirements of UBC Sections 1633 and 2213.

10 B3.3 Architecture

General design criteria for the architectural systems are as follows.

10 B3.3.1 Architecture—Engineered Buildings

General design criteria for materials and installation of architectural systems or components will be as follows.

Interior Walls. Where durability is required, interior walls may be constructed of concrete block masonry, structurally designed and reinforced as required. In offices, shops, etc., metal studs with gypsum board will usually be used to form interior partitions. Insulation for sound control will be used where required by design.

Fire Exits. Fire exits will be provided at outside walls as required by code. Exit signs will be provided. Fire doors will bear an Underwriters' Laboratories certification level for class of opening and rating for door, frame, and hardware. Doors will conform to wood or hollow metal door requirements and have fillers adequate to meet the fire rating.

Large Access Exterior Doors. Large access exterior doors will be rolling steel type with weather seals and windlocks. Components will be formed from galvanized steel, factory primed, and field painted. Doors will be motor-operated with override manual operation.

Painting. Exterior steel material that is not galvanized or factory finished will be painted. Painted color will match or harmonize with the color of the exterior face of the wall panels.

Color Schemes. Color schemes will be selected for overall compatibility.

10 B3.3.2 Architecture—Prefabricated Metal Buildings

Prefabricated metal buildings (packaged to include exterior doors, wall louvers, windows, and related enclosure components) will be furnished as follows.

Building Enclosure. Building enclosures will be of manufacturer's standard modular rigid frame construction with tapered or uniform depth rafters rigidly connected at ends to pinned-base tapered or uniform depth columns. Purlins and girts will be cold-formed "C" or "Z" sections conforming to "Specifications for Design of Cold-Formed Steel Structural Members" of American Iron and Steel Institute. All other members will be of ASTM A36 hot rolled shapes conforming to "Specification for Design, Fabrication and Erection of Structural Steel for Buildings" of American Institute of Steel Construction. Roof slopes will be approximately 1-inch rise per 12 inches of run. Metal roof coverings will be of prefinished standing seam panels of 24-gauge minimum.

Steel. Cold-formed components will conform to ASTMA570, Grade E, 42,000 psi minimum yield for material thicknesses equal to or less than 0.23 inch, or to ASTMA375, 50,000 pounds per square inch (psi) minimum yield for high tensile strength purlin or girt sections with material thicknesses equal to or less than 0.23 inch. Roof covering and wallcovering will conform to ASTM A446, Grade A, galvanized 33,000 psi minimum yield. All cold-formed components will be manufactured by precision roll or break forming.

10 B3.4 Concrete

Reinforced concrete structures will be designed in accordance with UBC 1997 and ACI 318-99, Building Code Requirements for Reinforced Concrete.

10 B3.4.1 Materials

The materials described below will be specified and used as a basis for design.

Reinforcing Steel. Reinforcing steel shall meet the requirements of ASTM A615 Grade-60. Welded wire fabric for concrete will conform to ASTM A 185.

Cement. Cement used in all concrete mixes will be Portland cement meeting the requirements of ASTMC150.

Aggregates. Fine aggregates will be clean natural sand. Coarse aggregates will be crushed gravel or stone. All aggregates shall meet the requirements of ASTM C33.

Admixtures. Plasticizers and retarders will be used to control setting time and to obtain optimum workability. Air entrainment of 4 to 6 percent by volume will be used in all concrete mixes. Calcium chloride will not be permitted. Interior slabs to be trowel finished may use less air entrainment.

Water. Clean water of potable quality shall be used in all concrete.

10 B3.4.2 Design

The system of concrete and steel reinforcing strength combinations will be used as follows.

- Concrete strength—psi (at 28days)--See table in Subsection 10B3.4.3
- Reinforcing strength—60,000 psi, Grade 60

10B3.4.3 Mixes

The design compressive strength (f'c) of concrete and grout, as measured at 28 days, will be as follows:

Material	Compressive Strength
Electrical ductbank encasement and lean concrete backfill (Class L-1)	2000 psi
Structural concrete (Class S-1)	3000 psi
Structural concrete (Class S-2)	4000 psi
Grout (Class G-1)	5000 psi

10B3.4.4 Concrete Tests

Quality control testing of concrete will be performed by an independent laboratory and will consist of the following.

Preliminary Review. Before concrete mixes are designed, the source and quality of materials will be determined and the following reports will be submitted.

- The type, brand, manufacturer, composition, and method of handling (sack or bulk) of cement.
- The type, source, and composition of fly ash.

- The classification, brand, manufacturer, and active chemical ingredients of all admixtures.
- The source of coarse aggregates and test reports to verify compliance with ASTMC33.
- The source of fine aggregates and test reports to verify compliance with ASTMC33.
- The results of tests to determine compliance of admixtures with appropriate ASTM requirements.

Design Mix Tests. Concrete will be proportioned to provide an average compressive strength as prescribed in UBC 1997 Section 1905.3. Documentation that proposed concrete proportions will produce an average compressive strength equal to or greater than required average compressive strength will be established based on trial mixtures in accordance with UBC Section 1905.3.3

Field Control Tests. Field control tests will include the following.

- Aggregate gradation. Each 500 tons of fine aggregate and each 1,000 tons of coarse aggregate will be sampled and tested in accordance with ASTM D75 and C136.
- Slump. A slump test will be made from each of the first three batches mixed each day. An additional test will be made for each 50 cubic yards placed in any one-day.
- Air content. An air content test will be made from one of the first three batches mixed each day and from each batch of concrete from which compression test cylinders are made. Air content tests will be in accordance with ASTMC231.
- Compression tests. One set of four concrete test cylinders will be made each day from each class of concrete being placed. Additional sets will be made depending on the amount of concrete placed each day. For each additional 100 cubic yards of each class, or major fraction thereof, placed in any one day, four additional sets of cylinders will be made. One cylinder of each set will be tested at an age of seven days, two cylinders of each set will be tested at 28 days, and one cylinder shall be stored until otherwise directed. Compression tests will be in accordance with ASTMC39.

10 B3.4.5 Reinforcing Steel Test

Mill test reports certifying that reinforcing steel is in accordance with ASTM and project specifications will be required.

10 B3.5 Steel and Other Metals

10 B3.5.1 Structural Steel

Steel framed structures will be designed in accordance with the UBC 1997 and the AISC Specification for the Structural Steel Building, Allowable Stress Design and Plastic Design, June 1, 1989. In addition, steel-framed structures will be designed in accordance with the criteria discussed in the following subsections.

10 B3.5.1.1 Materials

Structural steel shapes, plates, and appurtenances for general use will conform to ASTM A36 or A 572. Structural steel required for heavy framing members might consider the use of ASTM A441. Structural steel required for tubes will conform to ASTM A500, Grade B. Connection bolts will conform to ASTM A325. Connections will conform to AISC Specification for Structural Joints, November 13, 1985 edition. Welding electrodes will be as specified by the AWS. All structural steel

will be shop primed after fabrication. Exterior structural steel may be hot dipped galvanized in lieu of prime painted.

10 B3.5.1.2 Tests

Mill test reports or reports of tests made by the fabricator will be required certifying that all material is in conformance with the applicable ASTM specification. In addition, the fabricator will provide an affidavit stating that all steel specified has been provided at yield stresses in accordance with the drawings and the specification.

10 B3.5.1.3 Design

All steel framed structures will be designed as "rigid frame" (AISC Specification Type 1) or "simple" space frames (AISC Specification Type 2), utilizing single span beam systems, vertical diagonal bracing at main column lines, and horizontal bracing at the roof and major floor levels. The use of Type 1 rigid frames will generally be limited to one-story, open garage, warehouse or shed-type structures, or to prefabricated metal buildings.

Suspended concrete slabs will be considered as providing horizontal stability by diaphragm action after setup and curing. Deflections of the support steel will be controlled to prohibit "ponding" of the fresh concrete as it is placed. Metal roof decks attached with welding washers or fasteners may be considered to provide a structure with lateral force diaphragm action. Grating floors will not be considered as providing horizontal rigidity.

Connections will be in accordance with AISC standard connection design for field bolted connections. Connections will be designed with bolts for bearing type joints with threads in shear plane except where connections are required to be slip-critical. Larger diameter bolts may be used to develop larger capacity connections or elsewhere as determined by the engineer.

10 B3.6 Seismic Design Criteria

This section provides the general criteria and procedures that will be used for seismic design of structures, equipment, and components.

RCEC is located in Seismic Zone 4 according to the Uniform Building Code, 1997 edition. The seismic performance objectives for this facility are as follows.

- Resist minor levels of earthquake ground motion without damage.
- Resist moderate levels of earthquake ground motion without structural damage, but possibly experience some nonstructural damage.
- Resist major levels of earthquake ground motion without collapse, but possibly with some structural as well as nonstructural damage.

To achieve these objectives and to meet the requirements of the CEC and local codes, the facility will be designed in accordance with the 1997 edition of the Uniform Building Code. All structures, equipment internals, and components will be separated from adjoining structures.

10 B.3.6.1 Buildings and Structures

The seismic zone used for this site will be Zone 4 as determined from UBC 1997 Figure No. 16-2 titled "Seismic Zone Map of the United States," using an Importance Factor of 1.00. Seismic loading will be used in the design of structures only when it is greater than the computed wind loads.

Non-building structures are to be designed in accordance with UBC 1997 Section 1634. These are typically regular structures as defined in the UBC, so the static lateral force procedure will be applicable. In the event that dynamic analysis will be required based on discussions with the CBO, the affected structures will be evaluated in accordance with the requirements of the UBC.

Buildings and structures defined by UBC 1997 Section 1629.8.3 will be designed using the static lateral force procedure of Section 1630.

Buildings and structures defined by UBC 1997 Section 1629.8.4 will be designed using the dynamic lateral force procedure of Section 1631. The ground motion representation will use the response spectrum indicated in UBC Figure 16-3.

Lateral forces on elements of structures and nonstructural components will be determined from the greater of UBC 1632.2 requirements, or UBC 1634.5 requirement for equipment supported laterally at or below grade.

Steel-framed structures will comply with the requirements of UBC Chapter 22, Section 2213 including the requirements of Section 2213.5.1

Water storage tanks will meet the seismic design requirements of AWWA D100, Section 13, and UBC 1634.

10 B4 STRUCTURAL DESIGN METHODOLOGY

This section describes the structural aspects of the design of the proposed facility. Each major structural component of the plant is addressed by defining the design criteria and analytical techniques that will be employed.

10 B4.1 Structures

10 B4.1.1 Combustion and Steam Turbine Foundations

Combustion and steam turbine foundations will be designed to support the turbine and generator components.

The foundation will be designed to resist the loadings furnished by the manufacturer and will be constructed of reinforced concrete.

10 B4.1.1.1 Foundation Loads

Foundation loads will be furnished by the combustion turbine manufacturer and will be superimposed with loads for the foundation itself. Typical loading data supplied by the manufacturer include the following:

- Dead loads
- Live loads
- Wind loads from project specific criteria
- Seismic loads from project specific criteria
- Hydrostatic loads
- Temperature and pressure loads
- Emergency loads such as turbine accident loads

A typical combustion turbine foundation is indicated on Figure 10B4.1-1 and 10B4.1-2. A typical steam turbine foundation is indicated on Figure 10B4.1-3.

10 B4.1.1.2 Induced Forces

The combustion turbine and associated equipment will be securely anchored to the foundation using cast-in-place steel anchor bolts or sleeved through-bolts designed to resist the equipment forces.

10 B4.1.1.3 Structural System

Refer to Figure 10B4.1-1, 10B4.1-2 and 10B4.1-3 for information regarding the specific structural system.

10 B4.1.1.4 Structural Criteria

The foundation will be designed and constructed as a monolithic reinforced concrete structure using the criteria from Section 10B3.4 Concrete. The foundation system will likely be a pile or soil supported rigid mat.

The foundation design will address the following considerations:

- Soil bearing capacities and earth pressures
- Allowable settlements
- Equipment, structure, and environmental loads
- Natural frequencies of rotating equipment
- Access and maintenance
- Equipment performance criteria
- Dynamic effects of the rotating machinery

Environmental loading will be determined in accordance with, Section 10B3.1 Natural Phenomena. Wind loads will be determined using the velocity pressures specified in Subsection 10B3.2.3 Wind Loads.

Seismic loading to the foundation from the combustion turbine will be calculated using equivalent lateral forces applied at the center-of-gravity of the equipment in accordance with the criteria specified in Section 10B3.6 Seismic Design Criteria for rigid equipment.

Load combinations and their respective strength factors for the foundation design will be as indicated in Subsection 10B3.2.10 Load Combinations and Subsection 10B3.2.11 Allowable Stresses.

10 B4.1.1.5 Analytical Techniques

The combustion turbine foundation will be designed using static analysis techniques assuming a rigid mat. The mat will be sized such that the allowable settlement and bearing pressure criteria developed from a detailed subsurface investigation will not be exceeded. The foundation will be analyzed as a combined footing assuming a linear soil pressure distribution. The mat will be proportioned such that the resultant of the soil pressure coincides as nearly as possible with the resultant of the vertical loading. The factors of safety against overturning and sliding will be 1.5 and 1.1, respectively.

The combustion turbine foundation will be checked for dynamic response of the operating combustion turbine. Manual calculations and simple computer models based on the fundamental principles of dynamic behavior of structures will be used to determine the natural frequencies of the

support system. Where soil-structure interaction effects are important, low strain soil properties will be used to calculate soil springs using the procedures from Vibrations of Soils and Foundation by Richard, Hall, and Woods or a similar procedure. The concrete foundation will be analyzed as a rigid body on soil springs with the equipment modeled as a rigid mass located at its center of gravity and rigidly attached to the foundation. The foundation will be proportioned such that the principal natural frequencies will be at least 10 percent removed from the equipment operating speed.

Should the resulting foundation design prove to be uneconomical, the dynamic behavior of the foundation will be evaluated and compared to ISO 3945 Criteria for Vibration Severity. The resultant vibration level will be within the "Good" range of this standard.

A procedure for the dynamic analysis of large fan foundations supported by soil or piers may be used to evaluate the dynamic behavior of the turbine foundations.

10 B4.1.2 Heat Recovery Steam Generator (HRSG) Foundation

The HRSG foundation will be designed to support the HRSG and associated equipment.

The foundation will be designed to resist the loadings furnished by the manufacturer and will be constructed of reinforced concrete.

10 B4.1.2.1 Foundation Loads

Foundation loads will be furnished by the HRSG manufacturer and will be superimposed with loads for the foundation itself. Typical loading data supplied by the manufacturer include the following:

- Dead loads
- Live loads
- Wind loads
- Seismic loads
- Hydrostatic loads
- Temperature and pressure loads

The HRSG foundation will be designed to resist a superimposed uniform live load of 250 psf over the area not otherwise occupied by equipment.

A typical HRSG foundation is indicated on Figures 10B4.1-4 and 10B4.1-5.

10 B4.1.2.2 Induced Forces

The HRSG and associated equipment will be securely anchored to the foundation using cast-in-place steel anchor bolts designed to resist the equipment forces.

10 B4.1.2.3 Structural System

Refer to Figures 10B4.1-4 and 10B4.1-5 for information regarding the specific structural system.

10 B4.1.2.4 Structural Criteria

The foundation will be designed and constructed as a monolithic reinforced concrete structure using the criteria from Section B3.4 Concrete. The foundation system will be a reinforced concrete rigid mat.

The foundation design will address the following considerations:

- Soil bearing capacities and earth pressures
- Allowable settlements
- Equipment, structure, and environmental loads
- Access and maintenance
- Equipment performance criteria

Environmental loading will be determined in accordance with Section 10B3.1 Natural Phenomena. Wind loads will be determined using the velocity pressures specified in Subsection 10B3.2.3 Wind Loads.

Seismic loading to the foundation will be supplied by the HRSG manufacturer and will reflect the structural system used by the HRSG to resist lateral loading.

Load combinations and their respective allowable strengths will be as indicated in Subsection 10B3.2.10 Load Combinations and Subsection 10B3.2.11 Allowable Stresses.

10 B4.1.2.5 Analytical Techniques

The HRSG foundation will be designed using static analysis techniques assuming a rigid mat. The mat will be sized such that the allowable settlement and bearing pressure criteria developed from a detailed subsurface investigation will not be exceeded. The foundation will be analyzed assuming a linear soil pressure distribution. The mat will be proportioned such that the resultant of the soil pressure coincides as nearly as possible with the resultant of the vertical loading. The factors of safety against overturning and sliding will be 1.5 and 1.5, respectively.

10 B4.1.3 Stack and Foundation

The two stacks will be carbon steel stacks supported on a reinforced concrete mat foundation. The height of the stacks will be approximately 145 feet and each will be 18 feet in diameter. Final stack height will be determined based upon the results of air modeling.

10 B4.1.3.1 Foundation Loads

Foundation loads will be determined using project specific design criteria.

The design of the stack and foundation will include the following loads:

- Dead loads
- Live loads
- Wind loads
- Seismic loads
- Temperature and pressure loads

A typical steel stack foundation is indicated on Figure 10B4.1-6. Foundation loading magnitudes cannot be determined until specific stack design is completed.

10 B4.1.3.2 Induced Forces

The stack will be securely anchored to the foundation using cast-in-place steel anchor bolts designed to resist the foundation and stack induced forces.

10 B4.1.3.3 Structural System

The steel stack will resist lateral loading as a fixed base cantilevered structure.

10 B4.1.3.4 Structural Criteria

The predominate forces acting on the stack will result from wind or seismic loading. The stack will be designed as indicated in Appendix B, Subsection 10B3.2.4 Steel Stacks.

Seismic loads will be determined in accordance with UBC Section 1634 Nonbuilding Structures. The fundamental period will be determined using UBC equations and will be calculated by both considering and ignoring the structural contribution of any lining material. The lower period will be used in the development of the seismic forces.

The allowable longitudinal stress, F, for the design of the stack shell will be determined from the following equations from ASME/ANSI STS-1-1986.

F = 1/8 Et/r/FS for t/r < 8Fp/E

F = [Fy - Ks (Fy - Fp)] / FS for t/r > 8Fp/E

< 20Fy/E

F = Fy/FS for t/r > 20Fy/E

where

E	=	Steel modulus of elasticity,
t	=	Shell plate thickness with corrosion allowance,
r	=	Shell radius,
FS	=	Factor of safety equal to 1.5,
Fy	=	Steel yield stress, and
Fp	=	Steel proportional limit equal to 0.70 Fy.

$$Ks = \left[\frac{\frac{20Fy}{E} - \frac{t}{r}}{\frac{20Fy}{E} - \frac{8Fp}{E}} \right]^2$$

The minimum shell thickness will be 1/4-inch plus 1/16-inch corrosion allowance. The corrosion allowance will be considered in the generation of seismic loads but not in the resistance to seismic or wind loads. Allowable stresses for stiffeners, platform members, and other details will be in accordance with the American Institute of Steel Construction Allowable Stress Design, Ninth Edition. Allowable stresses for the shell will not be increased for wind or seismic loadings.

The stack will be supported using an octagonal or circular shaped reinforced mat footing. The foundation will be designed and constructed as a monolithic reinforced concrete structure using the criteria from Appendix G and Appendix B, Section B3.4 Concrete. The foundation system will likely be a soil supported or pile supported rigid mat.

The foundation design will address the following considerations.

- Soil bearing capacities and earth pressures
- Allowable settlements

- Structure and environmental loads

Load combinations and their respective allowable strengths will be as indicated in Subsection 10B3.2.10 Load Combinations and Subsection 10B3.2.11 Allowable Stresses.

10 B4.1.3.5 Analytical Techniques

Moments, shears, and axial forces will be calculated using static analysis procedures on a cantilevered member. Longitudinal stresses resulting from axial loads and flexure will be combined and compared to a single allowable stress.

The stack foundation will be designed using static analysis techniques assuming a rigid mat. The mat will be sized such that the allowable settlement and bearing pressure criteria developed from a detailed subsurface investigation will not be exceeded. The foundation will be analyzed assuming a linear soil pressure distribution. The mat will be proportioned to resist the vertical gravity loads concurrent with the controlling lateral loads while maintaining a minimum 1.5 factor of safety against overturning. The factor of safety against sliding will be a minimum of 1.5.

10 B4.1.4 Buildings

The various plant site buildings will provide support, enclosure, protection, and access to the systems contained within its boundaries.

10 B4.1.4.1 Foundation Loads

Foundation loads will be determined from the analysis and design of the superstructure and from the support of the equipment contained within the structure. The following loads will be considered.

- Dead loads
- Live loads
- Equipment and piping loads
- Wind loads
- Seismic loads

10 B4.1.4.2 Induced Forces

Each building and associated major equipment will be securely anchored to the foundation using cast-in-place steel anchor bolts designed to resist any induced forces.

10 B4.1.4.3 Structural System

The buildings will be designed as AISC Type 1 rigid frames or as Type 2 simple braced frame. For the purpose of resisting seismic lateral loads, the structure will be classified as a regular structure with a concentric braced frame, ordinary moment resisting frame, or special moment resisting frame in accordance with the definitions of Chapters 16 and 22 of the Uniform Building Code.

10 B4.1.4.4 Structural Criteria

The building steel frames will be designed and constructed using the materials and criteria set forth in Section 10B3.5 Steel and Other Metals.

Environmental loading will be determined in accordance with Section 10B3.1 Natural Phenomena. Wind loads will be determined using the velocity pressures specified in Subsection 10B3.2.3 Wind Loads.

Seismic loading for the buildings will be calculated using equivalent lateral forces applied to the structure in accordance with the procedures of UBC Chapter 16.

Building foundations will be designed and constructed using reinforced concrete according to the criteria set forth in Section 10B3.4 Concrete. The foundation system will likely be comprised of shallow soil supported spread footings to resist the column loads and an isolated slab on grade floor system or mat foundation.

The foundation design will address the following considerations.

- Soil bearing capacities and earth pressures
- Allowable settlements
- Equipment, structure, and environmental loads
- Access and maintenance
- Equipment performance criteria

Load combinations and their respective allowable stresses will be as indicated in Subsection 10B3.2.10 Load Combinations and Subsection 10B3.2.11 Allowable Stresses.

10 B4.1.4.5 Analytical Techniques

The building foundations will be designed using static analysis techniques assuming rigid spread footings or rigid mat. Spread footings or the mat will be sized such that the allowable settlement and bearing pressure criteria developed from a detailed subsurface investigation will not be exceeded assuming a linear soil pressure distribution. The footings will be proportioned such that the resultant of the soil pressure coincides as nearly as possible with the resultant of the vertical loading. The factors of safety against overturning and sliding will be 1.5 and 1.1, respectively.

10 B4.2 Tanks

10 B4.2.1 Vertical, Cylindrical Field Erected Water Storage Tanks

The vertical, cylindrical, field erected water storage tanks will generally be of carbon steel construction with a protective interior coating.

The tank roof will be of the self-supported dome or cone type. The tank bottom will be ground supported, flat bottomed, with a slope of 1 percent. The tank will be provided with ladders, landing platforms, and handrails as required providing access to all working areas. Vents, manholes, overflow piping, and grounding lugs will also be provided as necessary.

The typical foundation will consist of a circular ringwall. The interior of the ring will be comprised of compacted backfill with a layer of compacted sand to serve as a bearing surface for the tank bottom.

10 B4.2.1.1 Foundation Loads

Foundation loads will be determined using project specific design criteria.

The design of the tank and foundation will include the following loads.

- Dead loads
- Live loads

- Wind loads
- Seismic loads
- Hydrodynamic loads

A typical field erected tank foundation is presented on Figure 10B4.2-1. Foundation loading magnitudes from the tank will not exceed bearing allowables of the soil.

10 B4.2.1.2 Induced Forces

Storage tanks will be securely anchored to the foundation using cast-in-place steel anchor bolts designed to resist all induced forces in accordance with AWWA D100-84.

10 B4.2.1.3 Structural System

Storage tanks will resist lateral loading through shear in the tank walls. Overturning will be resisted by anchor bolts connecting the tank wall to the foundation. Refer to Figure 10B4.2-1 for information regarding the specific structural system.

10 B4.2.1.4 Structural Criteria

The foundation will be designed and constructed as a reinforced concrete ringwall using the criteria from Section 10B3.4 Concrete. Tank structures will be designed and constructed using the criteria established in AWWA D100-84.

Environmental loadings will be determined in accordance with Section 10B3.1 Natural Phenomena. Wind loads will be determined using the velocity pressures specified in Subsection 10B3.2.3 Wind Loads multiplied by the appropriate pressure coefficient from Table No. 16-H of UBC.

Seismic loads will be determined in accordance with Section 10B3.6 Seismic Design Criteria and AWWA D100-84, Section 13.

The seismic overturning moment will be determined from AWWA D100-84, Section 13.3.3.1 for a Seismic Zone 4. The structure coefficient will be determined from Table 16-P. The value of C1 will be determined from Section 13.3.3.1. The site amplification factor, S, will be determined from Table 17.

Load combinations and their respective allowable strengths will be as indicated in Subsection 10B3.2.10 Load Combinations, Subsection 10B3.2.11 Allowable Stresses, and Section 3 of AWWA D100-84.

Design loads will be applied at the center of gravity of the tank. Tank foundation design will include the moment resulting from lateral displacement (hydrodynamics) of the tank contents in accordance with AWWA D100-84, Section 13.3.3.2.

Piping connections will be designed with a minimum 2 inches of flexibility in all directions as specified in AWWA D100-84, Section 13.5.

10 B4.2.1.5 Analytical Techniques

The tank foundation will be designed using static analysis techniques of a circular ringwall. The ringwall will be proportioned to resist the dead load of the tank and the overturning moment determined from AWWA D100-84. The ringwall will also be proportioned to resist maximum anchor bolt-uplift force. Circumferential reinforcing steel hoops will be provided in the ringwall to develop

the hoop stress produced by lateral soil pressure within the ringwall. The ringwall will be proportioned to resist the vertical gravity loads concurrent with the controlling lateral loads while maintaining a minimum 1.5 factor of safety against overturning. The factor of safety against sliding will be a minimum of 1.5.

The tank structure will be designed and proportioned such that during the application of any load, or combination of loads, the maximum stresses as stipulated in AWWA D100-84 will not be exceeded.

10 B4.2.2 Horizontal, Cylindrical, Shop Fabricated Storage Tanks

The horizontal, cylindrical, shop fabricated tanks will be of carbon steel construction.

Tanks will be provided with ladders, landing platforms, and handrails as required providing access to all working areas. Each tank will be provided with a fill connection, fill drain, overflow, vent connections, manholes, and grounding lugs as necessary.

Foundations will be designed to resist the loadings imposed by the tanks and will be constructed of reinforced concrete.

10 B4.2.2.1 Foundation Loads

Foundation loads will be furnished by the tank manufacturer and will be superimposed with loads for the foundation itself.

Typical loadings supplied by the manufacturer include the following:

- Dead loads
- Live loads
- Wind loads
- Seismic loads
- Temperature and pressure loads
- Hydrodynamic loads

10 B4.2.2.2 Induced Forces

Tanks will be securely anchored to the foundation using cast-in-place steel anchor bolts designed to resist all induced forces.

10 B4.2.2.3 Structural System

Tanks will be supported by integral legs or saddle supports designed to resist gravity and environmental loadings.

10 B4.2.2.4 Structural Criteria

The foundation will be designed and constructed as a monolithic reinforced concrete structure using the criteria from Section 10B3.4 Concrete. The foundation will likely be a soil supported rigid mat.

Environmental loadings will be determined in accordance with Section 10B3.1 Natural Phenomena. Wind loads will be determined using the velocity pressures specified in Subsection 10B3.2.3 Wind Loads multiplied by the appropriate pressure coefficient from Table No. 16-H of UBC.

Seismic loading will be calculated using equivalent lateral forces applied at the center of gravity of the tank or tank component in accordance with the criteria specified in Section 10B3.6 Seismic Design Criteria.

Load combinations and their respective allowable strengths will be as indicated in Subsection 10B3.2.10 Load Combinations and Subsection 10B3.2.11 Allowable Stresses.

10 B4.2.2.5 Analytical Techniques

Tank foundations will be designed using static analysis techniques assuming a rigid mat. The mat will be sized such that the allowable settlement and bearing pressure criteria developed from a detailed subsurface investigation will not be exceeded. The foundation will be analyzed assuming a linear soil pressure distribution. The mat will be proportioned such that the resultant of the soil pressure coincides as nearly as possible with the resultant of the vertical loading. The factors of safety against overturning and sliding will be 1.5 and 1.5, respectively.

The tanks will be designed by a tank manufacturer in accordance with the ASME code, ANSI code, and the ASTM standards. Gravity and lateral loadings will be transferred to the foundation by integral legs or a saddle support system.

10 B4.3 Equipment

10 B4.3.1 Combustion and Steam Turbines

Combustion and steam turbines and accessories will be designed to resist all design loads. The combustion and steam turbines will be constructed of carbon and alloy steels as required by the manufacturer's standards and shall meet all applicable codes and standards.

Foundations will be designed to resist the loadings furnished by the manufacturer and will be constructed of reinforced concrete.

10 B4.3.1.1 Equipment Loads

Equipment loads will be determined by the manufacturer based on project performance criteria. Typical loadings used for design include the following.

- Dead loads
- Live loads
- Operating loads
- Construction loads
- Wind loads
- Seismic loads
- Temperature and pressure loads
- Emergency loads such as turbine accident loads

10 B4.3.1.2 Induced Forces

The combustion turbine and associated equipment will utilize steel anchor bolts, fasteners, welds, and other equipment anchorage devices to resist equipment induced forces.

10 B4.3.1.3 Structural Criteria

The combustion turbine, generator, and accessories will be designed to resist project specific design loads and UBC specified loads.

Environmental loading will be determined in accordance with Section 10B3.1 Natural Phenomena. Wind loads will be determined using the velocity pressures specified in Subsection 10B3.2.3 Wind Loads multiplied by the appropriate pressure coefficient from Table No. 16-H of UBC.

Seismic loading and design of the combustion turbine and accessories will be in accordance with project specific criteria and UBC. Seismic loading will be calculated using equivalent lateral forces applied at the center of gravity of the equipment or component in accordance with the criteria specified in Section 10B3.6 Seismic Design Criteria.

Inlet air filtration equipment and inlet air duct support structures shall be designed to resist the loading specified in UBC Chapter 16. For the purposes of resisting seismic lateral loads, the inlet air duct support structure will be classified as regular or irregular in accordance with the criteria established in UBC Chapter 16. The procedures for the analysis of regular and irregular structures will be as specified in UBC Chapter 16 and Subsection 10B3.6.1 Buildings and Structures.

Lateral forces on elements of structural and nonstructural components will be determined in accordance with UBC Section 1632, with Z equal to 0.4, I equal to 1.0, and ap and Rp in accordance with UBC Table 16-O. These seismic forces will be combined with forces due to normal operating loads.

Lateral forces on equipment will be determined in accordance with UBC Section 1632 with Z equal to 0.4, I equal to 1.0, and ap and Rp in accordance with UBC Table 16-O. Equipment bases, foundations, support frames, and structural members used to transfer the equipment seismic forces to the main lateral load resisting system will be designed for the same seismic load as the equipment.

Load combinations will be as indicated in Subsection 10B3.2.10 Load Combinations. These load combinations are in addition to those normally used in design and those specified in applicable codes and standards. For all load combinations, including seismic, the stresses in the structural supporting members and connections will remain in the elastic range.

10 B4.3.1.4 Analytical Techniques

The combustion turbine and auxiliary equipment will be designed and constructed in accordance with applicable requirements of codes and standards referenced in Appendix 10. Stamps will be affixed to denote conformance to the appropriate codes.

10 B4.3.2 Heat Recovery Steam Generator (HRSG)

The HRSG and accessories will be provided with platforms, stairways, and handrails as required to provide access for operations and maintenance.

The HRSG and components will be designed to resist all design loads. The HRSG and components will be constructed of carbon and alloy steels as required by the manufacturer's standards and shall meet all applicable codes and standards.

The foundation will be designed to resist the loadings furnished by the manufacturer and will be constructed of reinforced concrete.

10 B4.3.2.1 Equipment Loads

Equipment loads will be determined by the manufacturer and will be based on project performance criteria and applicable codes and standards. Typical loading used for design includes the following.

- Dead loads
- Live loads
- Operating loads
- Construction loads
- Wind loads
- Seismic loads
- Hydrostatic loads
- Temperature and pressure loads

10 B4.3.2.2 Induced Forces

The HRSG and associated equipment will utilize steel anchor bolts, fasteners, welds, and other equipment anchorage devices to resist equipment induced forces.

10 B4.3.2.3 Structural Criteria

The HRSG and associated equipment will be designed to resist project specific design loads and UBC specified loads.

Environmental loading will be determined in accordance with Appendix 10B, Section 10B3.1 Natural Phenomena. Wind loads will be determined using the velocity pressures specified in Subsection 10B3.2.3 Wind Loads multiplied by the pressure coefficients from Table No. 16-H of UBC.

Seismic loading and design of the HRSG and associated equipment will be in accordance with project specific criteria and the UBC. Seismic loading will be calculated using equivalent lateral forces applied at the center of gravity of the equipment or component in accordance with the criteria specified in Section 10B3.6 Seismic Design Criteria. The HRSG support structure will be designed to resist, at a minimum, the lateral forces specified in UBC Section 1634, Non-building structures and the applicable criteria of Section 10B3.6 Seismic Design Criteria.

For the purpose of resisting lateral seismic forces, the HRSG support structure will be classified as regular or irregular in accordance with the criteria established in UBC Chapter 16. The procedures for the analysis of regular and irregular structures will be as specified in UBC Chapter 16 and, Subsection 10B3.6.1 Buildings and Structures.

Lateral forces on elements of structural and nonstructural components will be determined in accordance with UBC Section 1632 with Z equal to 0.4, I equal to 1.0 and ap and Rp in accordance with UBC Table 16-O.

Lateral forces on equipment will be determined in accordance with UBC Section 1632 with Z equal to 0.4, I equal to 1.0, and ap and Rp in accordance with UBC Table16-O. Equipment bases, foundations, support frames, and structural members used to transfer the equipment seismic forces to the main lateral load resisting system will be designed for the same seismic load as the equipment.

Load combinations will be as indicated in Subsection 10B3.2.10 Load Combinations. These load combinations are in addition to those normally used in design and those specified in applicable codes and standards. For all load combinations, including seismic, stresses in the structural supporting members and connections shall remain in the elastic range.

10 B4.3.2.4 Analytical Techniques

The HRSG and associated equipment will be designed and constructed in accordance with applicable requirements of codes and standards referenced in Appendix 10B and Appendix 10C. Stamps will be affixed to denote conformance to the appropriate codes.

10 B4.3.3 Power Transformers

Power transformers, transformer equipment, material, and accessories will conform to the applicable standards of ANSI C57.12, NEMA TR1, ANSI/IEEE C59.94 and 98, and project specific criteria. The power transformer will be designed, fabricated, and tested in accordance with ANSI C57.12 series, NEMA TR 1, and project specific criteria.

The foundation will be designed to resist the loading furnished by the manufacturer and will be constructed of reinforced concrete.

10 B4.3.3.1 Foundation Loads

Foundation loads will be furnished by the power transformer manufacturer and will be superimposed with loads for the foundation itself. Typical loadings supplied by the manufacturer include the following.

- Dead loads
- Live loads
- Wind loads
- Seismic loads

A typical transformer foundation is indicated on Figure 10B4.3-1.

10 B4.3.3.2 Induced Forces

Power transformers, transformer equipment, and accessories will utilize steel anchor bolts, fasteners, welds, and other equipment anchorage devices to resist equipment induced forces.

10 B4.3.3.3 Structural System

The transformer will be regarded as a rigid body for foundation design purposes.

10 B4.3.3.4 Structural Criteria

Power transformers, transformer equipment, and accessories will be designed to resist project specific design loads, UBC specified loads, and loads from applicable codes and standards.

The foundation will be designed and constructed as a monolithic reinforced concrete structure using the criteria from Appendix 10.1A, Section 10.1A3.1 Foundations and Section 10B3.4 Concrete. The foundation will likely be a soil supported rigid mat. The foundations will incorporate an interconnected integral containment basin capable of holding 110 percent of the transformer coolant contents prior to passage through an oil/water separator.

Environmental loading will be determined in accordance with Section 10B3.1 Natural Phenomena. Wind loads will be determined using the velocity pressures specified in Subsection 10B3.2.3 Wind Loads, multiplied by the appropriate pressure coefficients from UBC Table No.16-H.

Seismic loading and design of the power transformers, transformer equipment, accessories, and foundations will be in accordance with project specific criteria and UBC Chapter 16. Loading will be approximated using equivalent lateral forces applied to the center of gravity of the equipment or component using the criteria specified in Section 10B3.6 Seismic Design Criteria.

Lateral forces on equipment will be determined in accordance with UBC Section 1632 with Z equal to 0.4, I equal to 1.0, and ap and Rp in accordance with UBC Table16-O. Equipment bases, foundations, support frames, and structural members used to transfer the equipment seismic forces to the foundation system will be designed for the same seismic load as the equipment. Load combinations will be as indicated in Subsection 10B3.2.10 Load Combinations. These load combinations are in addition to those normally used in design and those specified in applicable codes and standards. For all load combinations, including seismic, the stresses in the structural supporting members and connections will remain in the elastic range. Structural allowable strengths will be as indicated in Subsection 10B3.2.11 Allowable Stresses.

10 B4.3.3.5 Analytical Techniques

Power transformers, transformer equipment, and accessories will be designed and constructed in accordance with applicable requirements of codes and standards referenced in Appendix - 10D, Electrical Engineering Design Criteria.

The power transformer foundation will be designed using static analysis techniques assuming a rigid mat. The mat will be sized such that the allowable settlements and bearing pressure or pile loading criteria developed from a detailed subsurface investigation will not be exceeded. The foundation will be analyzed assuming a linear soil pressure distribution. The mat will be proportioned such that the resultant of the soil pressure coincides as nearly as possible with the resultant of the vertical loading. The factors of safety against overturning and sliding will be 1.5 and 1.5, respectively.

10 B4.3.4 Miscellaneous Equipment

Where possible, all miscellaneous equipment will be designed to project specific criteria. This miscellaneous equipment includes, but is not limited to, motor control centers, batteries, low voltage power and lighting systems, isolated bus ducts, pumps, lube oil cooling units, fire detection and protection systems, and switchgear. Standardized components such as motors, pumps, small fans, and other similar products that represent manufacturers' standard stock items will not be designed to meet project specific seismic loading criteria.

Miscellaneous equipment will meet all applicable codes and standards as well as the individual manufacturer's standards.

All equipment foundations and supports will be designed to resist project specific loading and the loading furnished by the equipment manufacturer.

10 B4.3.4.1 Foundation Loads

Foundation loads will be furnished by the equipment manufacturers and will be superimposed with loads for the foundation itself. Typical loadings supplied by the manufacturer include the following.

- Dead loads
- Live loads
- Wind loads
- Seismic loads
- Temperature and pressure loads (as applicable)

10 B4.3.4.2 Induced Forces

All miscellaneous equipment will utilize steel anchor bolts, fasteners, welds, and other equipment anchorage devices to resist equipment induced forces.

10 B4.3.4.3 Structural System

Each individual piece of equipment will have its own unique structural system, and it is the responsibility of each manufacturer to assure its adequacy.

10 B4.3.4.4 Structural Criteria

All miscellaneous equipment will be designed to resist project specific and UBC specified loads where possible and loads from applicable codes and standards.

Seismic loading and design of miscellaneous equipment will be in accordance with project specific criteria and UBC Chapter 16, if possible.

Seismic loading will be calculated using equivalent lateral forces applied to the center of gravity of the equipment or component in accordance with the criteria specified in, Section 10B3.6 Seismic Design Criteria.

Lateral forces on equipment will be determined in accordance with UBC Section 1632 with Z equal to 0.4, I equal to 1.0, and a_p and R_p in accordance with UBC Table16-O. Equipment bases, foundations, support frames, and structural members used to transfer the equipment seismic forces to the main lateral load resisting system will be designed for the same seismic load as the equipment.

Load combinations will be as indicated in Subsection 10B3.2.10 Load Combinations. These load combinations are in addition to those normally used in design and those specified in applicable codes and standards. For all load combinations, including seismic, the stresses in the structural supporting members and connections shall remain in the elastic range. Structural allowable strengths will be as indicated in Subsection 10B3.2.11 Allowable Stresses.

10 B4.3.4.5 Analytical Techniques

All miscellaneous equipment and accessories will be designed and constructed in accordance with applicable requirements of codes and standards.

All structural supports required for the miscellaneous equipment will be designed using static analysis techniques.

10 B5 HAZARD MITIGATION

RCEC will be designed to mitigate natural and environmental hazards caused by seismic and meteorological events. This section addresses the structural design criteria used to mitigate such hazards.

10 B5.1 Seismic Hazard Mitigation Criteria

Section 8.15 provides the description of the regional seismicity and the seismic risk associated with each of the major faults considering historical magnitude and probability of occurrence. Geologic hazards associated with these faults, when considered in concert with results and recommendations of the future geologic investigation to be provided in Appendix 10G (at a future date) will be consistent with the design capabilities provided for the facility. The seismic design criteria are implemented through meeting the requirements of Seismic Zone IV of the UBC.

Specific design features that will be incorporated into the plant to mitigate the identified seismic hazards include the following:

- Appropriate analysis techniques will be employed to calculate structure specific seismic loads.
- Plant structures, equipment, piping, and other components will be designed to resist the project specific seismic loads.
- All equipment will be positively anchored to its supporting structure. Nominal uplift capacity will be provided in the absence of calculated overturning forces.
- Anchorages will be designed to resist the project specific seismic loadings.
- Foundation systems will be selected and designed to minimize the effects of soil liquefaction.
- Adjacent structures will be seismically isolated from one another.
- Structural elements will be designed to comply with special detailing requirements intended to provide ductility.
- Connections for steel structures will have a minimum load carrying capability without regard to the calculated load.
- Lateral and vertical displacements of structures and elements of structures will be limited to specified values.

The foregoing design features are intended to provide the following degrees of safety for structures and equipment:

- Resist minor earthquakes without damage. Plant remains operational.
- Resist moderate earthquakes without structural damage but with some nonstructural damage. Plant remains operational or is returned to service following visual inspection and/or minor repairs.
- Resist major earthquakes without collapse but with some structural and nonstructural damage. Plant is returned to service following visual inspection and/or minor repairs.

10 B5.2 Meteorological and Climatic Hazard Mitigation

Meteorological and climatic data will form the design basis for RCEC. Portions of the data and the design bases that pertain to structural engineering have been provided in this Appendix.

Specific design features that will be incorporated into the plant to mitigate meteorological and climatic hazards include the following.

- Structures and cladding will be designed to resist the wind forces.
- Sensitive structures will be designed for wind induced vibrational excitation.
- Roofs will be sloped and equipped with drains to prevent accumulation of rainfall.
- A storm water system with a retention basin will be designed maintain pre-development flow patterns to extent possible. The existing drainage from the site flows to offsite areas southwest of the site. The discharge from the retention basin will also discharge to this area. The basin shall be designed in compliance with all local codes and regulations and to minimize the impacts of increased runoff to offsite areas due to the development. At a minimum, discharge flow rates from the site shall be maintained at or below pre-development rates for storm events up to and including the 25-year, 24-hour storm. The basin shall also be designed to safely pass the peak discharge from the 100-year, 24-hour storm without overtopping the basin embankment.
- Plant drainage systems will be designed to convey the runoff from a rainfall event with a 25-year recurrence interval. Modifications to the system will be incorporated to minimize ponding in localized areas and preclude flooding of any buildings.
- Ground floor levels of structures will be placed above the 100-year flood level of 7.0 feet.
- Plant mechanical and electrical equipment will be placed on elevated equipment bases when required.
- The plant site will be graded to convey runoff away from structures and equipment.

The foregoing design features will be incorporated in accordance with applicable codes and standards identified in this Appendix.

The degree of safety offered by these features is consistent with the requirements of the applicable codes and standards and the economic benefits these features provide.

Russell City Energy Center

Appendix 10-C
Mechanical Engineering Design Criteria

May 2001

Russell City Energy Center AFC

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APPENDIX 10C

MECHANICAL ENGINEERING DESIGN CRITERIA

10 C1 INTRODUCTION

This appendix summarizes the codes, standards, criteria, and practices that will be generally used in the design and construction of mechanical engineering systems for the Russell City Energy Center (RCEC). More specific project information will be developed prior to construction of RCEC to support detailed design, engineering, material procurement specifications, and construction specifications as required by the California Energy Commission.

10 C2 CODES AND STANDARDS

Design of the mechanical systems and components will be in accordance with the laws and regulations of the federal government, state of California, and industry standards. The current issue or revision of the documents at the time of the filing of this AFC will apply, unless otherwise noted. If conflicts arise between the cited documents, the more conservative requirements shall apply.

The following codes and standards are applicable to the mechanical aspects of the power facility:

- Uniform Building Code
- Uniform Mechanical Code
- Uniform Plumbing Code
- ASME Boiler and Pressure Vessel Code
- ASME/ANSI 1331.1 Power Piping Code
- ASME Performance Test Codes
- ASME Standard TDP-1
- ANSI B16.5, B16.34, and B133.8
- American Boiler Manufacturers Association (ABMA)
- American Gear Manufacturers Association (AFMA)
- Air Moving and Conditioning Association (AMCA)
- American Petroleum Institute (API) – except for electrical requirements
- American Society for Testing and Materials (ASTM)
- American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
- American Welding Society (AWS)
- Cooling Tower Institute (CTI)
- Heat Exchange Institute (HEI)
- Manufacturing Standardization Society (MSS) of the Valve and Fitting Industry
- National Fire Protection Association (NFPA)

10 C3 MECHANICAL ENGINEERING GENERAL DESIGN CRITERIA

10 C3.1 General

Systems, equipment, materials, and their installation will be designed in accordance with applicable codes, industry standards, and local, state, and federal regulations. They will also conform to the design criteria, manufacturing processes and procedures, and material selection, testing, welding, and finishing procedures specified in this section.

Detailed equipment design will be performed by the equipment vendors in accordance with the performance and general design requirements specified by Bechtel. Equipment vendors will be responsible for using construction materials best suited for the intended use.

Asbestos will not be used in the materials and equipment supplied. Where feasible, materials will be selected to withstand the design operating conditions, including expected ambient conditions, for the design life of the plant. It is anticipated that some materials will require replacement during the life of the plant due to corrosion, erosion, etc.

10 C3.2 Pumps

Pumps will be sized in accordance with industry standards. Where feasible, pumps will be sized for maximum efficiency at the normal operating point. Pumps will be designed to be free from excessive vibration throughout the operating range.

10 C3.3 Tanks

Large outdoor storage tanks will not be insulated.

The demineralized water storage tank will be constructed of carbon steel with an internal coating selected from manufacturers such as Plasite, Carboline, Sherwin Williams, International Paint or Hempel. Two coats will be applied with a dry film thickness (DFT) as recommended by the coating manufacturer.

Overflow connections and lines will be provided. Maintenance drain connections will be provided for complete tank drainage.

Water tanks will be designed, constructed, and certified to American Water Works Association (AWWA) Standards. Bolted construction for water tanks is acceptable.

Manholes, where provided, will be at least 18 in. in diameter and hinged to facilitate removal. Storage tanks will have ladders and cleanout doors as required to facilitate access/maintenance. Provisions will be included for proper tank ventilation during internal maintenance.

10 C3.4 Heat Exchangers

The surface condenser will be designed in accordance with Heat Exchanger Institute (HEI) standards. Other heat exchangers will be provided as components of mechanical equipment packages and may be shell-and-tube or plate type. Heat exchangers will be designed in accordance with Tubular Exchanger Manufacturers Association (TEMA) or manufacturer's standards. Fouling factors will be specified in accordance with TEMA.

Heat exchangers will include thermal relief valves as required.

10 C3.5 Pressure Vessels

Pressure vessels will include the following features/appurtenances:

- Process, vent, and drain connections for startup, operation, and maintenance
- Materials compatible with the fluid being handled
- A minimum of one manhole and one air ventilation opening (e.g., handhole) where required for maintenance or cleaning access
- For vessels requiring insulation, shop-installed insulation clips spaced not more than 18 in. on center
- Relief valves in accordance with the applicable codes

10 C3.6 Piping and Piping Supports

Stainless steel pipe may be Schedule 5S or 10S where design pressure permits. Underground piping may be high-density polyethylene (HDPE) where permitted by code, operating conditions, and fluid properties. In general, water system piping will be HDPE where embedded or underground, and carbon steel where above ground.

Piping systems containing steam will be of welded construction. Threaded joints will not be used in piping used for steam, lubricating oil, or CTG natural gas service. Natural gas piping components will not use synthetic lubricants. Victaulic or equivalent couplings will be used for low energy aboveground piping, where feasible.

Piping systems will have high point vents and low point drains. Drains with restricting orifices or steam traps with startup and blowdown drains and strainers/crud traps will be installed in low points of steam lines where condensate can collect during normal operation.

Steam piping systems and steam drain lines in the plant will be sloped in the direction of steam flow. Condensate collection in piping systems will be avoided by installing automatic drain devices and manual devices as appropriate.

Steam lines fitted with restricting devices, such as orifices in the process runs, will include adequate drainage upstream of the device to prevent water from collecting in lines.

Hose and process tubing connections to portable components and systems will be compatible with the respective equipment suppliers' standard connections for each service.

Stainless steel piping will be used for the steam turbine and combustion turbine lubricating oil system feed piping.

10 C3.7 Valves

10 C3.7.1 General Requirements

Valves will be arranged for convenient operation from floor level where possible and, if required, will have extension spindles, chain operators, or gearing. Hand-actuated valves will be operable by one person.

Valves will be arranged to close when the handwheel is rotated in a clockwise direction (when looking at the handwheel from the operating position). The direction of rotation to close the valve will be clearly marked on the face of each handwheel.

Stops limiting the travel of each valve in the open or closed position will be arranged on the exterior of the valve body. Valves will be fitted with an indicator to show whether they are open or closed; however, only critical valves will be remotely monitored for position.

Valve materials will be suitable for operation at the maximum working pressure and temperature of the piping to which they are connected. Steel valves will have cast or forged steel spindles. Seats and faces will be of low friction, wear-resistant materials. Valves in throttling service will be selected with design characteristics and of materials that will resist erosion of the valve seats when the valves are operated partly closed.

Valves operating at less than atmospheric pressure will include means to prevent air in-leakage. No provision will be made to repack valve glands under pressure.

10 C3.7.2 Drain and Vent Valves and Traps

Drains and vents in 900-pound class or higher piping and 500° F or higher service will be double valved.

Drain traps will include an air cock and easing mechanism. Internal parts will be constructed from corrosion-resistant materials and will be renewable.

Trap bodies and covers will be cast or forged steel and will be suitable for operating at the maximum working pressure and temperature of the piping to which they are connected. Traps will be piped to drain collection tanks or sumps and returned to the cycle if convenient.

10 C3.7.3 Low Pressure Water Valves

LP water valves will be the butterfly types of cast iron construction. Cast iron valves will have cast iron bodies, covers, gates (discs), and bridges; the spindles, seats, and faces will be bronze. Fire protection valves will be UL-approved butterfly valves meeting NFPA requirements.

10 C3.7.4 Instrument Air Valves

Instrument air valves will be the ball type of bronze construction, with the valve face and seat of an approved wear-resistant alloy.

10 C3.7.5 Nonreturn Valves

Nonreturn valves for steam service will be in accordance with ANSI standards and will be properly drained. Nonreturn valves in vertical positions will have bypass and drain valves. Bodies will have removable access covers to enable the internal parts to be examined or renewed without removing the valve from the pipeline.

10 C3.7.6 Motor-Actuated Valves

Motor-actuated valves will be fitted with both hand and motor operating gear. The hand and motor actuation mechanisms will be interlocked so that the hand mechanism is disconnected before the motor is started.

Motor actuators will include torque switches to stop the motor automatically when the valve gate has reached the "full open" or "full closed" position.

The motor actuator will be placed in a position relative to the valve that prevents leakage of liquid, steam, or corrosive gas from valve joints onto the motor or control equipment.

10 C3.7.7 Safety and Relief Valves

Safety valves and/or relief valves will be provided as required by code for pressure vessels, heaters, and boilers. Safety and relief valves will be installed vertically. Piping systems that can be over-pressurized by a higher-pressure source will also be protected by pressure relief valves. Equipment or

parts of equipment that can be over-pressurized by thermal expansion of the contained liquid will have thermal relief valves. HRSG safety valves will be flanged.

10 C3.7.8 Instrument Root Valves

Instrument root valves will be specified for operation at the working pressure and temperature of the piping to which they are connected. Test points and sample lines in systems that are 600-pound class or higher service will be double valved.

10 C3.8 Heating, Ventilating, and Air Conditioning

HVAC system design will be based on site ambient conditions specified in Section 1.0.

Except for the HVAC systems serving the control room and administration areas, the systems will not be designed to provide comfort levels for extended human occupancy.

Air conditioning will include both heating and cooling of the inlet filtered air. Air velocities in ducts and from louvers and grills will be low enough not to cause unacceptable noise levels in areas where personnel are normally located.

Fans and motors will be mounted on anti-vibration bases to isolate the units from the building structure. Exposed fan outlets and inlets will be fitted with guards. Wire guards will be specified for belt-driven fans and arranged to enclose the pulleys and belts.

Air filters will be housed in a manner that facilitates removal. The filter frames will be specified to pass the air being handled through the filter without leakage.

Ductwork, filter frames, and fan casings will be constructed of mild steel sheets stiffened with mild steel flanges and galvanized. Ductwork will be the sectional bolted type and will be adequately supported. Duct joints will be leaktight.

Grills and louvers will be of adjustable metal construction.

10 C3.9 Thermal Insulation and Cladding

Parts of RCEC requiring insulation to reduce heat loss or afford personnel safety will be thermally insulated. Minimum insulation thickness for hot surfaces near personnel will be designed to limit the outside lagging surface temperature to a maximum of 140°F, based on 80°F ambient temperature and 1 mph/hr air velocity. Other insulation minimums will be designed to limit the heat loss to approximately 80 Btu/hr-ft^2 based on an 80°F ambient condition and an air velocity of 20 mph/hr.

The thermal insulation will have as its main constituent calcium silicate, foam glass, fiber glass, or mineral wool, and will consist of pre-formed slabs or blankets, where feasible. Asbestos materials will be prohibited. An aluminum jacket or suitable coating will be provided on the outside surface of the insulation. Where a hard-setting compound is used as an outer coating, it will be nonabsorbent and noncracking. Thermal insulation will be chemically inert even when saturated with water. Insulation system materials, including jacketing, will have a flame spread rating of 25 or less when tested in accordance with ASTM E 84.

Insulation at valves, pipe joints, steam traps, or other points to which access may be required for maintenance will be specified to be removable with a minimum of disturbance to the pipe insulation. At each flanged joint, the molded material will terminate on the pipe at a distance from the flange

equal to the overall length of the flange bolts to permit their removal without damaging the molded insulation. Steam trap stations will be "boxed" for ease of trap maintenance and freeze protection.

Above ground insulated piping will be clad with pebbled or corrugated aluminum of not less than 30 mil thickness and frame reinforced. At the joints, the sheets will be sufficiently overlapped and corrugated to prevent moisture from penetrating the insulation.

Design temperature limits for thermal insulation will be based on system operating temperature during normal operation.

Outdoor and underground insulation, if required, will be moisture resistant.

10 C3.10 Testing

Hydrostatic testing, including pressure testing in accordance with the ASME Code, will be specified and performed for pressure boundary components where an in-service test is not feasible or permitted by code.

10 C3.11 Welding

Welders and welding procedures will be certified in accordance with requirements of the applicable codes and standards before performing any welding. Bechtel will maintain indexed records of welder qualifications and weld procedures.

10 C3.12 Painting

Except as otherwise specified, equipment will receive the respective manufacturer's standard shop finish. Finish colors will be selected from among the paint manufacturer's standard colors.

Finish painting of uninsulated piping will be limited to that required by OSHA for safety or for protection from the elements.

Piping to be insulated will not be painted.

10 C3.13 Lubrication

The types of lubrication specified for facility equipment will be suited to the operating conditions and will comply with the recommendations of the equipment manufacturers.

The initial startup charge of flushing oil will be provided by the equipment manufacturer and will be the manufacturer's standard lubricant for the intended service. Subsequently, such flushing oil will be sampled and analyzed to determine whether it can also be used for normal operation or must be replaced in accordance with the equipment supplier's recommendations.

Rotating equipment will be splash lubricated, force lubricated, or self-lubricated. Oil cups will be provided as necessary. Where automatic lubricators are fitted to equipment, provision for emergency hand lubrication will also be specified. Where applicable, equipment will be designed to be manually lubricated while in operation without the removal of protective guards. Lubrication filling and drain points will be readily accessible.

Russell City Energy Center

Appendix 10-D
Electrical Engineering Design Criteria

May 2001

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APPENDIX 10D

ELECTRICAL ENGINEERING DESIGN CRITERIA

10 D1 INTRODUCTION

This appendix summarizes the codes, standards, criteria, and practices that will be generally used in the design and construction of electrical engineering systems for the facility. More specific project information will be developed prior to construction of RCEC to support detailed design, engineering, material procurement, and construction specifications as required by the California Energy Commission.

10 D2 CODES AND STANDARDS

Design of the electrical systems and components will be in accordance with the laws and regulations of the federal government, State of California, and industry standards. The current issue or revision of the documents at the time of the filing of this AFC will apply, unless otherwise noted. If there are conflicts between the cited documents, the more conservative requirement shall apply.

The following codes and standards are applicable to the electrical aspects of the power facility.

- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- Anti-Friction Bearing Manufacturers Association (AFBMA)
- Insulated Cable Engineers Association (ICEA)
- Institute of Electrical and Electronics Engineers (IEEE)
- Illuminating Engineering Society (IES)
- National Electrical Code (NEC)
- National Electrical Manufacturers Association (NEMA)
- National Electrical Safety Code (NESC)
- National Fire Protection Association (NFPA)
- Underwriters Laboratories, Inc. (UL)

10 D3 SWITCHYARD AND TRANSFORMERS

10 D3.1 Switchyard

The switchyard will be air-insulated. The switchyard will consist of SF6 circuit breakers for the transformers and lines to the grid, with disconnect switches on each side of the breakers. Each line will be equipped with the appropriate instrument transformers for protection and metering. Instrument transformers will also be used for generator synchronizing. Surge arresters will be provided for the outgoing lines in the area of the takeoff towers.

The 230 kV switchyard will be located on the north end of the site. Two lines will run from the switchyard to a take-off tower located in the northeast corner of the site.

The SF6 breakers may be of either the dead or live tank design with two bushing current transformers on each bushing. Disconnect switches shall be vertical. Switches will be located on each side of the breakers to isolate the breaker, and one switch will be located at each line

termination or transformer connection for maintenance. Instrument transformers (current and capacitive voltage transformers) will be included for protection. Separate instrument transformers will be used for metering.

Aluminum alloy tubular bus will be used. Cable connections between the tube bus and equipment will be ACSR cable. Tube and cables will meet all electrical and mechanical design requirements.

The switchyard design will meet the requirements of the National Electrical Safety Code—ANSI C2.

A grounding grid will be provided to control step and touch potentials in accordance with IEEE Standard 80, Safety in Substation Grounding. All equipment, structures, and fencing will be connected to the grounding grid of buried conductors and ground rods, as required. The switchyard ground grid will be tied to the plant ground grid.

Shield wires and/or lightning masts will provide lightning protection. The lightning protection system will be designed in accordance with IEEE 998 guidelines.

All faults shall be detected, isolated, and cleared in a safe and coordinated manner as soon as practical to insure the safety of Equipment, Personnel, and the Public. Protective relaying will meet IEEE requirements and will be coordinated with the utility's requirements.

Each bus will be provided with a redundant high impedance differential relay system. Each outgoing line will be provided with redundant high speed relay systems with transfer trip capability. Transmission lines will have primary and backup microprocessor-based distance relays with communication capability to the remote substation. Relay equipment for the remote ends is not included.

Each circuit breaker will be provided with independent breaker failure relay protection schemes. Breaker failure protection will be accomplished by fault detector relays and timing relays for each breaker. Each high voltage breaker will have 2 redundant trip coils.

Interface with the utility supervisory control and data acquisition (SCADA) system will be provided. Interface will be at the interface terminal box and RTU. Communication between the facility switchyard and the substation at the other end of the overhead transmission lines will be included. Remote Terminal Units (RTUs) will allow interface and remote control of the switchyard.

Revenue metering will be provided on the 230 kV outgoing lines, recording net power to or from the switchyard (bi-directional). Meters and the metering panel will be provided.

10 D3.2 Transformers

Each generator will be connected to the 230kV switchyard through a separate main 18 kV to 230 kV step-up transformer. The step-up transformers will be designed in accordance with ANSI standards C57.12.00, C57.12.90, and C57.116. The main transformers will be two winding, delta-wye, OA/FA/FA. The neutral point of the HV winding will be solidly grounded. Each main step-up transformer will have metal oxide surge arresters adjacent to the HV terminals and will have manual de-energized ("no-load") tap changers located in the HV windings.

Facility power will be supplied through two unit auxiliary transformers, each connected upstream of the CTG Breakers. The unit auxiliary transformers will be two winding, delta-wye 18 kV to 4.16 kV transformers

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Appendix 10-E
Control Engineering Design Criteria

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APPENDIX 10E

CONTROL ENGINEERING DESIGN CRITERIA

10 E1 INTRODUCTION

This appendix summarizes the codes, standards, criteria, and practices that will be generally used in the design and installation for 10F.1 instrumentation and controls for the Facility. More specific project information will be developed prior to construction of RCEC to support detailed design, engineering, material procurement specifications, and construction specifications as required by the California Energy Commission.

10 E2 CODES AND STANDARDS

Design specifications for all work performed will be in accordance with the laws and regulations of the federal government and the State of California. A summary of general codes and industry standards applicable to design and construction follows.

- American National Standards Institute (ANSI)
- American Society of Mechanical Engineers (ASME)
- The Institute of Electrical and Electronics Engineers (IEEE)
- The Instrumentation, Systems, and Automation Society (ISA)
- National Electrical Manufacturers Association (NEMA)
- National Electrical Safety Code (NESC)
- National Fire Protection Association (NFPA)
- American Society for Testing and Materials (ASTM)

10 E3 CONTROL SYSTEMS DESIGN CRITERIA

10 E3.1 General Requirements

Pneumatic signal levels, where used, will be 3–15 psig for pneumatic transmitter outputs, controller outputs, electric-to-pneumatic converter outputs, and valve positioner inputs.

Instrument analog signals for electronic instrument systems shall be 4 to 20 ma dc.

The primary sensor full-scale signal level, other than thermocouples, will be between 10 mV and 125 V.

10 E3.2 Pressure Instruments

Pressure instruments will have linear scales with units of measurement in pounds per square inch gauge.

Pressure gauges will have either a blowout disk or a blowout back and an acrylic or shatterproof glass face.

Pressure gauges on process piping will be corrosion resistant and weatherproof.

Steam pressure sensing transmitters or gauges mounted above the steam line will be protected by a loop seal or siphon.

Pressure test points will have isolation valves and caps or plugs. Pressure devices on pulsating services will have pulsation dampers. Pressure devices subject to shock during equipment starts, stops, or transient conditions will be installed on an isolated gauge panel.

10 E3.3 Temperature Instruments

Temperature instruments will have scales with temperature units in degrees Fahrenheit. Exceptions to this are electrical machinery RTDs and transformer winding temperatures, which are in degrees Celsius.

Dial thermometers will have 4½ or 5-inch diameter (minimum) dials and white faces with black scale markings, and will be every-angle type and bimetal actuated. Dial thermometers will be corrosion resistant and weatherproof.

Temperature elements and dial thermometers will be protected by thermowells except when measuring gas or air temperatures at atmospheric pressure. Temperature test points will have thermowells with caps or plugs.

RTDs will be either 100ohm platinum or 10ohm copper, ungrounded, three-wire circuits (R_{100}/R_0=1.385). The element will be spring-loaded, mounted in a thermowell, and connected to a cast iron head assembly.

Thermocouples will be single-element, grounded, spring-loaded, Chromel-Constantan (ANSI Type E) for general service. Chromel-Alumel (ANSI Type K) may be used for flue gas temperature measurement and high temperature applications (exceeding 1100°F). Thermocouple heads will be the cast type with an internal grounding screw.

10 E3.4 Level Instruments

Reflex-glass or magnetic level gauges will be used. Level gauges for high-pressure service will have suitable protection for operating personnel.

Gauge glasses used in conjunction with other level instruments will cover the full range that is covered by the complementary instruments. Level gauges will be selected so that the normal vessel level is approximately at gauge center.

A single remote water level indicating system will be provided for each HRSG drum.

10 E3.5 Flow Instruments

Flow transmitters will be the differential pressure types with the range matching the primary element. In general, linear scales and trend displays will be used for flow indication.

The flow element for HP and IP feedwater flow to each HRSG will be laboratory calibrated venturi flow nozzles or low-loss flow tubes.

Feedwater flow meters will be temperature compensated when the water temperature is greater than 250°F. Critical steam flow meters will be temperature and pressure compensated. Airflow measurements will be temperature compensated.

10 E3.6 Control Valves

Control valves in throttling service will generally be the globe-body cage types with body materials, pressure rating, and valve trims suitable for the service involved. Other style valve bodies (e.g., butterfly, eccentric disk) may also be used when suitable for the intended service.

Valves will be designed to fail in a safe position.

Control valve body size will not be more than two sizes smaller than line size, unless the smaller size is specifically reviewed for stresses in the piping.

Control valves in 600-class service and below will be flanged where economical. Where flanged valves are used, minimum flange rating will be ANSI 300 Class.

Critical service valves will be defined as ANSI 900 Class and higher valves in sizes larger than 2 inches.

Severe service valves will be defined as valves requiring anticavitation trim, low noise trim, or flashing service, with differential pressures greater than 100 psid.

In general, control valves will be specified for a noise level no greater than 90 dBA when measured 3 feet downstream and 3 feet away from the pipe surface.

Valve actuators will use positioners and the highest pressure, smallest size actuator, and will be the pneumatic-spring diaphragm or piston type. Actuators will be sized to shut off against at least 110 percent of the maximum shutoff pressure and designed to function with instrument air pressure ranging from 80 to 125 psig.

Handwheels will be furnished only on those valves that can be manually set and controlled during system operation (to maintain plant operation) and do not have manual bypasses.

Control valve accessories, excluding controllers, will be mounted on the valve actuator unless severe vibration is expected.

Solenoid valves supplied with the control valves will have Class H coils. The coil enclosure will normally be a minimum of NEMA 4 but will be suitable for the area of installation. Terminations will typically be by pigtail wires.

Valve position switches (with input to the DCS for display) will be provided for MOVs and open/close pneumatic valves. Modulating automatic combined recirculation flow control and check valves (provided by the pump manufacturer) or modulating control valves will be used for pump minimum-flow recirculation control.

10 E3.7 Instrument Tubing and Installation

Tubing used to connect instruments to the process line will be 3/8-inch outside diameter copper or stainless steel as necessary for the process conditions. Half-inch O.D. tubing may be used when deemed necessary by the Contractor.

Instrument tubing fittings will be the compression type. One manufacturer will be selected for use so that equipment will be standardized as much as practical throughout the plant.

Differential pressure (flow) instruments will be fitted with three-valve manifolds; two-valve manifolds will be specified for other instruments as appropriate.

Instrument installation will be designed to correctly sense the process variable. Taps on process lines will be located so that sensing lines do not trap air in liquid service or liquid in gas service. Taps on process lines will be fitted with a shutoff (root or gauge valve) close to the process line. Root and gauge valves will be main-line class valves.

Instrument tubing will be supported in both horizontal and vertical runs as necessary. Expansion loops will be provided in tubing runs subject to high temperatures. The instrument tubing support design will allow for movement of the main process line.

10 E3.8 Pressure and Temperature Switches

Field-mounted pressure and temperature switches will have either NEMA Type 4 housings or housings suitable for the environment.

In general, switches will be applied such that the actuation point is within the center one-third of the instrument range.

10 E3.9 Field-Mounted Instruments

Field-mounted instruments will be of a design suitable for the area in which they are located. They will be mounted in areas accessible for maintenance and relatively free of vibration, and will not block walkways or prevent maintenance of other equipment. Freeze protection will be provided.

Field-mounted instruments may be grouped on racks when practical. Supports for individual instruments will be prefabricated, off-the-shelf, 2-inch pipestand. Instrument racks and individual supports will be mounted to concrete floors, to platforms, or on support steel in locations not subject to excessive vibration.

Individual field instrument sensing lines will be sloped or pitched in such a manner and be of such length, routing, and configuration that signal response is not adversely affected.

Local control loops will generally use a locally mounted indicating controller (pressure, temperature, flow, etc.).

Liquid level controllers will generally be the nonindicating, displacement type with external cages.

10 E3.10 Instrument Air System

Branch headers will have a shutoff valve at the takeoff from the main header. The branch headers will be sized for the air usage of the instruments served, but will be no smaller than 3/8 inch. Each instrument air user will have a shutoff valve and filter at the instrument.

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Appendix 10-F
Chemical Engineering Design Criteria

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APPENDIX 10F

CHEMICAL ENGINEERING DESIGN CRITERIA

10 F1 INTRODUCTION

This appendix summarizes the codes, standards, criteria, and practices that will be generally used in the design and installation of chemical engineering systems for the Russell City Energy Center (RCEC). More specific project information will be developed prior to RCEC construction to support detailed design, engineering, material procurement specifications, and construction specifications as required by the California Energy Commission.

10 F2 DESIGN CODES AND STANDARDS

The design and specification of all work performed will be in accordance with the laws and regulations of the federal government and the State of California. Industry codes and standards partially unique to chemical engineering design, to be used in design and construction of the RCEC, are summarized below.

- ANSI—American National Standards Institute

  ANSI B31.1—Power Piping Code

- ASME—American Society of Mechanical Engineers

  ASME—Performance Test Code 31, Ion Exchange Equipment

- ASTM—American Society for Testing and Materials.

  ASTM D859-94—Referee Method B for Silica as SiO_2

  ASTM D888-96—Referee Method A for Dissolved Oxygen

  ASTM D513-96—Referee Method D for CO_2

- OSHA—Occupational Safety and Health Administration
- SSPC—Steel Structures Painting Council Standards

  SSPC SP3—Power Tool Cleaning

  SSPC SP7—Brush-Off Blast Cleaning

  SSPC SP1—Solvent Cleaning

  SSPC SP6—Commercial Blast Cleaning

  SSPC SP5—White Metal Blast Cleaning

- UL—Underwriters Laboratories
- AWWA—American Waterworks Association

  WWA 2540-95—Method C for TDS

Other recognized standards will be used as required to serve as design, fabrication, and construction guidelines when not in conflict with the above-listed standards.

Codes and industry standards used for design, fabrication, and construction will be the codes and industry standards, including all addenda, in effect as stated in equipment and construction purchase or contract documents.

10 F3 GENERAL CRITERIA

10 F3.1 Design Water Quality

10 F3.1.1 Circulating Water

RCEC will use recycled water from the City of Hayward Waste Water Treatment Plant (WWTP) for circulating water makeup. The WWTP effluent will first be treated on-site in a Title 22 treatment facility, and the effluent produced will then be used as cooling tower makeup.

Data from the City of Hayward WWTP indicate that the effluent has the characteristics defined in Section 8.15, Water Resources.

10 F3.1.2 Service Water

Title 22 effluent will be used to supply RCEC with all general service water requirements such as fire fighting water, plant wash water, and other miscellaneous uses, as well as influent water to the cycle makeup water treatment system to meet the process needs for HRSG, including power augmentation and evaporative cooler water makeup.

A typical water analysis range for this water is presented in Section 8.15.

Water for potable/sanitary uses will be supplied from the municipal water supply. The water will be treated to meet local Public Health requirements.

10 F3.1.3 Cycle Makeup

Service water will be supplied to the Cycle Makeup Treatment System (demineralization system). The high quality effluent from the Cycle Makeup Treatment System will serve as makeup to the steam cycle. In addition, cycle makeup water will be used also to supply water for various uses during unit startup.

Water for cycle makeup will be the highest quality practical. Minimum quality requirements for cycle makeup water will be as follows:

- Total dissolved solids--0.1mg/l
- Silica as SiO_2--0.02 mg/l
- Specific conductance at demineralizer effluent--0.2 µS/cm
- pH--6.5 to 7.5

10 F3.1.4 Construction Water

Water for use during construction will be supplied from the Municipal Water supply or on-site wells.

10 F3.1.5 Fire Protection Water

Water for fire protection will be from a dedicated portion of the fire/service water storage tank and the cooling tower basin.

10 F3.2 Chemical Conditioning

10 F3.2.1 Cycle Chemical Conditioning

Condensate-feedwater chemical conditioning will consist of an oxygen scavenger supplemented as required by a volatile, alkaline material such as ammonia for pH control.

HRSG chemical feed will consist of a mixture of sodium phosphates to control boiler water pH, minimize scale formation, and provide boiler water buffering capacity.

10 F3.2.2 Circulating Water System Chemical Conditioning

Circulating water chemical conditioning will consist of chemicals to minimize corrosion and to control the formation of mineral scale and biofouling. Corrosion and scaling will be controlled by the use of sulfuric acid for alkalinity adjustment in conjunction with inhibitors, as required. Chlorination utilizing sodium hypochlorite will minimize biofouling of the condenser tubes and the cooling tower.

10 F3.2.3 Closed-Cycle System Chemical Conditioning

Bypass chemical feeders will provide water-conditioning chemicals to the Closed Cycle Cooling System. Makeup water to the closed systems will be condensate quality and an inhibitor (compatible with demineralized water) will be used for corrosion control.

10 F3.3 Chemical Storage

10 F3.3.1 Storage Capacity

Chemical storage tanks for bulk chemicals will, in general, be sized to store a minimum of 1.5 times the normal bulk shipment. The minimum acceptable volume of the SCR aqueous ammonia storage tank will provide at least 3 days storage.

Specialty chemicals used for makeup cycle water treatment, condensate and feedwater conditioning, circulating water, and miscellaneous uses, will be delivered in totes or specialized containers according to the chemical suppliers.

10 F3.3.2 Containment

Chemical storage tanks containing corrosive and hazardous fluids will be surrounded by curbing. Curbing and drain piping design will allow a full tank capacity spill without overflowing the curbing. For multiple tanks located within the same curbed area, the largest single tank will be used to size the curbing and drain piping.

Alternatively, where curbing is not possible, double-walled chemical tanks will be used for bulk chemicals that are corrosive and hazardous, in lieu of containment.

10 F3.3.3 Closed Drains

Waste piping for volatile liquids and wastes with offensive odors, will use closed drains to control noxious fumes and vapors.

10 F3.3.4 Coatings

Tanks, piping, and curbing for chemical storage applications will be provided with a protective coating system. Specific requirements for selection of an appropriate coating will be identified prior to equipment and construction contract procurements.

10 F3.4 Wastewater Treatment

Metal cleaning wastes from pre-operational and operational chemical cleaning of the boiler and preboiler systems of the HRSG will be collected, treated, and disposed offsite by the chemical cleaning contractor. Other maintenance chemical cleaning wastes such as Reverse Osmosis (RO) chemical cleaning wastes and combustion turbine off-line washes will be collected in sumps, tested for compliance with discharge limits, treated, and hauled off-site (if necessary) by a licensed

contractor. Cooling tower blowdown will be discharged directly from the circulating water system to the receiving water body (WWTP outfall). RO brine will also be discharged directly from the treatment system to the cooling tower blowdown for combined disposal. Other plant process wastewaters such as floor drains, HRSG blowdown, filter backwash and demineralizer wastes, as well as miscellaneous waste water streams, will be collected in the plant wastewater collection system for offsite discharge. Plant effluent to be discharged off-site will meet all applicable criteria of federal, state, and local permits.

Sanitary wastewater will be collected, treated, and discharged to the on-site package treatment system. Treated effluent from the on-site packaged sanitary treatment system will be discharged with the other plant wastes.

The wastes produced by the Title 22 facility will be discharged under a separate agreement to the receiving body of water.