KLEINFELDER

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GEOTECHNICAL SERVICES REPORT EAST ALTAMONT ENERGY CENTER ALAMEDA COUNTY, CALIFORNIA

PREPARED FOR: PARSON ENERGY AND CHEMICAL
2675 MORGANTOWN ROAD
READING, PA 19607

BY: KLEINFELDER, INC.
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STOCKTON, CA 95205

DATE: OCTOBER 30, 2001

KLEINFELDER
An employee owned company

File No. 20-4561-01.G01
October 30, 2001

Mr. David Erali
Parson Energy and Chemical
2675 Morgantown Road
Reading, PA 19607

Subject: **GEOTECHNICAL SERVICES REPORT**
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

Dear Mr. Erali:

Kleinfelder is pleased to present the results of our geotechnical services performed for the proposed East Altamont Energy Center to be located in Alameda County, California. The accompanying report includes background information regarding the anticipated construction, the purpose of our services, and scope of services provided. In addition, discussions regarding our investigative procedures, the known geologic and seismic conditions in the project area, and the site conditions encountered during our field explorations are presented. Finally, geotechnical conclusions and recommendations are provided for project design and construction. The appendices of the report include logs of borings, results of cone penetration tests, logs of test pits, and a summary of laboratory tests. We have also included an information sheet published by the American Society of Foundation Engineers (ASFE). Our firm is a member of ASFE, and we feel this sheet will help you better understand geotechnical engineering reports.

We appreciate the opportunity of providing our services for this project. If you have questions regarding this report or if we may be of further assistance, please contact our office.

Respectfully submitted,

KLEINFELDER, INC.

REGISTERED PROFESSIONAL ENGINEER GARY H. GULSETH No. 2283 6/05 GEOTECHNICAL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER RONALD TERRY HEINZEN No. 388 Exp. 3-31-03 GEOTECHNICAL STATE OF CALIFORNIA

Gary H. Gulseth, G.E.
Geotechnical Department Manager

Ron T. Heinzen, G.E.
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GHG/RTH:lr
4c: Client

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. *No one except you* should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one—not even you—*should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions *only* at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an *opinion* about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

TABLE OF CONTENTS

SECTION **PAGE**

GEOTECHNICAL SERVICES REPORT
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

1. INTRODUCTION

In this report we present the results of our geotechnical services performed for the proposed East Altamont Energy Center to be located in Alameda County, California. The site location relative to existing streets is shown on Plate 1.

We understand that design of the proposed energy center is currently underway and that final criteria are not available as of this writing. On this basis, we understand that major site features will include:

- Heat recovery steam generators (HRSG) supported on 2 to 4 foot thick, 180 feet by 45 feet reinforced concrete mats;
- Combustion turbine/generators supported on 6 foot thick, 100 feet by 35 feet mats;
- Steam turbine generators supported on 8 foot thick, 110 feet by 45 feet mats;
- A cooling tower and basin supported a 1.5 foot thick, 1000 feet by 56 feet mat;
- Two raw water storage tanks measuring 150 feet in diameter and 50 feet in height and two demineralized water storage tanks measuring 50 feet in diameter and 30 feet in height all supported on shallow ring wall foundations;
- An administration/control/maintenance building and a water/wastewater treatment building will be constructed in the west-central portion of the site. We understand the two buildings will be single story, pre-engineered structures with concrete slab-on-grade floor systems;
- Large transformers and firewalls supported on 30 foot by 50 foot concrete slabs;
- An electrical substation area and switchyard control enclosure that will contain several transmission towers supported on deep foundations; and
- Two wastewater recycle ponds and two evaporation ponds in the north and south portions of the facility.

Appurtenant construction will include various equipment supported on concrete mat foundations, various pipe supports and utility bridges, numerous buried utilities, asphalt-concrete paved driveways and parking, several small above ground tanks, buried vessels, and miscellaneous support structures. Preliminary structural loading and maximum allowable settlement criteria provided are summarized below:

Construction Period	Total Structural Load at Each Stage(kips)	Max. Allowable Settlement (Total)	Max. Allowable Differential Settlement
Steam Turbine/Generators			
During Construction	14,120	3/4"	3/8"
Post-Construction	16,120	1/2"	1/4"
Heat Recovery Steam Generators			
During Construction	12,730	1"	1/2"
Post-Construction	13,324	3/4"	1/2"
Combustion Turbine/Generators			
During Construction	4,800	1"	1/2"
Post-Construction	5,000	1/2"	1/4"
Cooling Tower and Basin			
During Construction	13,827	1-1/2"	3/4"
Post-Construction	27,027	2"	1"
Demineralized Water Storage Tanks			
During Construction	290	1"	1/2"
Post-Construction	3,990	4"	2"
Raw Water Storage Tanks			
During Construction	1,287	1"	1/2"
Post-Construction	34,587	4"	2"
Transformers			
During Construction	--	1-1/2"	--
Post-Construction	3,750 (est.)	<3/4"	--
Buildings			
Post-Construction	Typ. column load foundation pressure 3 – 4 ksf with floor load of 500 psf		
Equipment Mats			
During and Post Construction	Typ. mat load 2 – 3 ksf. The max. allowable settlement (total) is 1" during construction and <1/2" for post-construction		

Grading plans were not available at the time this report was prepared. However, as site topography is relatively level, aside from the proposed ponds we anticipate that cuts and fills during earthwork will be minimal (2 to 3 feet or less in vertical extent) and limited to providing vehicular access and level foundation pads with positive site drainage. We anticipate that pond excavations will range from about 3 to 6 feet below existing site grade and that 8 to 12 feet tall embankments or levees will be constructed along the perimeter. Excavations for underground utilities are not anticipated to exceed 10 feet below final site grade.

A plot plan showing the proposed facility layout is presented on Plate 2. In the event these structural or grading details are inconsistent with the final design criteria, our firm should be contacted prior to final design in order that we may update our recommendations as needed.

2. PURPOSE AND SCOPE OF SERVICES

The purpose of our services was to explore and evaluate the subsurface conditions at various locations on the site in order to develop recommendations related to the geotechnical aspects of project design and construction.

The scope of our services was outlined in our proposal dated March 30, 2001(File No. 21-YP4-810) and included the following:

- A visual site reconnaissance to investigate the surface conditions at the project site;
- A field investigation that consisted of drilling borings, excavating test pits, performing cone penetration tests (CPT's), and performing field resistivity tests within the area of the proposed development to explore the subsurface conditions at the project site;
- Laboratory testing of representative samples obtained during the field investigation to evaluate relevant physical and engineering parameters of the subsurface soils;
- A review of selected literature regarding the known geology and seismicity of the project area;
- A review of geotechnical engineering studies previously performed by Kleinfelder in the project area;
- Evaluation of the data obtained and an engineering analysis to develop our geotechnical conclusions and recommendations;
- Preparation of this report which includes:
  - A description of the proposed project;
  - A description of the field and laboratory investigations;
  - A description of the site conditions, including the geologic setting, seismic setting, surface conditions, and subsurface conditions encountered during our field investigation;
  - Conclusions and recommendations related to the geotechnical aspects of:
    - Seismic hazards, including fault rupture, liquefaction and seismic shaking;
    - Uniform Building Code (UBC) and California Building Code (CBC) seismic design criteria;
    - Expansive soils;
    - Foundation design and construction, including allowable tension and compression capacities, lateral capacity, modulus of subgrade reaction for elastic design approaches, and dynamic soil properties for use in evaluating foundation for vibrating machinery;
    - Concrete floor slabs and exterior flatwork;
    - Earth retaining walls;
    - Asphalt concrete and Portland cement concrete pavements;
    - Site surface drainage;

- Field resistivity measurements for use in evaluation of grounding systems;
- Soil corrosion potential; and
- General earthwork, including site preparation, fill materials, engineered fill, temporary excavations, pond embankments and wet or unstable subgrade conditions.

➢ An appendix that includes logs of borings, logs of test pits, results of CPT's and a summary of laboratory tests.

3. PREVIOUS GEOTECHNICAL STUDIES

Kleinfelder has performed several geotechnical studies in the project area that provide relevant soils and geologic information for this current study. The previous studies reviewed for this investigation included test borings and resistivity information for a high voltage transmission line located along Kelso Road immediately south of the site, and numerous investigations for the adjacent Mountain House Development to the east and the wind farms to the west. Our firm has also been providing geotechnical services in the Tracy area for the past 40 years and have completed approximately 300 individual studies southwest of the site.

4. FIELD INVESTIGATION

The subsurface conditions at the site were explored between May 2 and 29, 2001, by drilling 25 borings (B-1 to B-25) to depths ranging from about 20 to 101.5 feet below existing grade. In addition, on May 16, 2001, eleven test pits (TP-1 to TP-10) were excavated in the pond areas to depth ranging from about 7.5 to 8.5 feet. Furthermore, on May 2 and 3, 2001, nineteen CPT tests (CPT-1 to CPT-19) were performed to depths ranging from about 30 to 100 feet. Between May 9 and August 28,2001, nine field resistivity tests (R-1 to R-9) were performed. Finally, percolation tests were performed in the area of the proposed waste disposal field. Results of the percolation tests indicated poor percolation characteristics for the near-surface soils. Additional testing is currently being performed and results will be presented under separate cover. The approximate boring, test pit, CPT and field resistivity test locations are presented on Plate 2. The following subsections present a general description of our field exploration services.

4.1 Borings and Test Pits

Boring were drilled using a CME-75 truck-mounted drill rig equipped with 6-inch O.D. hollow-stem auger. During the drilling operations, penetration tests were performed in accordance with ASTM D1586 at regular intervals using a Modified California Sampler and/or Standard Penetration Sampler to evaluate the relative density of course-grained (cohesionless) soil and to retain soil samples for laboratory testing. The penetration tests were performed by initially driving the sampler 6 inches into the bottom of the bore hole using a 140 pound trip-hammer falling 30 inches to penetrate loose soil cuttings and "seat" the sampler. Thereafter, the sampler was progressively driven an additional 12 inches, with the results recorded as the corresponding number of blows required to advance the sampler 12 inches, or any part thereof. A pocket penetrometer was used to evaluate the consistency of fine-grained (cohesive) soil samples retained. In the absence of pocket penetrometer test results, the consistency of fine-grained soils was estimated from penetration tests.

Test pits were excavated using a tire-mounted backhoe equipped with a 24-inch wide bucket. During excavation of the test pits, soil samples were obtained by driving thin-walled brass tubes (2-inch outside diameter and 6 inches long) into undisturbed soil and by collecting representative bulk samples of each soil strata encountered within the test excavations. The consistency of the fine-grained (cohesive) soils encountered were evaluated by penetrating the side walls of the test pits using a pocket penetrometer. After the test pits were completed they were backfilled with the excavated soil. Backfill was loosely placed and not compacted to the requirements typically specified for engineered fill. Since the test pits were located in the pond areas, it may not be necessary to remove and compact the backfill during construction. However, if structures, slabs-on-grade, or pavements will be located over the test pit areas, the test pit fill should be removed and compacted as engineered fill prior to construction of improvements.

A representative with our firm maintained a log of the borings and test pits and visually classified soils encountered according to the Unified Soil Classification System (see Plate A-1 of the Appendix). Soil samples obtained from the borings and test pits were packaged and sealed in the field to reduce moisture loss and disturbance, and returned to our Stockton laboratory for further testing.

A key to the Logs of Borings and test pits is presented on Plate A-2 of Appendix A. Logs of Borings are presented on Plates A-3 through A-27 of Appendix A. Logs of Test Pits are presented on Plates A-28 through A-38 of Appendix A. Prior to our field exploration, Borings B-1 through B-21 and all test pits were located and staked in the field by CH_2M Hill. Borings B-22 through B-25 were located in the field by visual sighting and/or pacing from existing site features. The locations of borings and test pits shown on Plate 2 should be considered approximate and may vary from that indicated on the plate.

4.2 CPT Soundings

The CPT soundings were performed by hydraulically pushing a 1.4-inch diameter Dutch Cone Penetrometer into the subsurface soils using an enclosed truck-mounted 20-ton ram system provided by Gregg Exploration. During penetration the cone or tip resistance and sleeve friction resistance is recorded on a nearly continuous based to the depth of exploration. Based published correlation's, the data obtained is used to estimate stratigraphy, soil type, groundwater depth and in situ soil parameters, such as undrained shear strength and standard penetration (N) values.

Soundings were performed at test locations CPT-2 and CPT-7 to evaluate the average soil shear wave velocity for every about 1 meter of penetration using a downhole seismic piezocone tests (SCPTU). During a pause in cone penetration, the seismic waves or shear source were provided by a sludge hammer striking a metal beam attached to each side of the CPT rig (the second soundings are identified as CPT-2a and CPT-7a). The seismic wave is then received and recorded by a seismic pick-up that was added to the cone string. The signals obtained from the SCPTU are analyzed to select the main shear wave pulse from the signal, to remove outside noise if necessary, and review Fourier transforms for each soil layer identified. The shear wave velocity, Vs, is then calculated by dividing the difference in travel distance between two depths by the time difference between two recorded signals.

A soil behavior type classification chart and the graphical CPT results provided by Gregg Exploration (including measured tip resistance, sleeve friction and interpreted soil profiles) are presented on Plates B-1 through B-22 in Appendix B. In addition, the average numerical tip resistance (Qt), skin resistance (Fs), and friction ratio (Rf) for each 0.3 meters of penetration are presented on Plates B-23 through B-41 in Appendix B. Based on published correlation's, also included is the interpreted soil behavior type (SBT), standard penetration test (SPT) N-values at 60% energy calculated for Qt/N ratios (N_{60}), SPT N_{60} values corrected for overburden pressure ($(N1)_{60}$), equivalent clean sand $N1_{60}$ $(N1)_{60cs}$, undrained shear strength (Su), friction angle (PHI), relative density (Dr), and overconsolidation ratio (OCR). Finally, the shear wave velocity results from the seismic piezocone tests are presented graphically on Plates B-2,3,8 and 9 and summarized on Plate B-42 through B-48 in Appendix B.

Prior to our field exploration, the CPT's were located and staked in the field by CH_2M Hill. The CPT locations shown on Plate 1 should be considered approximate and may vary from that indicated on the plate.

4.3 Field Resistivity Testing

Field resistivity testing was performed based on the Wenner 4-pin method using a Soiltest Model 40C and Nilsson Model 400 4-pin soil resistance meters. The Wenner array consisted of four electrodes placed in line and driven into the ground at intervals of 5, 10, 15, 20, 25 and 30 feet. Resistivity refers to the resistance to current flow developed in geologic materials and is expressed herein as ohm-centimeters. The procedure consists of applying a direct current flow between the two outer electrodes. The current drop is then detected by the two inner electrodes and recorded on the meter. The "apparent" resistivity is then computed using the Wenner expression with "apparent" resistivity signifying an average value resulting from vertical layering effects. A summary of our field resistivity test results in presented in 7.11 6.11.

5. LABORATORY INVESTIGATION

Laboratory tests were performed in accordance with current ASTM standards on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory testing program was formulated with emphasis on the evaluation of natural moisture content, in-place density, grain-size distribution, plasticity, specific gravity, expansion pressure, consolidation potential, and shear strength of the materials encountered. Two pH, minimum resistivity, sulfate and chloride tests were performed on a near-surface soil samples in accordance with Caltrans and EPA procedures to evaluate the corrosivity of the soils to buried concrete and ferrous metals.

Laboratory testing was also performed in accordance with Caltrans procedures on a composite sample of the near-surface clays to establish an appropriate lime concentration for improving the support characteristics of the soils for pavements and for reducing the shrink-swell (expansion) characteristics of the soils. Initially, pH tests were performed on soil samples mixed with high calcium quick lime concentrations of 3, 4 and 5 percent by dry weight to evaluate the minimum percentage of lime required to raise the pH of the sample to 12.4 or greater. Once the minimum lime concentration was established, an R-value and compressive strength tests were performed on compacted and cured samples.

The results of laboratory tests are summarized on Plate C-1 in Appendix C. This information, along with the field observations, was used to prepare the final boring and test pit logs in Appendix A.

6. SITE CONDITIONS

6.1 Geologic Setting

The project site lies within the central portion of the Great Valley geomorphic province of California. The province is bordered to the north by the Cascade and Klamath ranges; to the west by the structurally complex sedimentary and volcanic rock units of the Coast Ranges; to the east by the granitic and metamorphic basement rocks which form the gently sloping western foothills of the Sierra Nevada range; and to the south by the east-west trending Transverse ranges. About 644 kilometers (km) long and 80 km wide, the Great Valley is an asymmetrical, synclinal trough formed by tilting of the Sierran block during the late Tertiary and Quaternary periods with the western side dropping to form the valley and the eastern side uplifting to form the Sierra Nevada mountains. Within the project area, erosion of the adjacent Sierra Nevada and Coast Ranges has in-filled the valley with a thick sequence of unconsolidated to semi-consolidated Quaternary (Pleistocene and Holocene) age alluvial, basin, and delta plain sediments deposited by the Sacramento and San Joaquin rivers and their tributaries. The thickness of the valley sediments varies from a thin veneer at the edges of the valley to thousands of meters in the western portion. The bedrock complex underlying the sediments is composed of metamorphosed marine sediments similar to those found in the foothills of the western Sierra Nevada and the core of the Coast Ranges.

Locally, the project site is situated on alluvial flatland deposits which were formed by streams draining from the nearby mountains and foothills of the Coast Ranges. Various authors have mapped the local geology of the site area. These maps differ in scale and detail but agree the site is underlain at the surface by unconsolidated to weakly consolidated Holocene (less than 10,000 year old) clay, silt, sand and gravel alluvial fan deposits (Qf) derived from the Coast Range. A map showing the surficial geologic conditions within the project area is presented on Plate 3.

6.2 Seismic Setting

The project area is located within a region characterized by moderate to high seismic activity. However, the subject site is not located within, nor is it adjacent to any Fault-Rupture Hazard Zones (formerly Alquist-Priolo Special Studies Zones) (Hart and Bryant, 1997) and no faults that displace valley alluvium are known to exist near the proposed project site. Numerous active and potentially active faults, however, are identified east and west of the project area. An active fault is one that has experienced seismic activity during historic time (since roughly 1800) or exhibits evidence of surface rupture during Holocene time (about the last 10,000 years). The definitions of potentially active vary widely. The most widely accepted definition of potentially active is a fault showing evidence of displacement older than 10,000 years and younger than 1.6 million years (Pleistocene age). Faults showing evidence of displacement older than 1.6 million years are classified as inactive.

The San Andreas fault (SAF), located about 75 km to the southwest, is considered to dominate the structure and seismicity of the region. This right-lateral strike-slip fault which extends from the Gulf of California, in Mexico, to Cape Mendocino, off the coast of Humbolt County in Northern California, forms a portion of the boundary between two independent tectonic plates on the surface of the earth. To the west of the SAF is the Pacific Plate, which moves north relative to the North American Plate, located east of the fault. In the San Francisco Bay area, movement across this plate boundary is concentrated on the SAF; however, it is also distributed, to a lesser extent, across a number of faults which include the Calaveras, Concord-Green Valley, Clayton-Marsh Creek-Greenville, Rodgers Creek, and Hayward faults among others. Together, these faults are referred to as the SAF system.

Several secondary or potentially active fault traces are located in the general vicinity of the project site. The closest of these is Segment 6 of the Great Valley fault system, located about 1.5-km to the east. The Great Valley fault system is characterized by a zone of concealed or "blind" thrust faulting, reverse faults, and folds that extend for several hundred kilometers from the southern San Joaquin Valley in Kern County northward to the northern San Joaquin Valley in Tehama County. Although not exposed at the surface, regional studies have suggested the Great Valley fault system may be comprised of between 18 and 25 segments ranging from about 12 to 57 kms in length, with most segments between 20 and 30 km, on the basis of the seismo-tectonic environment of the area. The characteristic earthquake for the average-length segment is believed capable of yielding earthquakes of magnitude 6.3 to 6.4, or slightly smaller than the 1983 (M6.5) Coalinga earthquake, and the longest segments are believed capable of yielding earthquakes as large as magnitude 6.8 to 7.0.

Recorded seismic activity within the project area has most often been associated with faults of the SAF system, with the closest of these being the Clayton-Marsh Creek-Greenville, Calaveras and Hayward faults located about 14, 33 and 44-km to the southwest. Several earthquakes attributed to the SAF include the 1906 (M8+) San Francisco Earthquake, the 1838 and 1865 (M7) San Francisco Earthquakes, and 1989 (M6.9) Loma Prieta Earthquake. Earthquakes attributed to faults of the SAF system closer to the site include the 1861 (M5.7) San Ramon Valley earthquake on the Calaveras fault, the 1980 (M5.8) Livermore earthquake on the Clayton-Marsh Creek-Greenville fault, the 1889 (M6.3) Antioch earthquake, the 1955 (M5.4) Concord earthquake on the Concord-Green Valley fault, and the 1868 (M6.8) Hayward earthquake on the Hayward fault.

Several significant earthquakes recorded within the western margin of the Great Valley have been attributed theoretically to the Great Valley fault system located about 1.5 km east of the site. These include the 1866 (M6.3) and the 1881 (M6.0) West San Joaquin Valley earthquakes south of the site, the 1892 (M6.3) Winters earthquake; the 1983 (M6.5) Coalinga earthquake; and the 1985 (M6.1) Kettlemen Hills earthquake.

A search of earthquake databases[1] indicated that in excess of 5,500 historic seismic events have been recorded within the project area. The parameters used to define the limits of the historical earthquake search include geographical limits (within 100 km of the site), dates (1800 through July 2001), and magnitudes (M>4). The result of our historical search is summarized below. Epicenters for historical earthquakes (M>4.0) identified in the historical search within the vicinity of the site are shown on Plate 4.

Time Period (1800 to July 2001)	201+years
Maximum Magnitude	7.9
Approximate distance to nearest historical M> 4 earthquake	15 km
Number of events exceeding magnitude 4 within search area	212

[1] *The earthquake database is principally comprised of an earthquake catalog for the State of California prepared by the California Division of Mines and Geology (CDMG). The original CDMG catalog (Real, et al., 1978) is a merger of the University of California at Berkeley and the California Institute of Technology instrumental catalogs (Hileman, et al., 1973). Updates prepared by CDMG in 1979 and 1982 extend the coverage through 1982. In addition to the CDMG updates, the data for earthquakes for the period between 1910 and May 2001 have been obtained from a composite catalog developed by Council of the National Seismic System (CNSS). The earthquake database also consists of earthquake records between 1800 and 1900. This subset of the earthquake database was derived from Seeburger and Bolt (1976) and Toppozada, et al. (1978, 1981).*

A map showing the relationship of active and potentially active faults to the project site is also presented on Plate 4. A table[2] summarizing significant regional faults in the project area, the distance from the fault trace at the surface to the site, and the faults' seismic parameters are presented below:

Fault Name	Fault Length (km)	Closest Distance to Site (km)	Magnitude of Maximum Earthquake *	Slip Rate (mm/yr)	Values of	
					a	b
Great Valley 6	45	1.5	6.7	1.5	3.24	0.90
Great Valley 7	45	10	6.7	1.5	2.57	0.80
Greenville-Marsh Creek	56	14	6.9	2	2.99	0.90
Calaveras (northern)	52	33	6.8	6	3.60	0.90
Great Valley 5	28	35	6.5	1.5	2.50	0.80
Concord-Green Valley	70	36	6.9	6	3.27	0.80
Hayward	80	44	7.1	9	3.46	0.80
Calaveras (Southern)	100	45	6.2	15	4.06	0.90
Vaca	28	46	6.7	1.5	2.50	0.80
Great Valley 8	41	56	6.6	1.5	2.60	0.80
Ortigalita	66	64	6.9	1	3.15	0.90
West Napa	30	70	6.5	1	2.06	0.80
Cordelia	20	70	6.7	1	2.20	0.80
Rodgers Creek	60	74	7.1	9	2.54	0.70
San Andreas (1906 Event)	470	75	7.9	24	4.79	0.90
Foothills Fault System (Bear Mountains fault zone)	360	80	6.5	0.05	1.85	0.90

* moment magnitude

The "a" and "b" values listed in this table are a measure of the frequency of occurrence of earthquakes of various magnitudes. The general form of this recurrence model is based on the Gutenberg-Richter (Gutenberg and Richter, 1956) exponential frequency-magnitude relationship:

$$\log N (M) = a - bM$$

where N is the cumulative number of earthquakes of magnitude "M" or greater per year, and "a" and "b" are constants based on recurrence analyses.

[2] *The closest distance to the faults relative to the project site and associated parameters presented in the table are based on data presented by Real et al. (1978), Toppozada et al. (1978), Hart et al. (1984), Wesnousky (1986), Wong et al. (1988), Working Group on California Earthquake Probabilities (1990), Wagner et al. (1990), Lienkaemper (1992), Lienkaemper and Borchardt (1992), Oppenheimer et al. (1992), Schwartz (1994), Jennings (1994a, 1994b), Frankel et al. (1996), and Petersen et al. (1996). The maximum earthquake magnitudes presented in this table are based on the moment magnitude scale developed by Kanamori (1977).*

6.3 Surface

At the time of our field explorations, the rectangular shaped site consisted of a plowed agricultural field with a moderate growth of low weeds or alfalfa. The site was bound to the north by an unpaved road and disced field; to the south by a concrete lined ditch and agricultural field; to the east by an unlined ditch, unpaved road and agricultural field; and to the west by Mountain House Road, a concrete lined swale, and agricultural fields. An existing power plant was noted to the southwest. Several power poles were located on the west perimeter of the site. In addition, a concrete standpipe was noted near the west-central edge of the site.

6.4 Subsurface

In general, the subsurface conditions encountered at our explorations appeared relatively uniform and consistent with our previous findings in the project area. The subsurface soils encountered consisted predominately of hard, low compressible silty clays to depths ranging from about 2.5 to 15.5 feet (average depth = 5 ft.), underlain by very stiff, low compressible silty and sandy clays to depths ranging from about 6.5 to 21.5 feet (average depth = 12 ft.). With several exceptions, these soils were underlain by highly interbedded strata of very stiff to hard clays and 0.5 to 7 foot thick strata of discontinuous, medium dense to very dense silty, clayey and poorly graded "clean" sands to the depth explored.

At several boring locations, 0.5 to 3.5 feet thick interbedded strata soft to stiff, moderately compressible clays were encountered below depths of about 10 feet. The CPT soundings did not reveal any soft soil strata. Instead, CPT's recorded stiff, moderately compressible clays at one or two depths in 12 of the 19 soundings with an average thickness of about 2 ft. Because of the exploration method, it has been our experience that CPT data in soft to stiff clays, as well as loose to medium dense sands, below groundwater is generally more representative of the in-place soil conditions. Hollow stem auger borings in these soil strata tends to soften, loosen or otherwise disturb the soils due to a combination of the drilling procedure and boiling caused by hydrostatic pressures that develop.

Test borings were checked for the presence of groundwater during and following the drilling operations. After the boreholes were allowed to stand open for three days, groundwater was recorded at depths ranging from about 10.6 to 14.5 feet below existing site grade (average depth = 12.3 ft). It should be noted that groundwater elevations and soil moisture conditions within the project area will vary depending on seasonal rainfall, irrigation practices, land use, and/or runoff conditions not apparent at the time of our field investigation. The evaluation of such factors is beyond the scope of this investigation

Detailed descriptions of the subsurface conditions encountered during our field investigation are presented on the Logs of Borings and Logs of Test Pits, Plates A-3 through A-38 of Appendix A, and on the graphical CPT results, Plates B-2 through B-22 in Appendix B. A summary of laboratory tests is presented on Plate C-1 of Appendix C.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

Based on our findings, it is our professional opinion that the site should be suitable from a geotechnical standpoint for support of the proposed facility provided the recommendations contained herein are incorporated into the project design. Given the conditions encountered, the subgrade soils should provide adequate support for shallow and deep foundations as discussed below. Other than foundation support, the primary geotechnical consideration is the shrink-swell (expansion) characteristics of the near-surface clays and the potential for post-construction uplift or heave of lightly loaded concrete slabs and foundations. Specific conclusions and recommendations addressing these geotechnical considerations, as well as general recommendations regarding the geotechnical aspects of design and construction are presented in the following sections.

7.2 Expansive Clays

Based on our findings and previous experience, the near-surface clays are moderately plastic and may exhibit a significant shrink-swell (expansion) potential with variations in moisture content. Results of swell tests performed on two samples of the near-surface clay indicated swell pressures of about 500 and 900 pounds per square feet (psf). Tests performed for previous studies in the project area have indicated swell pressures as great as 1,400 psf. Accordingly interior floor slabs, lightly loaded spread foundations, lightly loaded structural slabs, and exterior flatwork could be susceptible to post-construction heave, cracking and increased maintenance if the clays are not modified or improved. Typical improvement alternatives used in the project area to address expansive clays have included 1) moisture conditioning and compacting the native soils during earthwork under strict quality control guidelines, then wetting or pre-soaking the building or foundation slabs prior to slab placement, 2) supporting the proposed buildings or foundation slabs on a layer of non-expansive fill, or 3) stabilizing the native clays by mixing with lime. Each of these alternatives is discussed below.

7.2.1 Moisture Conditioning/Compaction Control

The first alternative is usually the least costly option. This procedure serves to reduce the clays swell potential by remolding and controlling the compaction of the clays during earthwork and then pre-swelling the clays prior to placement of slab concrete, thus reducing post-construction movement. However, this option also represents the greatest risk between the two alternatives for post-construction movement and cosmetic cracking. Even with close quality control, the pre-soaking does not always uniformly penetrate and completely swell the soils prior to placement of concrete. Accordingly, some swelling or heaving may occur following construction. In addition, the clays are in a soft/wet condition if the procedure is performed properly, making them more susceptible to settlement. Structural slab foundations that do not have perimeter footings or thickened edges may also be subject to edge effects caused by seasonal wetting and drying of the subgrade soils or man-made water sources.

During earthwork, this procedure consists of uniformly increasing the moisture content of the upper 18 inches of subgrade soils to between 3 and 5 percentage points above the optimum moisture content during earthwork and compacting the soils to between 85 and 95 percent relative compaction. The zone of moisture conditioned soils should extend laterally at least 5 feet outside the perimeter of the structures.

Unless construction occurs during extended periods of rainfall, following earthwork the subgrade soils commonly dry because the building and structural pads are often exposed for a period of time. Since it is critically important that upper 18 inches of subgrade soils are in a very moist/soft or swelled condition prior to placement of slab concrete, it is often necessary to uniformly wet or pre-soak the subgrade soils to raise the soils moisture content to at least 3 percentage points above its optimum moisture content or at least 1 percentage points above its plastic limit, whichever is less. Pre-soaking is usually performed using liberal sprinkling, flooding, or other suitable method. A representative from Kleinfelder should perform a field check of the soils moisture content and consistency prior to placement of slab concrete. Weather conditions at the time of construction will determine the amount of time allowed between the moisture conditioning and/or pre-soaking and slab placement. Generally, slab concrete should be placed no more than three days after field testing. In hot and/or windy weather, however, slab concrete should be placed within 24 hours of the field testing. The time required for pre-soaking could vary from a few days to over a week depending on the moisture and compaction condition of the subgrade soils. To lessen the time required for pre-soaking, care should taken to not over-compact the soils during earthwork or allow vehicles/equipment to operate on the building pads following earthwork.

7.2.2 Non-Expansive Engineered Fill

If a higher performance standard and reduced level of risk is desired, the proposed buildings or structural slabs should be supported on at least 12 inches of non-expansive, engineered fill by removing and replacing the native clays, raising the pads above existing site grade or a combination of both. The layer of non-expansive fill would serve to replace the near-surface clays most susceptible to expansion, increase the dead-load imposed on the underlying clays to resist up-lift forces, and produce a more uniform heave pattern, resulting in less differential movement, should the lower clays shrink or swell. The zone of non-expansive, engineered fill should extend laterally at least 5 feet outside the perimeter of the structures. Prior to placement of the non-expansive fill, the exposed native clays should be scarified to a minimum depth of 6 inches, uniformly moisture conditioned to between 3 and 5 percentage points above the optimum moisture content and compacted to at least 90 percent relative compaction. The moisture content of the exposed native clays should be maintained as discussed above until placement of the non-expansive fill.

7.2.3 Lime Stabilization

Lime stabilization generally represents the median between the three alternatives in regards to cost and risk for post-construction movement and cosmetic cracking. Through cation exchange, flocculation – agglomeration, lime carbonation, and pozzolanic reaction, the lime reduces the plasticity and, thus, shrink-swell potential of the clays and improves its workability. lime also acts as a cementing agent, providing added strength to the soil. During and/or following periods of rainfall, lime stabilized soils tend to remain reasonably stable and provide a firm, accessible working platform for equipment. Stabilization, however, should not be considered in lawn, planter or tree areas. Lime greatly increases the pH of the soils and, thus, does not promote plant growth. In accordance with requirements outlined in Section 24 of the Caltrans Standard Specifications, this procedure consists of mixing the upper 16 inches of subgrade soils within the proposed building pad areas with high calcium quick lime and compacting the soil as engineered fill. The results of our lime stability evaluation indicate that 4.0 percent high calcium quick lime by dry weight of the soil should be assumed for estimating purposes. The zone of lime stabilized soils should extend laterally at least 5 feet outside the perimeter of the proposed structures.

Proper curing of lime stabilized soils is critically important because strength gain is dependent upon time, temperature, and the presence of water. Generally a 3 to 7 days curing period is required, during which time equipment heavier than pneumatic rollers is kept off. Two types of curing are employed to retain the moisture in the stabilized soils – sprinkling and membrane. Sprinkling with water to keep the surface damp, together with light rolling to keep the surface knitted together, has proven to be reasonably successful during periods of cooler temperatures, light wind and rainfall. However, the preferred method is membrane curing. In membrane curing, the stabilized soil is either sealed with one shot of cutback asphalt (0.2 to 0.4 gal/sq.yd.) within one day after final rolling or primed with increments of asphalt emulsion applied several times during the curing period. In some cases curing may not be extensive or not needed if the overlying structure or pavement layer is placed within a few days after construction of the stabilized layer. Prior to stabilization operations, our firm should review the lime contractors proposed stabilization scheme to verify that the intent of our geotechnical recommendations has been properly addressed and the proposed procedure is adequate.

Prior to or during lime stabilization, the untreated clay soils underlying the stabilized section should be checked for moisture content. Since lime stabilized soil is stronger than non-expansive fill, the moisture content and density of the underlying soils are less critical. However, some heaving or swelling could still occur if these underlying soils are not at least in an over optimum moisture condition.

Recommendations for pavements and exterior flatwork are presented in following sections.

7.3 Shallow Foundations

Based on our findings, proposed lightly loaded buildings, small tank pads, small equipment pads, pipe supports, utility bridges, and the cooling tower and basin can be supported on shallow foundations. In general, the near-surface clays and sands are relatively strong and low to moderately compressible under the anticipated structural loading. Based on the premise, the following subsections present criteria and recommendations for shallow spread foundations, structural mat foundations, tank ring wall foundations, lateral soil resistance, and additional design and construction considerations.

7.3.1 Spread Foundations

The proposed single story buildings, various pipe supports, and utility bridges may be supported on shallow, reinforced concrete, spread footings founded on undisturbed native soil, engineered fill or a combination of both. Continuous and isolated spread footings should have minimum widths of 12 and 24 inches, respectively, and be embedded at least 18 inches below the lowest final adjacent subgrade[3]. Footings so established may be designed using a net allowable bearing pressure of 2,500 pounds per square foot (psf) for dead plus sustained live loading. A one-third increase in allowable bearing pressure may be applied when considering short-term loading due to wind or seismic forces. Where located near existing or future utility lines, footings should extend below a 1(h):1(v) plane projected upward from the closest bottom corner of the trench.

The intent of deepening foundations to 18 inches is to extend the base of the footing below the critical depth of seasonal moisture fluctuation, or zone where shrink-swell cycles are most severe. In addition, perimeter continuous foundation would serve as a horizontal moisture break, reducing the potential for seasonal or man-made wetting and drying below the buildings. Accordingly, continuous foundations should extend the entire perimeter of the buildings, including door and bay openings.

Total settlement of an individual foundation will vary depending on the plan dimensions of the foundation and the actual load supported. Based on the anticipated and assumed foundation dimensions and loads, we estimate maximum total and differential foundation settlements should be on the order of 1/2 inch, respectively.

7.3.2 Structural Mat Foundations

The proposed miscellaneous small equipment, small tanks, and the cooling tower and basin may be supported on reinforced concrete mat foundations founded on undisturbed native soils, engineered fill or a combination of both. Mat foundations for miscellaneous equipment and other support equipment may be designed using a net allowable bearing pressure of 3,000 psf

[3] *Within this report, subgrade refers to the top surface of undisturbed native soil, native soil compacted during site preparation, or engineered fill.*

for dead plus sustained live loading. Mat foundations supporting the cooling tower and basin and small tanks may be designed using a net allowable bearing pressure of 2,000 psf. A one-third increase in allowable bearing pressures may be applied when considering short-term loading due to wind or seismic forces.

Based on the above allowable bearing pressure and the anticipated foundation dimensions, we estimate the maximum the total foundation settlement for the miscellaneous equipment should be on the order of 1 inch or less during construction and 1/2 inch or less post-construction. The maximum differential settlement, assuming the mat will be designed to act as a rigid unit, should be on the order of 1/2 inch. Total foundation settlement for the proposed cooling tower and basin should be on the order of 1 inch during construction and 3/4 inches post-construction. The maximum differential settlement should be on the order of 1/2 to 1 inch during and post-construction, respectively.

Tanks supported on mat foundations should be uniformly filled in 1/4 to 1/3 increments and allowed to settle completely between the incremental loading. Several survey monuments should be placed around the perimeter of the mat foundation and monitored periodically before, during and after each incremental loading to document the nature and amount of foundation settlement occurring. Results of the survey reading should be provided to Kleinfelder for review prior to applying the next incremental load. Flexible connections that compensate for the anticipated settlement should be used until the incremental loading is complete.

Structural concrete mat foundations designed based on approximate flexible methods (Winkler foundation) may use the following k-values or coefficients of subgrade reaction (assuming a square plate measuring 1 foot by 1 foot), Young's modulus (E_s), and Poisson's ratios (μ_s) for the subgrade soils depending on the subgrade condition below the structures.

Subgrade Condition	k-value, pci	Young's Modulus, psi	Poisson's Ratio
Hard Native Clay	200	2,000	0.3
Very Stiff Native Clay	160	1,000	0.4
Stiff Native Clay	80	500	0.4
Silty & Clayey Sand (dry) Silty & Clayey Sand (wet)	400 135	200	0.25
Moisture Conditioned Clay	50	500	0.5
Non-Expansive Fill	200	1,500	0.4
Lime Stabilized Clay	250	2,000	0.4
Engineered Native Fill	140	800	0.4

The above values were based on published correlations. Field tests at sites with similar soil conditions in the Tracy area often show that the coefficient of subgrade reaction can be increased significantly above the published values. If greater design values are desired or if floor slabs or structural mat foundations are critical/sensitive to loading and deflection, field plate load tests should be performed to better define the subgrade modulus.

7.3.3 Tank Ring Wall Foundations

The proposed raw water and demineralized water storage tanks may be supported on perimeter ring wall foundations founded on native soils and/or engineered fill. The foundation should have a minimum width of 16 inches and be embedded at least 18 inches below the lowest final adjacent subgrade. Where located near existing or future utility lines, ring wall foundations should extend below a 1(h):1(v) plane projected upward from the closest bottom corner of the trench. Footings so established may be designed using a net allowable bearing pressure of 2,500 pounds per square foot (psf) for dead plus sustained live loading. A one-third increase in allowable bearing pressure may be applied when considering short-term loading due to wind or seismic forces.

The interior tank pad fill should consist of Class 2 aggregate base or granular soil compacted to at least 90 percent relative compaction in accordance with ASTM D1557. Prior to placement of the fill, the exposed native subgrade should be scarified to a minimum depth of 12-inches, moisture conditioned to between 2 and 4 percentage points above optimum moisture content, and compacted as engineered fill. The moisture content of the native soils should be maintained by liberal sprinkling or other suitable method until placement of interior fill. To reduce long-term differential movement and stresses in the tank bottom plates, consideration should be given to grading the tank pad fill in a conical shape with the central portion raised about 4-inches, then gently sloping to the outside edges of the fill.

As typical for large storage tanks, the primary consideration from a geotechnical standpoint is differential settlement between the center and edge of the tank. Based on our evaluation and the subsurface conditions encountered, we estimate that total settlement near the center of tank prior to filling will be less than 1/2 inch with a maximum differential settlement 1/4 inch or less between the center and edge of the tanks. Once filled, we estimate that total and differential settlement should be in the range of 3 and 1 inch, respectively, or less. Furthermore, we estimate the ring-wall footing could experience additional settlement if allowed to settle independently of the tank plate. Because we anticipate the tank bottom plate and the shell are structurally tied together, structural design should equalize loading on the ringwall and tank in order to reduce stress and differential movement.

Approximately 40 to 50 percent of the above estimated settlement is expected to be elastic, occurring during or shortly after initial application of structural loads. The remaining settlement should occur slowly due to dissipation of excess pore pressures and soil creep.

The tanks should be initially loaded in no greater than 1/3 increments, allowing for the initial settlement to occur between the incremental loads. Accordingly, a monitoring program should be established to evaluate total and differential settlement during the initial loading and for six months thereafter. The monitoring program should include survey points established along the perimeter of the tanks and on the tank structures. The geotechnical engineer should evaluate the results after each survey reading.

If pipelines entering or leaving the tanks are sensitive to the anticipated differential movement, flexible connections should be used until the tank has been filled and settlements are complete. Thereafter, rigid connections may be installed.

7.3.4 Lateral Resistance

Resistance to lateral loads (including those due to wind or seismic forces) may be determined using an allowable at-rest coefficient of friction of 0.4 between the bottom of concrete foundations and the underlying soils. Lateral resistance for foundations can alternatively be provided by the passive soil pressure acting against the vertical face of the footings. The total passive pressures available in engineered fill and undisturbed native soil may be taken as equivalent to pressures exerted by fluids weighing 400 and 350 pounds per cubic foot (pcf), respectively. These two modes of resistance can be combined. However, since horizontal movement is required to mobilize passive resistance, the allowable at-rest frictional resistance should be reduced by 50 percent.

Lateral resistance parameters provided above are ultimate values. Therefore, a suitable factor of safety should be applied to the total lateral resistance for design purposes. For static and seismic loading conditions, factors of safety of at least 1.5 and 1.15, respectively, should be used for design. The appropriate factor of safety will depend on the design condition and should be determined by the project Structural Engineer.

7.3.5 Additional Considerations

Prior to placing reinforcing steel, shallow foundation excavations should be cleaned of all debris, loose or soft soil, and water. If shrinkage cracks appear in the footing excavations, the excavations should be thoroughly moistened to close all cracks prior to placement of concrete. All exposed footing excavations should be observed by the project Geotechnical Engineer to document that soil conditions are consistent with our findings and document that recommendations contained herein have been implemented during construction.

The structural engineer should evaluate footing configurations and reinforcement requirements to account for loading, shrinkage temperature stresses, and hoop tension. Hoop tension is caused by the lateral earth pressure inside the ring-wall due to product surcharge and tank dead load. As a minimum, continuous and ring wall footings should be reinforced with at least four No. 4 reinforcement bars, two top and two bottom, to provide structural continuity and permit spanning of local subgrade irregularities.

7.4 Drilled Pier Foundations

Due to settlement considerations, the proposed turbine/generators, HRSG and tall towers and stacks should be supported on a deep foundation system. Several foundation types would be acceptable for structural support. Not to the exclusion other foundation types, in recent years we have found that drilled, cast-in-place, concrete piers have performed well and have been used extensively in the project area due to ease of construction and cost. Driven precast concrete displacement piles have also occasionally been specified. However, given the predominately very stiff to hard consistency of soils underlying the site, pile driving may be difficult making pre-drilling necessary. Low displacement piles, such as H-beam or open end pipe piles, could also be considered, however, these piles tend to not effectively utilize available skin friction which reduces their load capacity, generally rendering them traditionally uneconomical for use. Accordingly, recommendations contained herein are limited to 24 to 60 inch diameter drilled cast-in-place piers.

7.4.1 Axial Capacities

Given the relatively shallow groundwater encountered at the site, drilled, cast-in-place concrete piers should be designed using skin friction developed between the soil and the pier shafts. Based on procedures developed by Reese and O'Neil (1988), we estimate the hard, very stiff and stiff clays could provide allowable skin friction resistances in the range of 1,250, 850 and 330 psf, respectively. When considering the overall soil profiles at each of the exploration locations within the anticipated pier depths, an allowable skin friction of 1,000 psf for dead-plus-sustained live loading may reasonably be used for design. We estimate that there should be more than sufficient reserve capacity provided by the hard clays to compensate for the interbedded weaker stiff clay layers. A one-third increase in the allowable skin friction may be applied when considering short-term loading due to wind or seismic forces.

The allowable design capacity presented above is a net value, therefore, the weight of the pier may be neglected when estimating downward axial capacities. A minimum factor of safety of 2 was applied to determine the allowable skin friction capacity for dead-plus-sustained live loading conditions.

In determining the total capacity of an individual pier, the sidewall area of the pier shaft equal to an equivalent depth of two pier diameters, one top and one bottom, should be neglected to account for soil disturbance and remolding caused by elastic and lateral deflections of the pier. Uplift loads (under either static or seismic loading conditions) can be resisted by the dead weight of the pier plus skin friction developed along the pier shaft equal to 75 percent of the allowable downward skin friction capacity.

No reduction in the axial capacity of an individual pier will be required to account for group action effects provided adjacent piers are spaced at least 3 pier diameters, center-to-center. If piers will be spaced closer, our firm should be consulted to evaluate the foundation details and provide alternative preliminary recommendations, if warranted.

Maximum total settlements of 3/4 inch and 1/2 inch or less should be anticipated during and post construction, respectively. Maximum differential settlements of 1/2 inch and 1/4 inch or less should be anticipated during and post-construction, respectively. These values do not include elastic compression of the pier under design loads.

7.4.2 Lateral Resistance

Resistance to lateral loads will be provided by the resistance of the soil against the piers and by the bending stiffness of the piers themselves. Based on the results of a computer program COM624P (1993) originally developed by Dr. Lymon Reese, the following table presents estimated ultimate lateral resistance capacities and maximum induced bending moments for concrete piers ranging from 24 to 60 inches in diameter. Moment and shear diagrams for each pier diameter can be provided upon request.

	Lateral Resistance (kips)		Maximum Induced Moment (kip-foot)		Depth to Maximum Moment (feet)		Depth to Zero Moment (feet)	
Pier Size (inches)	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
24	100	52	-375	152	0	6	17	14
30	145	74	-650	258	0	6.5	20	16.5
36	205	95	-1083	375	0	8	24	19.5
42	260	125	-1516	575	0	9	26	22
48	340	160	-2250	833	0	10	29	25
54	420	195	-2933	1150	0	11	32	27
60	505	230	-3766	1466	0	12	35	29

Notes regarding table above:

1. The above ultimate lateral resistance values and moments are for a pier-head deflection of 1/4 inch. For pier-head deflections up to 3/4 inch, lateral resistances and moments may be taken as directly proportional to the deflection.

2. A suitable factor of safety should be applied to the above ultimate lateral resistance for design purposes. The appropriate factor of safety will depend on the design condition and should be determined by the project Structural Engineer. Depending on the application, factors of safety typically range from 1.5 to 2.0.

3. Lateral resistance values provided above are for a single, isolated pier subjected to a short-term lateral load. The resistance of a single, isolated pier subjected to a sustained lateral load may be taken as 80 percent of the values provided above. Additionally, the lateral resistance of each individual pier within a pier group should be reduced by the factors provided below to account for group action or shadowing effects (in direction of load only).

Center-to Center Pier Spacing (Diameters)	Lateral Resistance Reduction Factor
6	1.0
5	0.9
4	0.8
3	0.7
2	0.6

4. Above values were obtained using pier lengths of at least 20 feet for the 24 and 30 inch diameter piers, at least 25 feet for 36 and 42 inch diameter piers, at least 30 feet for 48 inch diameter piers, at least 35 feet for 54 inch diameter piers, and at least 40 feet for 60 inch diameter piers. Piers in excess of these lengths should have essentially the same lateral resistances and moments. Where piers will be shorter than the above lengths, an additional evaluation should be performed since their lateral resistance will be less.

5. Depths specified above are depths below the bottom of the pier cap (if present), or lowest, final adjacent grade, whichever is lower.

6. Above values of maximum moment are due only to a lateral load (equal to the lateral resistance) imposed at the pier head.

7. If the fixity of the pier head lies between rigid (fixed) head condition and flexible (free) head condition, the lateral resistance and moments can be taken as directly proportional to the degree of fixity. For example, the positive and negative bending moments should be approximately equal for when the pier head fixity is about 50 percent.

8. Depth to Zero Moment refers to the first point of counterflexure for a free-head pier and the second point of counterflexure for a fixed-head pier.

Resistance to lateral loads may also be provided by passive resistance of the soil against pier caps and grade beams (if present). The ultimate passive pressures available in engineered fill or undisturbed, native soil may be taken as equivalent to the pressure exerted by a fluid weighing 400 and 350 pounds per cubic foot (pcf), respectively. A suitable factor of safety should be applied to this value for design purposes. The appropriate factor of safety will depend on the design condition and should be determined by the project Structural Engineer. Depending on the application, typical factors of safety could range from 1.0 to 1.5.

7.4.3 Construction Considerations

Based on our findings and previous experience, we anticipate that the very stiff to hard clays will not cave or slough during the pier excavations. However, the interbedded sands and stiff sandy clays may have limited "stand-up" capacity and could be susceptible to caving and sloughing. Also, it is possible that undisclosed layers of soft soil or other unanticipated conditions may be encountered. Accordingly, steel casing or a bentonite-based drilling fluid may be required to maintain the sidewall integrity of the pier shafts. The outside diameter of the casing, if used, should not be less than the diameter of the drilled shaft. The casing should be removed slowly from the excavation as concrete is being placed with the bottom of the casing kept at least five feet below the top of the concrete where possible. Casing should not be left in the ground except by permission of the project Geotechnical Engineer. If bentonite-based drilling is used, steel reinforcement and concrete should be placed immediately upon drilling completion of each pier excavation to reduce the quantity of suspended soil particles that may settle to the bottom of the hole. The depth of all pier excavations should be checked several times before concrete placement to assure excessive sedimentation has not occurred. Additionally, slurry drilling methods used for all pier excavations should be in accordance with Caltrans procedures and/or procedures outlined in the publication entitled: Drilled Shafts: Construction Procedures and Design Methods, by Reese, L.C. and O'Neill, M.W., dated August 1988 (Publication No. FHWA-HI-88-042).

All reinforcing steel used in the construction of drilled piers should have appropriate properties for strength, durability, and bond in accordance with standards specified by the Structural Engineer. As a minimum, reinforcing steel should extend the entire length of the pier and should be hooked into the grade beam, pier cap or structural slab at the top. The area of reinforcement steel should be designed to resist all tensile loads to which the pier may be subjected.

The clear spacing between steel bars of the rebar cage should be at least three times the size of the maximum coarse aggregate to allow concrete to flow. The contractor should handle the rebar cage in a manner so as not to cause damage in placing. The project plans should be followed closely in the placing of guides on the rebar cage to allow concentric spacing in the borehole and adequate cover of the cage with concrete. During the concrete pour, the reinforcing cage should be held in position by some positive method to minimize displacement during concrete placement.

The proper concrete mix design for drilled piers varies with the design stress intensity, the anticipated concrete placement procedures, and the spacing of the reinforcement. The project specifications should provide provisions as to concrete slump, temperature, air content, homogeneity, job-site conditions, and method of placement. In order to properly develop the design skin friction, current practice calls for concrete to have a 4 to 6 inch slump during placement "in the dry" and no pulling of casing, a 5 to 7 inch slump if casing is to be pulled or the pier shaft is heavily reinforced, and a 7 to 9 inch slump with ¾ inch maximum size aggregate if concrete is to be placed by tremie or pumping methods.

Concrete used for pier construction may be placed by free fall in dry boreholes provided the soil walls are stable or cased and concrete can be directed vertically down the center of the excavation so as to avoid striking the sides of the borehole, the rebar cage, or any other obstruction. If a hopper is used, it should have a fixed pipe so that it does no flap, permitting the concrete to angle back and forth as it is being placed. If water or seepage is present in the drilled shaft, concrete should be placed into the pier excavations using tremie methods. The end of the tremie pipe should remain below the surface of the in-place concrete at all times. During placement, concrete should not be allowed to "mushroom" or overflow the drilled shaft. Any excess concrete poured outside the shaft should be removed before it cures with the shaft.

Steel reinforcement and concrete should be placed as-soon-as possible but not greater than 4 hours after completion of each pier excavation. Additionally, drilled excavations should be scheduled to allow concrete in each pier to set before drilling adjacent holes; at least 18 hours is typically required. Allowing concrete to harden in adjacent piers can be critical where a center-to-center spacing of 4 diameters or less is used.

7.5 Concrete Slabs

Interior concrete floor slabs that will be covered with moisture-sensitive floor coverings should be underlain by a capillary break to reduce the potential for soil moisture vapor migrating upwards toward the slab. This capillary break should consist of at least 4-inches of "clean" coarse sand or compact, free draining crushed rock graded so that 100 percent passes the 1-inch sieve and less than 5 percent passes the No. 4 sieve. If the floor slabs are supported on non-expansive fill (see Section 7.2), the gravel layer can be omitted provided the fill consists of a relatively clean, coarse-grained sand. In the event omission of the gravel is considered, Kleinfelder should evaluate the proposed "clean" sand and/or non-expansive fill to assess its suitability for use as a capillary break.

If the interior floor slab or areas of the floor slab are not covered with moisture-sensitive floor coverings and subject to concentrated loads and/or fork lift traffic, the capillary break can be replaced with at least 6-inches of Class 2 aggregate base compacted as engineered fill. The purpose of the aggregate base would be to provide more uniform support for the heavier loads and less deflection at the slab joints.

The gravel or sand capillary break should be overlain by a moisture proofing membrane (such as minimum 10-mil polyethylene sheeting, "Moiststop," or similar product) to further reduce the potential for upward migration of water vapor through the slab. Care should be taken to properly lap and seal the membrane, particularly around utilities, to provide a vapor tight barrier.

To promote uniform curing of the slab, protection of the membrane during construction, and provide a leveling coarse for concrete slabs; a 1 to 2-inch thick layer of fine-to-medium-grained sand should be placed immediately below the floor slab prior to placing slab concrete. This sand should be moistened prior to concrete placement. However, if the sand has been allowed to become wet (due to precipitation or excessive moistening) or if standing water is present above the membrane, the concrete should not be placed. Excessive water beneath interior floor slabs could result in significant vapor transmission through the slab, adversely affecting moisture-sensitive floor coverings.

From a geotechnical standpoint, floor slabs should have a minimum nominal thickness of 4 inches and should be reinforced as a minimum with 6"x6"/10x10 welded wire mesh placed within the middle-third of the floor slab to reduce dry shrinkage cracking of the concrete. Thicker floor slabs with increased reinforcement may be required wherever large rack loads, vehicular traffic, heavy concentrated loads, heavy equipment or machinery is anticipated. Even with careful subgrade preparation, a risk remains for some post-construction heave (see Section 7.2) of the underlying clays and cosmetic cracking of the slabs. If this risk is unacceptable, it can be reduced by reinforcing the slabs using No. 4 reinforcement bars at 24 inches on-center each way within the middle-third of the slabs. The final design floor slab thickness and reinforcement should be provided by the Structural Engineer.

7.6 Exterior Flatwork

Like interior floor slabs, exterior concrete flatwork supported directly on native clays may be subject to the same shrink-swell cycles and potential distress. Some of the adverse effects of swelling and shrinking can be reduced with proper moisture treatment or pre-soaking (see Section 7.2) prior to concrete placement. However, the flatwork will be subject to edge effects caused by seasonal wetting and drying of the subgrade soils or man-made water sources. To protect against edge effects, lateral cutoffs such as inverted curbs, geo-composite drains or plastic sheeting should be considered. To further reduce the risk of post-construction movement, consideration should be given to increasing the thickness of the flatwork and placement of at least 12 inches of non-expansive fill or lime stabilized native soils below the flatwork. Cutoffs should extend at least 4 inches below the depth of non-expansive fill or moisture-conditioned native soils. An evaluation of your acceptable level of risk and desired future performance of flatwork should be considered when developing project plans and specifications.

To reduce cracking and tripping hazards, consideration should be given to reinforcing exterior concrete slabs with steel bars rather than wire mesh. As a minimum, smooth dowels should be provided at all joints. The dowels should be at least 24 inches in length, greased or sleeved at one end, and spaced at a maximum lateral spacing of 18 inches. Expansion joints should be frequent within the slabs, typically 6 to 8 feet spacing horizontally.

7.7 Retaining Walls

Retaining walls should be designed to resist the earth pressure exerted by the retained, compacted backfill plus any additional lateral force due to surcharge loading, i.e., construction equipment, foundations, roadways, etc., at or near the wall. The following equivalent fluid earth pressures are recommended assuming wall heights of 10 feet or less and a fully drained backfill condition:

Earth Pressure Condition	Backfill Slope	Lateral Earth Pressure (pcf)
Active	Level	35
At-Rest	Level	55

Retaining walls capable of deflecting a minimum of 0.1 percent of their height at the top may be designed using the active earth pressure. Retaining walls incapable of this deflection or are fully constrained against deflection should be designed for the at-rest earth pressure. Where uniform surcharge loads are located within a lateral distance from constrained and unconstrained retaining walls equal to the wall height, 30 and 45 percent of the surcharge load, respectively, should be applied uniformly over the entire height of the wall.

Retaining wall backfill should be free draining and provisions should be made to collect and dispose of excess water away from the wall. Wall drainage may be provided by either a minimum 1-foot wide layer of clean drainrock/gravel enclosed by geosynthetic filter fabric or by prefabricated drainage panels (such as Miradrain, Enkadrain, or an equivalent substitute) installed per the manufacturer's recommendations. In either case, drainage should be collected by perforated pipes and directed to a sump, storm drain, weep holes, or other suitable location for disposal. Drainrock should consist of clean durable stone having 100 percent passing the 1-inch sieve and zero percent passing the No. 4 sieve. Synthetic filter fabric should conform to the requirement in Section 88 "Engineering Fabrics" of the Caltrans Standard Specifications. Caltrans Class 2 Permeable Material meeting the requirements of Section 68-1.025 of the Standard Specifications can be substituted for the clean drainrock and filter fabric following review and approval by the Geotechnical Engineer. The upper 12 inches of engineered backfill above the wall drainage should consist of native soils, concrete, asphalt-concrete, or similar backfill to reduce surface drainage into the wall drain system.

If retaining walls are 4 feet or less in height, the perforated pipe may be omitted in lieu of weep holes on 4 feet center-to-center maximum spacing. The weep holes should consist of 4 inch or larger diameter holes (concrete walls) or unmortered head joints (masonry walls). They should be placed as low as possible but not be higher than 18 inches above the lowest adjacent grade. Two eight-inch square overlapping patches of geosynthetic filter fabric should be affixed to the rear wall openings of each weep hole to retard soil piping.

All backfill should be placed and compacted in accordance with recommendations provided herein for engineered fill. During grading and backfilling adjacent to any walls, heavy equipment should not be allowed to operate within a lateral distance of 5 feet from the wall, or within a lateral distance equal to the wall height, whichever is greater, to avoid overstressing of the wall. Within this zone, only hand operated equipment ("whackers," vibratory plates or pneumatic compactors) should be used to compact backfill soils.

Expansive soils, i.e., clays, plastic silts, and/or clayey sands, should not be used for backfill against retaining walls unless approved by the geotechnical engineer. The wedge of nonexpansive backfill material should extend from the bottom of each retaining wall outward and upward at a slope of 1(h):1(v) or flatter.

7.8 Asphalt Concrete Pavements

Based on the results of our laboratory tests and previous experience, the subgrade soils are potentially expansive and exhibit poor support characteristics for pavements as typically represented by R-values of 5 or less. Pavement sections[4] are presented below based on a minimum Caltrans R-value of 5, current Caltrans design procedures, and traffic indices ranging from 4 to 9. The traffic index (TI) is a measure of traffic wheel loading frequency and intensity of anticipated traffic. For comparison, TI's of between 4 and 5 are often suitable for design of automobile parking areas; TI's of between 5 and 6 are commonly used for design of fire truck access lanes and areas subject to channelized flow with light delivery trucks; and TI's greater than 6.0 are common for design of pavements supporting light to moderate truck traffic. Based on our experience at Calpine's Los Medanos Energy Center, a traffic index of 4.0 was specified for automobile parking areas and traffic indices of 5 and 5.5 were used for occasional heavy truck traffic areas. Traffic indices assumed above should be reviewed by the project Owner, Architect, and/or Civil Engineer to evaluate their suitability for this project. The use of rigid concrete pavement is favored where trash pick-up or truck traffic necessitates short radius maneuvering and/or heavy metal bin movement on rollers.

CONVENTIONAL PAVEMENT SECTIONS

Traffic Index	Asphalt-Concrete (inches)	Class 2 Aggregate Base (inches)	Class 2 Aggregate Subbase (inches)
4.0	3.0	6.5	--
4.5	3.0	8.5	--
	3.0	4.0	4.5
5.0	3.0	10.0	--
	3.0	4.0	6.5
5.5	3.0	12.0	--
	3.0	4.0	8.5
6.0	3.0	14.0	--
	3.0	4.0	10.5
6.5	3.0	15.5	--
	3.0	5.5	11.0
7.0	3.0	17.5	--
	3.0	6.5	12.0

[4] *Caltrans design procedures for asphalt concrete pavements provide sections in units of inches, rounded up to the nearest 1/2-inch. Sections provided for T.I's ranging from 4 to 7 include no Gravel Equivalent Safety Factor (per the Flexible Pavement Structural Section Design Guide for California Cities and Counties prepared through the cooperative efforts of the County Engineers Association of California, the League of California Cities and Caltrans). Some cities and counties may require a greater Gravel Equivalent Safety Factor for design of pavements within public streets. If required, the pavement sections should be reevaluated. Sections provided for T.I's greater than 7 include a Gravel Equivalent Safety Factor of 0.2 feet per Caltrans criteria.*

Traffic Index	Asphalt-Concrete (inches)	Class 2 Aggregate Base (inches)	Class 2 Aggregate Subbase (inches)
8.0	5.0	17.5	--
	5.0	7.0	11.5
9.0	5.5	20.5	--
	5.5	8.5	13.5

The pavement sections provided above are contingent on the following recommendations being implemented during and following construction.

- Native, unstabilized subgrade soils should be scarified to a minimum depth of 12-inches below the finished subgrade elevation, uniformly moisture conditioned to between 2 and 4 percentage points above the optimum moisture content, and compacted as engineered fill to at least 95 percent relative compaction. The moisture content of the native clays should be maintained by liberal sprinkling or other suitable method until placement of the aggregate base.

- Subgrade soils should be in a stable, non-pumping condition at the time aggregate base materials are placed and compacted.

- Aggregate base and aggregate subbase materials should conform to the specifications stated in Section 25 and 26 of the Caltrans Standard Specifications and be compacted as engineered fill to at least 95 percent relative compaction.

- Adequate drainage (both surface and subsurface) should be provided such that the subgrade soils and aggregate base materials are not allowed to become wet.

- Asphalt paving materials and placement methods should conform to the specifications stated in Section 39 of the Caltrans Standard Specifications, latest edition.

- All concrete curbs separating pavement and landscaped areas should extend into the subgrade and below the bottom of adjacent, aggregate base materials.

- Periodic maintenance will be performed to repair degraded areas and seal cracks with an appropriate filler.

In lieu of supporting pavement directly on expansive clays, numerous developments in the Tracy area have used lime stabilization to improve the subgrade conditions and reduce maintenance costs. This procedure reduces the plasticity/expansion characteristics of the near-surface clays and increases the soil strength. Thus, pavement sections can be reduced (thus reducing the relative cost of the lime stabilization). A laboratory lime stabilization evaluation was performed on one composite subgrade soil sample to evaluate the lime application rate that would be required and the support characteristics of the soil/lime mixture. Results of our tests indicated a minimum lime application rate of 4 percent by dry weight of the soils, an average soil compressive strength of 200 psi, and an increase in the R-value from 5 to 52. The alternative pavement sections presented below are based on these test results, on our previous experience with lime stabilization, and the following criteria:

- A minimum lime stabilized soil compressive strength of 200 psi.
- Lime stabilized soil will provide a minimum R-value of 50.
- Gravel equivalency factor for the lime stabilized soil of 1.1..
- Minimum depth of lime stabilized soil will be 12 inches.
- Maximum depth of lime stabilized soil will be 18 inches.
- It is typically difficult to achieve the required minimum compaction near the bottom of thick lime stabilized sections. Furthermore, the native soils underlying the lime stabilized section are not compacted. To compensate for these factors, 3 inches of lime stabilized soil has been added to the calculated pavement section.

LIME STABILIZED PAVEMENT SECTIONS

Traffic Index	Asphalt-Concrete (inches)	Class 2 Aggregate Base (inches)	Lime Stabilized Soil (inches)
4.0	3.0	4.0	12 (minimum)
4.5	3.0	4.0	12 (minimum)
5.0	3.0	4.0	12 (minimum)
5.5	3.0	4.0	12 (minimum)
6.0	3.0	4.0	13.5
6.5	3.0	4.0	15.5
7.0	3.5	4.0	17.0
8.0	5.0	4.0	17.0
9.0	5.5	5.5	18.0

The zone of lime stabilized soils should extend laterally at least 2 feet beyond the perimeter of the pavement sections. Prior to earthwork operations, our firm should review the lime contractors proposed stabilization scheme to confirm that the intent of our geotechnical recommendations has been properly addressed and the proposed procedure is adequate. If this option is considered, additional laboratory tests should be performed at least two weeks prior to construction to further confirm the required application rate for lime.

Following construction on several isolated projects, some shrinkage of the lime stabilized soils has occurred, resulting in minor or narrow reflection cracking of the overlying asphalt concrete. Although the cracking has not been significant, we have found that the 4 inches of recommended aggregate base has performed well to reduce this reflection cracking by "bridging" or spanning over subgrade cracks that do develop. As an option, the aggregate base layer can be eliminated provided the asphalt concrete layer thickness is increased and a reinforcing asphalt fabric, such as Petromat or a substitute with equivalent physical properties, is used between the asphalt lifts. If this option is considered, our office should be contacted to provide supplemental recommendations.

Lime stabilized pavement sections provided above are contingent on the following additional recommendations being implemented during and following construction.

- Lime stabilized subgrade soils should be uniformly moisture conditioned as necessary and compacted to at least 95 percent relative compaction.
- Following earthwork, the lime stabilized soils should be cured as discussed in Section 7. 2 – Expansive Clays.
- Subgrade soils should be in a stable, non-pumping condition at the time aggregate base materials are placed and compacted.
- Aggregate base materials should be compacted as engineered fill to at least 95 percent relative compaction.
- Adequate drainage (both surface and subsurface) should be provided such that the subgrade soils and aggregate base materials are not allowed to become wet.
- Lime stabilization and aggregate base materials should conform to the specifications stated in Sections 24 and 26, respectively, of the Caltrans Standard Specifications, latest edition.
- Asphalt paving materials and placement methods should conform to the specifications stated in Section 39 of the Caltrans Standard Specifications, latest edition.
- All concrete curbs separating pavement and landscaped areas should extend into the subgrade and below the bottom of adjacent, aggregate base materials.
- Periodic maintenance will be performed to repair degraded areas and seal cracks with an appropriate filler.

7.9 Portland Cement Concrete Pavements

Portland cement concrete pavement sections presented below are based on current Portland Cement Association (PCA) design procedures using a computer program titled PCAPAV 2.10, traffic indices ranging from 4.0 to 9.0, native subgrade soil conditions, and the assumptions listed below. These assumptions should be reviewed by the project Owner, Architect, and/or Civil Engineer to evaluate their suitability for this project. Changes in the assumptions will affect the corresponding pavement section.

- Modulus of subgrade reaction = 75 psi/in
- Modulus of rupture of concrete = 550 psi
- Aggregate Interlock Joints
- Concrete shoulders
- 20-year design life
- Load Safety Factor = 1.0
- Light axle load category for T.I.'s up to 6.0. Moderate axle load category for T.I.'s of 5.6 and 7. Heavy axle load category for T.I.'s of greater than 7.0.

Traffic Index	Portland Cement Concrete (inches)	Class 2 Aggregate Base (inches)
4.0	5.5	4.0
4.5	5.5	4.0
5.0	5.5	4.0
5.5	6.0	4.0
6.0	6.0	4.0
6.5	6.5	4.0
7.0	7.0	6.0
8.0	8.0	6.0
9.0	8.0	6.0

Portland cement concrete pavement sections provided above are contingent on the following recommendations being implemented during construction.

- Subgrade soils should be scarified to a minimum depth of 12-inches below the finished subgrade elevation, uniformly moisture conditioned to between 2 and 4 percentage points above the optimum moisture content, and compacted as engineered fill to at least 95 percent relative compaction. The moisture content of the native clays should be maintained until placement of the aggregate base.
- Aggregate base materials should be compacted to at least 95 percent relative compaction.
- Adequate drainage (both surface and subsurface) should be provided such that the subgrade soils are not allowed to become wet.
- Concrete pavement should have a minimum 28 day compressive strength of 3,000 psi. Concrete slumps should be from 3 to 4 inches. The concrete should be properly cured in accordance with PCA recommended procedures and vehicular

traffic should not be allowed for 3 days (automobile traffic) or 7 days (truck traffic).

- To help offset plastic shrinkage, concrete pavement may be reinforced with at least No. 3 bars, 24 inches on-center, each way or 6x6-W2.0xW2.0 wire mesh (located 1/3 of the slab thickness from the top of the slab).
- Construction joint spacing in feet should not exceed twice the slab thickness in inches, e.g., 12x12 ft. for a 6-inch slab thickness, with a maximum spacing of 15 feet. Layout joints to form square panels. When not practical, rectangular panels can be designed if the long dimension is no more than 1.5 times the short.
- Control joints should have a depth of at least one-forth the slab thickness, e.g., 1 inch for a 4 inch slab.
- Isolation (expansion) joints should extend the full depth of the slab and should be used only to isolate fixed objects abutting or within paved areas.
- Thickened edges should be used along outside edges of concrete pavements. Edge thickness should be at least 2 inches greater than the concrete pavement thickness and taper to the actual concrete pavement thickness 36 inches inward from the edge. Integral curbs may be used in lieu of thickened edges.

If the subgrade soils are stabilized with lime (as discussed in Section 7.8), the PCC pavement sections presented above could be reduced. If this option is considered, our firm can provide supplemental recommendations, upon request.

7.10 Site Drainage

The ground surface should slope away from building pad, equipment pad and pavement areas toward appropriate drop inlets or other surface drainage devices with positive grades maintained for the life of the project. Landscaping after construction should not promote ponding of water adjacent the structures. Roof draining should be installed with appropriate downspout extensions outfalling on splash blocks so that water is directed a minimum of 5 feet horizontally away from the structures.

7.11 Erosion Control

Local soil characteristics, vegetative cover, topographic relief, and the frequency and intensity of rainfall and wind largely impact the potential for soil erosion. Removal of vegetation and/or disturbance to surficial soil by construction activities may result in local increases of erosion rates in unprotected areas. As a result, sedimentation may increase in local drainages at site perimeters and slope intersections. Uncontrolled diversion of storm water runoff from the site to unlined drainage channels could result in erosion of the drainage channels due to concentrated flow. This is particularly true during and immediately following site grading.

Site development normally increases the amount of impervious area, thus increasing the volume of storm water runoff.

To reduce soil erosion and sediment transport, protective material such as gravel, crushed stone, pavement, erosion-resistant vegetation, and other effective erosion control material, i.e., jute netting or geotextile erosion control mats, should be used to stabilize exposed soil. Slopes should be provided with temporary drainage and erosion control measures during construction until permanent measures can be installed. Storm water runoff from construction areas should be conveyed to temporary diked detention areas for sediment deposition, then discharged to the existing natural drainage courses with velocities slow enough to prevent further erosion in the drainage courses. Sediment retention structures such as sediment basins, sediment traps, or silt fences should be used to keep eroded material on the site. Straw bales, used along, or in combination with geotextiles, can be effective sediment retention structures when properly installed and maintained.

7.12 Dynamic Soil Properties

As requested, the following presents dynamic soil properties for use in evaluating foundations for vibrating machinery.

The use of measured shear wave velocities (Vs) is generally the most reliable means of evaluating the in situ value for maximum shear modulus (G_{max}) based on the following equation:

$$G_{max} = \rho(Vs)^2$$

Average measured shear wave velocities obtained at CPT-2 and CPT-7 are presented in on Plates B-44 and B-47 in Appendix B. Based on our data obtained, average mass soil densities (ρ) of 3.73 and 3.98 lb.-sec^2/ft.^{4} for soil located above and below groundwater, respectively, may be used in the above equation. The maximum shear modulus can also be estimated based on various empirical relationships (Hardin (1978), Jamiolkowski et al. (1991), Seed et at. (1984), Weiler (1988), Seed and Idriss (1970)) that incorporate the soil overconsolidation ratio (OCR), void ratio (e), and plasticity index (PI). Estimated average values for these soil properties are presented below. Average estimated soil values for modulus of elasticity (Young's modulus) and Poisson's ratio are presented in Section 7.3.2.

Subgrade Condition	OCR	Void Ration (e)	Plasticity Index (PI)
Hard Clay	8	0.65	29
Very Stiff Clay	4	0.65	15
Stiff Clay	1	0.75	15
Sand	1	0.55	0

The damping behavior of soil has been found to be strongly influenced by the plasticity characteristics and overconsolidation ratio (OCR) of the soil (Kokushu et al. (1982), Dobry and Vucetic (1987), Sun et al. (1988). Damping ratios of highly plastic soils are lower than those of low plasticity soils at the same cyclic strain amplitude. The figure (after Vucetic and Dobry (1991)) presented on Plate 6 shows a variation of damping ratio of fine-grained soils with cyclic shear strain amplitude and plasticity index. The damping curves presented can be applied to both fine- and coarse-grained soils. The damping behavior of gravel is very similar to that of sand with a PI = 0 (Seed et al.(1984)).

7.13 Corrosion Potential

The results of pH, resistivity, sulfate and chloride tests are summarized below and presented in Appendix C. The tests were performed on soil samples obtained from the locations and depths shown on the following table:

Sample	Water Soluble Sulfates (mg/kg)	Water Soluble Chloride (mg/kg)	pH	Minimum Resistivity (ohm-cms
B-8, 9,10 – 1 ft.	110	160	7.9	1,450
B-15, 19 – 5 ft.	100	110	7.7	989

The ACI Manual of Concrete Practice, Section 201.2R-92, recommends using a Type II cement for foundations placed in these soils. In accordance with California Test 532; "if the chloride concentration is determined to be less than 500 ppm," "the influence of the chloride-ion at this level is considered to be non-corrosive." A commonly accepted correlation between soil minimum resistivity and corrosivity towards ferrous metals is provided below:

Soil Resistivity	Corrosivity
0 to 1,000 ohm-cm	Severely corrosive
1,000 to 2,000 ohm-cm	Corrosive
2,000 to 10,000 ohm-cm	Moderately corrosive
Over 10,000 ohm-cm	Mildly corrosive

Kleinfelder has performed these soil corrosivity tests as requested by the client. These tests are only an indicator of soil corrosivity. A competent corrosion engineer should be retained to design corrosion protection systems appropriate for the project.

7.13.1 Soil Resistivity Results

Nine soil resistivity surveys were performed using a Wenner 4-Pin method at approximate locations shown on Plate 2. A summary of our survey results is presented below:

Test Number	Boring/ Station Numbers	Probe Spacing (feet)	Layer Depth (feet)	Resistivity of Layer (ohms-cms)	Resistivity Surface to Layer Bottom (ohms-cms)
R-1	B-20 N-S	5	0-5	9,575	9,575
		10	5-10	6,654	7,852
		20	10-20	2,363	5,745
		30	20-30	1,135	6,549
R-2	CPT-10 E-W	5	0-5	1,819	1,819
		10	5-10	2,021	1,915
		20	10-20	443	996
		30	20-30	235	1,494
R-3	B-12 N-S	5	0-5	622	622
		10	5-10	1,137	804
		20	10-20	9,505	5,975
		30	20-30	4,356	8,962
R-4	B-18 N-S	5	0-5	9,093	9,093
		10	5-10	4,708	6,204
		20	10-20	-	-
		30	20-30	-	-
R-5	CPT-7 N-S	5	0-5	1,053	1,053
		10	5-10	234	383
		20	10-20	-	-
		30	20-30	-	-
R-6	B-9 E-W	5	0-5	881	881
		10	5-10	-	-
		20	10-20	-	-
		30	20-30	-	-
R-7	CPT-16 N-S	5	0-5	1,627	1,627
		10	5-10	-	-
		20	10-20	-	-
		30	20-30	-	-
R-8	CPT-15 N-S	5	0-5	1,053	1,053
		10	5-10	910	977
		20	10-20	-	-
		30	20-30	-	-
R-9	CPT-2 N-S	5	0-5	958	958
		10	5-10	1,269	1,092
		20	10-20	-	-
		30	20-30	-	-

7.14 General Earthwork

The following subsections present general criteria for site earthwork. Previous sections should be reviewed for supplemental earthwork recommendations.

7.14.1 Site Stripping

Prior to general site grading, surface vegetation, organic topsoil and any debris should be removed and disposed of outside the construction limits. The remaining roots can be disced into the surface during subgrade preparation provided the organic content of the soil (as determined by loss-on-ignition tests) does not exceed 5 percent by weight. Deep stripping may be required where concentrations of organic soils or tree roots are encountered during site grading. The depth of stripping should be determined in the field by a representative of our firm prior to earthwork. Stripped topsoil (less any debris) may be stockpiled and reused for landscape purposes. This material, however, should not be incorporated into any engineered fill.

Although not encountered or identified during our investigation, it is possible buried objects, such as abandoned utility lines, septic tanks, cesspools, wells, foundations, etc., may exist on site. If encountered within the area of construction, these items should be removed and disposed of off-site. Existing wells should be abandoned in accordance with applicable regulatory requirements. Existing utility pipelines that extend beyond the limits of the proposed construction and will be abandoned in-place should be plugged with cement grout to prevent migration of soil and/or water. All excavations resulting from removal activities should be cleaned of loose or disturbed material and dish-shaped with sides sloped 3(h):1(v) or flatter to permit access for compaction equipment.

7.14.2 Subgrade Preparation

Previous sections should be reviewed for specific recommendations related to expansive soils, foundations, retaining walls and pavements. All areas not addressed by these specific recommendations that will to receive engineered fill or to be used for the future support of structures should be scarified to a depth of at least 6 inches, uniformly moisture-conditioned to between 3 and 5 percentage points above the optimum moisture content, and compacted as engineered fill to between 90 and 95 percent relative compaction. Within pavement areas, the scarified subgrade should be compacted to at least 95 percent relative compaction.

In-place scarification and compaction may not be adequate to densify all disturbed soil within areas grubbed or otherwise disturbed below a depth of about 6 inches. Therefore, overexcavation of disturbed soil, scarification and compaction of the exposed subgrade, and replacement with engineered fill may be required to sufficiently densify all disturbed soil.

7.14.3 Storage and Evaporation Ponds

Based on our project understanding, we anticipate that the upper and lower portions of the proposed pond embankments will be constructed by cut and engineered fill. The results of our static and pseudo-static analysis indicates that provided these slopes do not exceed an inclination of 2(h):1(v) they should remain stable under all loading conditions. Some displacement or movement, however, should be anticipated in the event of significant seismic ground shaking. This movement is expected to be shallow seated, requiring limited clean-up and dressing to restore the slopes to original condition. If this condition is unacceptable, the slopes should be flattened. Fill slopes should be constructed by overfilling and trimming back to provide a firm, well compacted slope face. As an alternative, the fill sloped could be track-walked with a sheep's foot compactor until a firm soil condition is achieved.

Although no laboratory testing was performed to evaluate the permeability of the native clays or the suitability of the soils for use in constructing soil liners, based on our previous experience the native clays should be suitable for this use. When compacted, the permeability of these soils often exhibits permeability characteristics of $1x10^{-7}$ cm/sec or slower. If clay liners are constructed, laboratory tests should be performed during the initial stages of site earthwork to confirm the permeability of the in-place soils and provide supplemental adjustments to the liner if necessary.

As previously discussed, the native clays are moderately plastic and when exposed may exhibit significant shrinking and cracking during warm weather conditions. Although this condition should not reduce the gross performance of the ponds, when the ponds are again filled these cracks will become filled with water which may lead to development of hydrostatic pressures, a softening of the surficial soils, and subsequently accelerated sloughing or erosion of the embankments. Furthermore, the permeability or "water-holding" capacity of the ponds could be effected for a period of time. Maintenance of the embankments and pond liners (if constructed) can be reduced by either overlying the clays with a 12 to 18 inch layer of low plasticity silt or sand to reduce moisture fluctuations or by reducing the plasticity of the clays by intermixing or blending the soils with a low plasticity soil. If blending is considered, laboratory tests should be performed to evaluate the permeability of the mixed soil. If requested, Kleinfelder can provide additional criteria for either of these alternatives.

7.14.4 Temporary Excavations

Construction site safety generally is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. The Contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, and/or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations). Flatter slopes and/or trench shields may be required if loose, cohesionless soils and/or water are encountered along the slope face. Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within a lateral distance equal to 1/3 the slope height from the top of any excavation. During wet weather, earthen berms or other methods should be used to prevent runoff water from entering all excavations. All runoff water, seepage and/or groundwater encountered within excavations should be collected and disposed of outside the construction limits.

7.14.5 Fill Materials

The native soils encountered in our borings, minus organics, debris and/or other deleterious materials, should be suitable for use as engineered fill in proposed building areas. However, the native clays are also considered potentially expansive and should be addresses as discussed in Section 7.2 - Expansive Clays.

All import fill soils should be nearly-free of organic or other deleterious debris, essentially non-plastic, and less than 3 inches in maximum dimension. In general, well-graded mixtures of gravel, sand, non-plastic silt, and small quantities of cobbles, rock fragments, and/or clay are acceptable for use as import fill. Specific requirements for import fill are provided below.

Gradation (ASTM C136)	
Sieve Size	**Percent Passing**
3-inch	100
No. 4	50 – 100
No. 200	15 – 70
Plasticity (ASTM D4318)	
Liquid Limit	**Plasticity Index**
Less than 30	Less than 12
Organic Content (ASTM D2974)	
Less than 3 percent	

All imported fill materials to be used for engineered fill should be sampled and tested by the project Geotechnical Engineer prior to being transported to the site.

Trench backfill and bedding placed within existing or future county right-of-ways should meet or exceed the requirements outlined in the current county specifications. Trench backfill or bedding placed outside existing or future right-of-ways could consist of native or imported soil which meets the requirements for fill material provided above. However, coarse-grained sand and/or gravel should be avoided for pipe bedding or trench zone backfill unless the material is fully enclosed in a geotextile filter fabric, such as Mirafi 140N or an equivalent substitute. In a very moist or saturated condition, fine grained soil can migrate into the coarse sand or gravel voids and cause "loss of ground" or differential settlement along and/or adjacent the trenches; thereby leading to pipe joint displacement and pavement distress. Consideration should be given to using watertight joints where pipes and culverts are placed below groundwater and in highly erodible soils, i.e., silty sands and silts.

Where access for compaction testing in deep trenching operations is limited by trench stability, safety, and other access concerns, a cement slurry backfill or controlled low strength material may be used for backfill as long as adequate pipe anchoring measures to prevent pipe floating is employed. The slurry should be adequately vibrated into position under the spring line of the pipe.

Utility trenches backfilled with sand or other permeable material can act as a conduit for exterior surface water to enter below structures. Accordingly, native clayey soils or lean concrete should be used as backfill for a minimum lateral distance of 2 feet on each side of the exterior building line to act as a "plug."

Trench backfill recommendations provided above should be considered minimum requirements only. More stringent material specifications may be required to fulfill bedding requirements for specific types of pipe. The project Civil Engineer should develop these material specifications based on planned pipe types, bedding conditions, and other factors beyond the scope of this study.

7.14.6 Engineered Fill

All fill soils, either native or imported, required to bring the site to final grade should be compacted as engineered fill. Engineered fill composed of potentially expansive clay should be uniformly moisture-conditioned to between 3 and 5 percentage points above the optimum moisture content, placed in horizontal lifts less than 8 inches in loose thickness, and compacted to between 90 and 95 percent of the maximum dry density as determined by ASTM Test Method D 1557[5]. Engineered fill composed of cohesive and non-expansive sands, silts and import fill should be uniformly moisture-conditioned to between 1 and 4 percentage points above the optimum moisture content, placed in horizontal lifts less than 8 inches in loose thickness, and compacted to at least 90 percent of the maximum dry density. Additional fill lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable. Disking and/or blending may be required to uniformly moisture-condition soils used for engineered fill.

The upper 6 inches of subgrade soils in pavement areas should be uniformly moisture-conditioned to between 2 and 4 percentage points above the optimum moisture content and compacted to at least 95 percent relative compaction.

All trench backfill in building or other structural areas should be placed and compacted in accordance with recommendations provided above for engineered fill. During backfill, mechanical compaction of engineered fill is recommended. Jetting may be performed on trench backfill placed outside the structural areas provided sufficient time is set aside to allow consolidation to occur. Field density tests should be performed to document the compaction achieved. However, relative compaction values below the level required for engineered fill should be anticipated and allowed provided the trench backfill is not exhibiting settlement. In other words, a performance criterion is often used for jetted trenches versus a minimum level of relative compaction.

[5] *This test procedure should be used wherever relative compaction, maximum dry density, or optimum moisture content is referenced within this report.*

7.14.7 Unstable Subgrade Conditions

Based on our findings and historical records, groundwater levels are not anticipated to rise near-surface or impede grading operations at the site. However, if site grading is performed during or following extended periods of rainfall, the moisture content of the near-surface soils may be significantly above optimum. This condition, if encountered, could seriously delay grading by causing an unstable subgrade condition. Typical remedial measures include discing and aerating the soils during dry weather; mixing the soil with dryer materials; removing and replacing the soils with an approved fill material; stabilization with a geotextile fabric or grid; or mixing the soil with an approved hydrating agent, such as a lime or cement product. Our firm should be consulted prior to implementing any remedial measure to observe the unstable subgrade condition and provide site specific recommendations.

7.15 Seismic Hazards

Per the UBC and CBC requirements, the following discusses potential seismic and related geologic hazards that could potentially impact development of the project site. The hazards considered include: seismically induced surface fault rupture, liquefaction, and strong ground shaking. In addition, UBC and CBC seismic parameters are presented for project design.

7.15.1 Fault Rupture

Earthquakes are caused by the sudden displacement of earth along faults with a consequent release of stored strain energy. The fault slippage can often extend to the ground surface where it is manifested by sudden and abrupt relative ground displacement. Damage resulting from fault rupture occurs only where structures are located astride the fault traces that move. The subject site is not located within, nor is it adjacent to any Fault-Rupture Hazard Zones (formerly Alquist-Priolo Special Studies Zones) (Hart, 1990). The closest known active fault to the site is the Greenville fault, located about 14-km to the southwest.

7.15.2 Seismic Shaking

Probabilistic modeling procedures were used to estimate the peak ground accelerations corresponding to the Upper Bound Earthquake (UBE) and the Design Basis Earthquake (DBE). As defined in the 1998 CBC, the UBE is defined as the ground motion that has a 10 percent probability of being exceeded in 100 years (return period of about 950 years). The DBE is defined as the ground motion that has a 10 percent probability of being exceeded in 50 years (return period of about 475 years).

The probabilistic analysis approach is based on the characteristics of the earthquake and of the causative fault associated with the earthquake. These characteristics include such items as magnitude of the earthquake, distance from the site to the causative fault, length, and activity of the fault. The effects of site soil conditions and mechanism of faulting are accounted for in the attenuation relationship. The theory behind the seismic risk analysis has been developed over many years (Cornell, 1968, 1971; Merz and Cornell 1973) and is based on the "total probability theorem" and on the assumption that earthquakes are events that are independent of time and space from one another. According to this approach, the probability of exceeding PE(Z) at a given level of ground motion, Z, at the site within a specified time period, T, is given by

$$PE(Z) = 1 - e^{\vartheta(Z)T}$$

where $\vartheta(Z)$ is the mean annual rate of exceedence of ground motion level Z. Different probabilities of exceedence may be selected, depending on the level of performance required.

The attenuation relationship provides mean values of ground motions associated with a set of parameters that can include, in all or in part, magnitude, distance, site soil conditions, and mechanism of faulting. The uncertainty in the predicted ground motion is taken into consideration by including a magnitude dependent standard error in the probabilistic analysis. Many attenuation relationships have been developed to estimate the variation of peak ground surface acceleration. Of these relationships, we have selected the relationship presented by Boore et al. (1994, 1997) because it was developed from statistical analyses of recorded earthquakes from Western North America, including the records from the 1989 Loma Prieta earthquake and 1992 Landers earthquake, and its wide acceptance by seismologists. Furthermore, this relationship has been used in developing recent National Seismic Hazard Maps (Frankel et al., 1996) for the State of California. This relationship also incorporates an estimated average shear wave velocity (Vs) of the subsurface profile. For our evaluation, we have used a Vs value of 310 m/s as suggested by Boore et al. (1997) for typical alluvial soils.

The estimated peak horizontal ground accelerations (in units of gravity) calculated using the method discussed above for the DBE and UBE, as well as the corresponding return period and annual probability of occurrence, are presented below.

Event	Return Period	Probability of Occurrence	Annual Probability of exceedence	Peak Horizontal Acceleration (g)
DBE	475	10% in 50 years	0.0021	0.50
UBE	950	10% in 100 years	0.0011	0.62

7.15.3 Liquefaction

A common secondary hazard as a result of strong ground shaking is the potential for soil liquefaction and subsidence. Liquefaction describes a phenomenon in which saturated soil loses shear strength and deforms as a result of increased pore water pressure induced by strong ground shaking during an earthquake. Dissipation of the excess pore pressures will produce volume changes within the liquefied soil layer, which can manifest at the ground surface as settlement of structures, floating of buried structures, and failure of retaining walls. Factors known to influence liquefaction include soil type, grain size, relative density, confining pressure, depth to groundwater, and the intensity and duration of ground shaking. Soils most susceptible to liquefaction are saturated, loose sandy soils.

The potential for an earthquake with the intensity and duration characteristics capable of promoting liquefaction is a possibility during the design life of the project. However, a large majority of the subsurface soils encountered below groundwater during our investigation are generally high in clay content and/or relatively dense and subsequently not susceptible to liquefaction. However, the results of our CPT exploration show that relatively thin (about 1 to 2 feet thick) isolated strata of loose to medium dense silty, clayey, and "clean" sand underlie the site at various depths below groundwater. Results of our evaluation (Seed, 1985), as updated by the NCEER Liquefaction Workshop expert panel (Youd, et al., 1998), indicate that these sand strata may have a potential for liquefaction in the event of strong ground shaking. Other sand strata encountered appear to be relatively dense and not susceptible to liquefaction. The data obtained from the hollow-stem auger borings was not used in our liquefaction analysis since the N-value results are often considered unreliable for liquefaction analysis. Hydrostatic pressures tend to develop at the bottom of the borehole that often cause boiling and an artificial loosening of sands below groundwater.

Using empirical procedures developed by Tokimatsu and Seed (1987), we estimate that seismically induced settlement at the top of the liquefiable sand layers should be 1/2 inch or less combined. This settlement is not expected to be widespread since the potentially liquefiable sand layers appear to be discontinuous and confined. Localized differential settlement can be assumed to be on the order of one-half to two-thirds the total settlement. Furthermore, ground surface settlements should be significantly less due to bridging effects within the overlying very stiff to hard clay. Settlement of this magnitude typically does not present a concern from a structural and performance standpoint. However, if this settlement presents a consideration, our firm should be consulted to provide supplemental recommendations.

7.15.4 Site Characterization

Based on the results of our field investigation, the project site is underlain by at least 100 feet of predominately very stiff to hard clay, silt and medium dense to very dense sand to the maximum depth explored in this investigation with an average shear wave velocity (Vs) of 270 meters per second (m/s). Based on this data, we classify the site soil profile for site response as S_2 with a S factor of 1.2 according to Table 16B-J of the 1998 CBC Vol. 2B. The upper 100 feet of soil would also classify as type S_D per Table 16A-J of the 1998 CBC, Vol 2 and UBC. S_D is defined as a soil profile consisting of stiff soil with shear wave velocity between 180 and 360 m/s, or SPT-N of between 15 and 50 blows per foot (bpf), or undrained shear strengths (Su) of between 1000 and 2000 psf for the upper 100 feet (30 meters). The site can also be classified as site Class C according to Boore et al. (1993). Site Class C is defined as a site having an average shear wave velocity between 180 m/s and 360 m/s in the top 30m.

7.15.5 Seismic Design Criteria

According to 1998 California Building Code (CBC) Vol. 2 Figure 16A-2 and §1629A.4, the site lies within Seismic Zone 4 with a Seismic Zone Factor (Z) of 0.4.

In recent years, many modern structures located near the seismic source have been severely damaged or collapsed. The severe damage and/or collapse is attributed to near fault motions that are characterized by energetic unidirectional velocity pulses (Singh 1984, 1985). What makes these motions particularly damaging is the impulse (area under the acceleration time history multiplied by the mass). A structural system that yields during a long duration pulse (impulse loading) may experience very large permanent deformations and/or collapse. The extent of these actions depends on the strength and natural period of the structure and the structure articulation, as well as the amplitude, duration, and shape of the pulse. The near fault pulse type motions can be particularly damaging because they can accumulate inelastic deformations in one direction and their considerations in the near fault conditions should be properly evaluated.

The site lies very close to segment 6 of the Great Valley fault. According to ICBO (1998), the Great Valley fault is not considered for the Near Source factors. However, observations from the past earthquakes have shown that even in a zone of moderate seismic activity, the near source effects should be considered in the structural design of the proposed facility. Structures with strength discontinuities, soft stories, plan irregularities, discontinuous shear walls and ductile moment frames are particularly vulnerable to these type of motions and should either be avoided or properly evaluated.

For a code equivalent lateral force design, procedures from 1998 CBC should be implemented. The Near-Source Factors N_a and N_v in the code proposal are incorporated into the seismic coefficients C_a and C_v which are both used to determine the total design lateral force or shear at the base of the building or structure. The values of these factors depend on the distance of the structure from the fault and the fault type. These factors can be obtained from Tables 16A-Q through 16A-T of 1998 CBC.

Since the Great Valley fault is not considered for the Near Source effects by ICBO (1998), the Greenville fault should be considered as the source for near source motions since it is the closest significant fault. Based on the information presented on Sheet F-17 of ICBO (1998), the Greenville fault is about 14 km from the site. Accordingly to Table 16A-U of 1998 CBC, the Greenville fault is classified as a Seismic Source Type B. As such, per Tables 16A-S and 16A-T of the 1998 CBC, the Near-Source Factors N_a and N_v are 1.0 and 1.0, respectively. Alternatively, consideration should be given to dynamic analyses utilizing site specific response spectra that account for the types of near source effects observed in the recent Northridge, California and Kobe, Japan earthquakes.

8. ADDITIONAL SERVICES

The review of plans and specifications, field observations, and testing by Kleinfelder, Inc. is an integral part of the conclusions and recommendations made in this report. If Kleinfelder, Inc. is not retained for these services, the client agrees to assume Kleinfelder, Inc.'s responsibility for any potential claims that may arise during construction. The actual tests and observations by Kleinfelder, Inc. during construction will vary depending on type of project and soil conditions. The tests and observations would be additional services provided by our firm. The costs for these services are not included in our current fee arrangements.

As a minimum, our construction services should include observation and testing during site preparation, grading and placement of Engineered Fill, and observation of foundation excavations prior to placement of reinforcing steel.

9. LIMITATIONS

1. The conclusions and recommendations of this report are for design purposes for the East Altamont Energy Center project as described in the text of this report. The conclusions and recommendations in this report are invalid if:

    - The assumed structural or grading details change
    - The report is used for adjacent or other property
    - Changes of grades and/or groundwater occur between the issuance of this report and construction
    - Any other change is implemented which materially alters the project from that proposed at the time this report was prepared

2. The conclusions and recommendations in this report are based on the borings, CPT's and test pits excavated for this investigation. It is possible that variations in the soil conditions exist between or beyond the points of exploration, or the groundwater elevation may change, both of which may require additional investigations, consultation, and possible design revisions.

3. We are not corrosion engineers and have not been requested to perform corrosion testing. A competent corrosion engineer should be retained to design corrosion protection systems appropriate for the project.

4. This report was prepared in accordance with the generally accepted standard of practice that existed in Alameda County at the time the report was written. No warranty, express or implied, is made.

5. It is the CLIENT'S responsibility to see that all parties to the project, including the designer, contractor, subcontractor, etc., are made aware of this report in its entirety.

6. This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on site and off site) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify Kleinfelder, Inc. of such intended use. Based on the intended use of the report, Kleinfelder, Inc. may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder, Inc. from any liability resulting from the use of this report by any unauthorized party.

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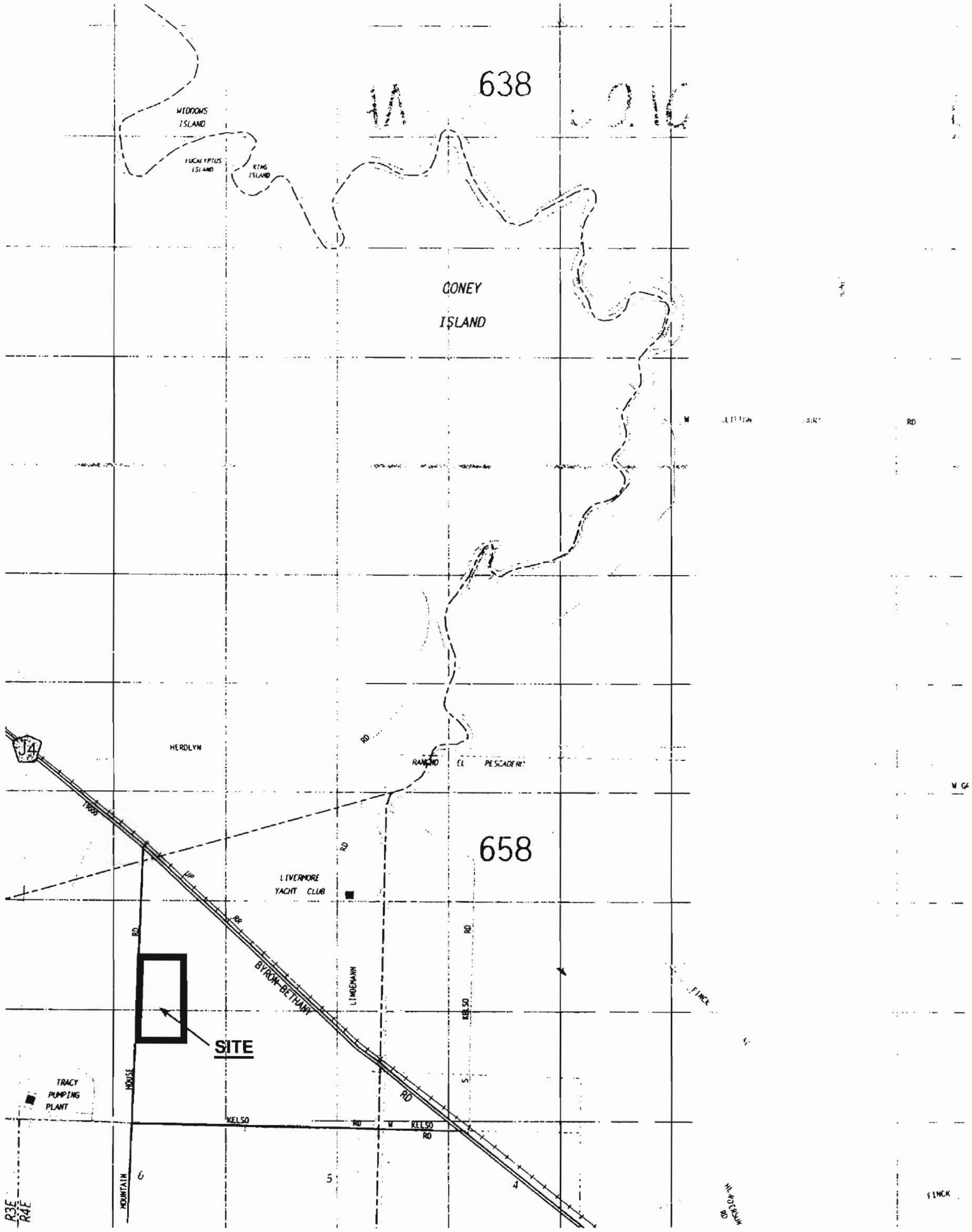


NOT TO SCALE

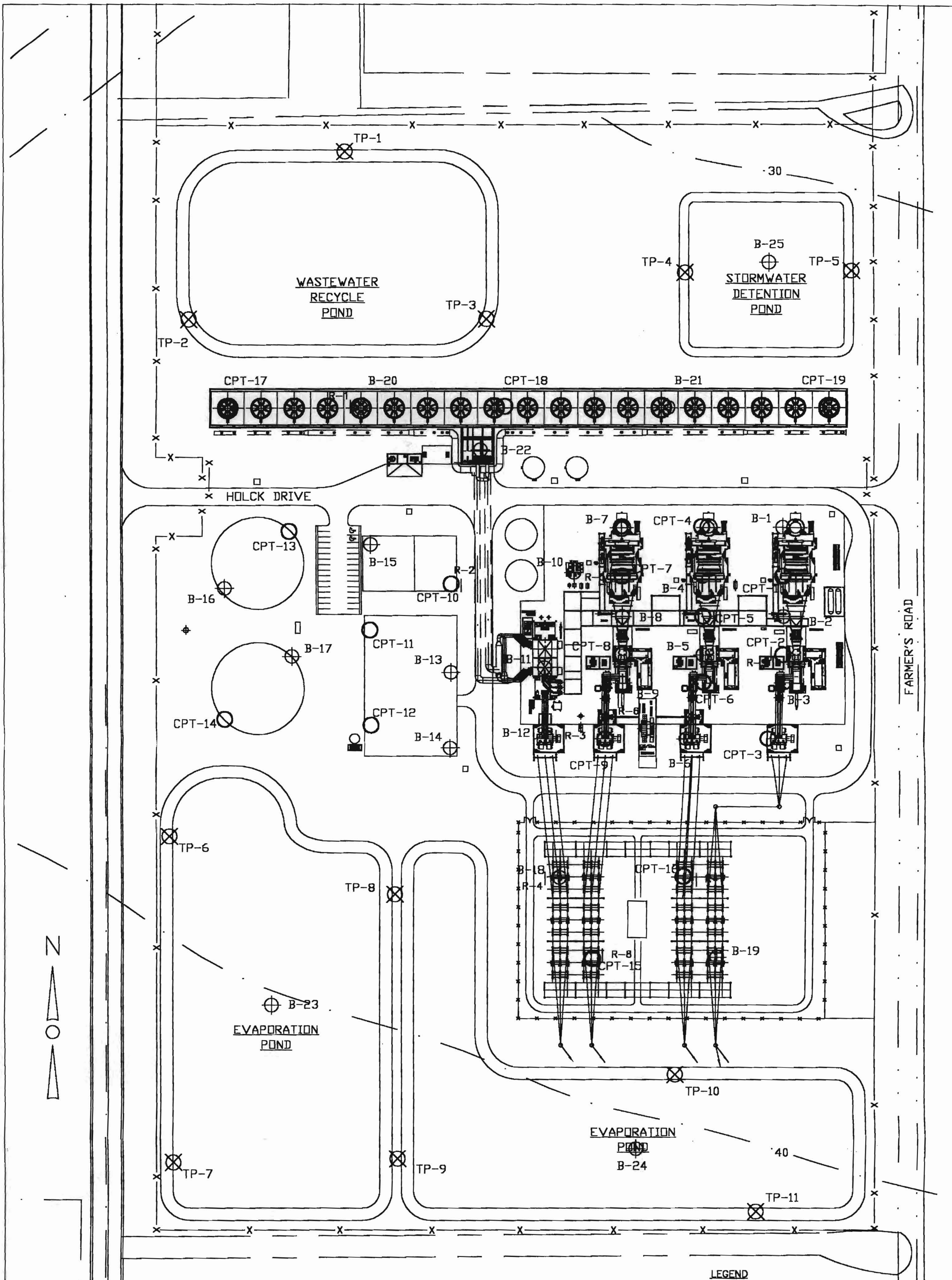
KLEINFELDER

VICINITY MAP
EAST ALTOMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE No.

1

DATE PRODUCED:8/23/2001	DATE REVISED:
PROJ. NO.:20-4561-01	FILENAME:2011D474.FH9



PLAN

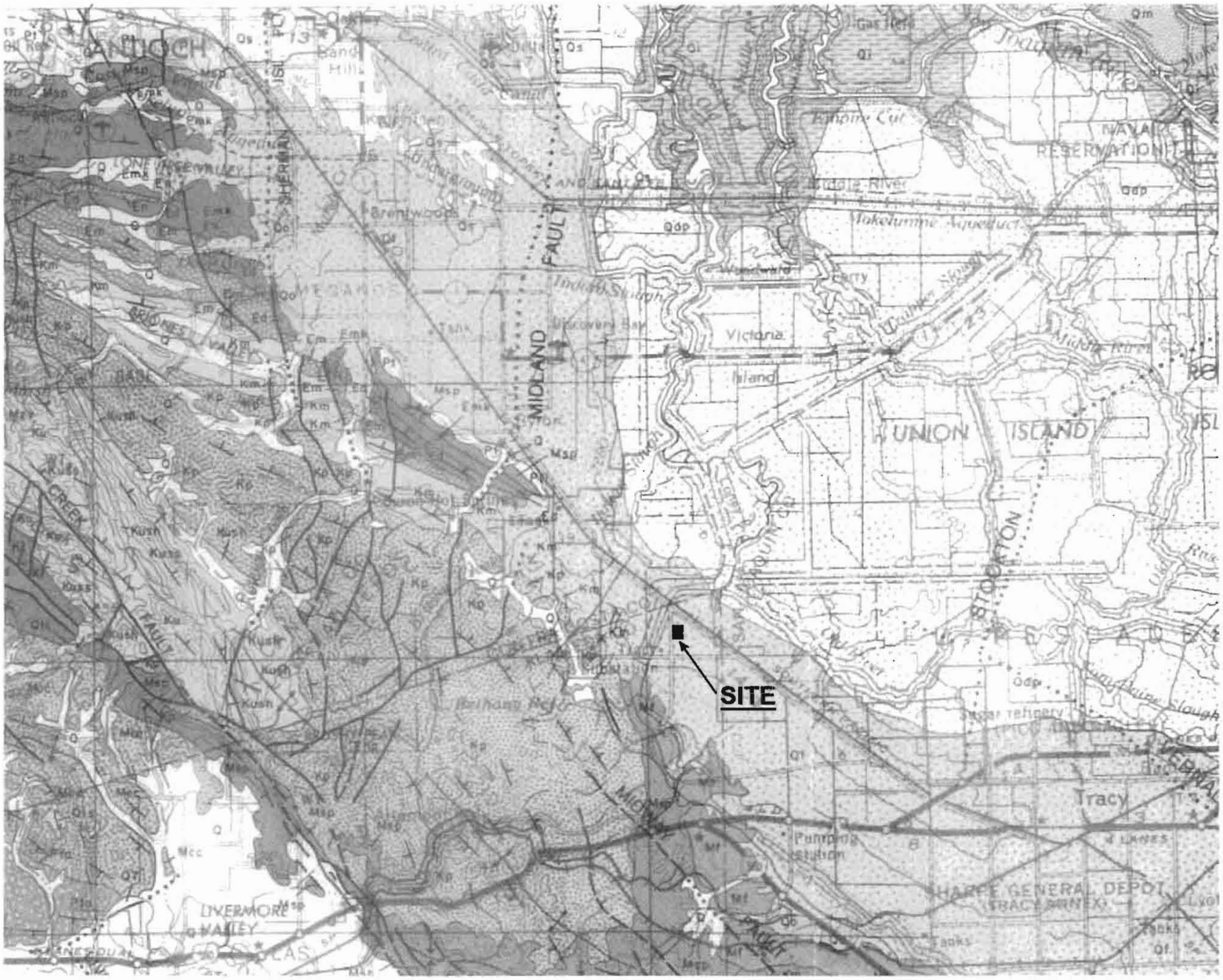
150 0 150 300 450

SCALE IN FEET

LEGEND

- TP-1 DENOTES NUMBER AND LOCATION OF TEST PIT EXCAVATED FOR THIS INVESTIGATION
- B-1 DENOTES NUMBER AND LOCATION OF BORING DRILLED FOR THIS INVESTIGATION
- CPT-1 DENOTES NUMBER AND LOCATION OF CONE PENETROMETER TEST PERFORMED FOR THIS INVESTIGATION
- R-1 DENOTES NUMBER AND LOCATION OF RESISTIVITY LINE RUN FOR THIS INVESTIGATION

KLEINFELDER 2825 EAST MYRTLE STREET STOCKTON, CA 95205-4794	EXPLORATION LOCATION MAP EAST ALTOMONT ENERGY CENTER	DATE PRODUCED:8/22/2001	DATE REVIEWED:	PLATE 2
		PROJ. No.:20-4561-01	FILE NAME:2011D473.CAD	



KEY

Symbol	Description
Qi	Intertidal deposits *(Peaty mud)*
Qdp	Dos Palos Alluvium
Qf	Alluvial fan deposits
Qs	Dune sand
Qo	Older alluvium
Msp	San Pablo Group *(Marine sandstone)*
Mcc	Contra Costa Group *(Nonmarine sedimentary rocks)*
Mf	Fanglomerate
Pt	Tehama Formation *(Sand, silt, and volcaniclastic rocks)*
Emk	Markley Sandstone *(Marine)*
En	Nortonville Shale *(Marine)*
Ed	Domengine Sandstone *(Marine)*
Ku	Upper Cretaceous marine sedimentary rocks
Kuss	Sandstone
Kush	Shale
Kb	Berryessa Formation *(Marine sandstone and shale)*
Kp	Panoche Formation *(Marine sandstone and shale)*

N

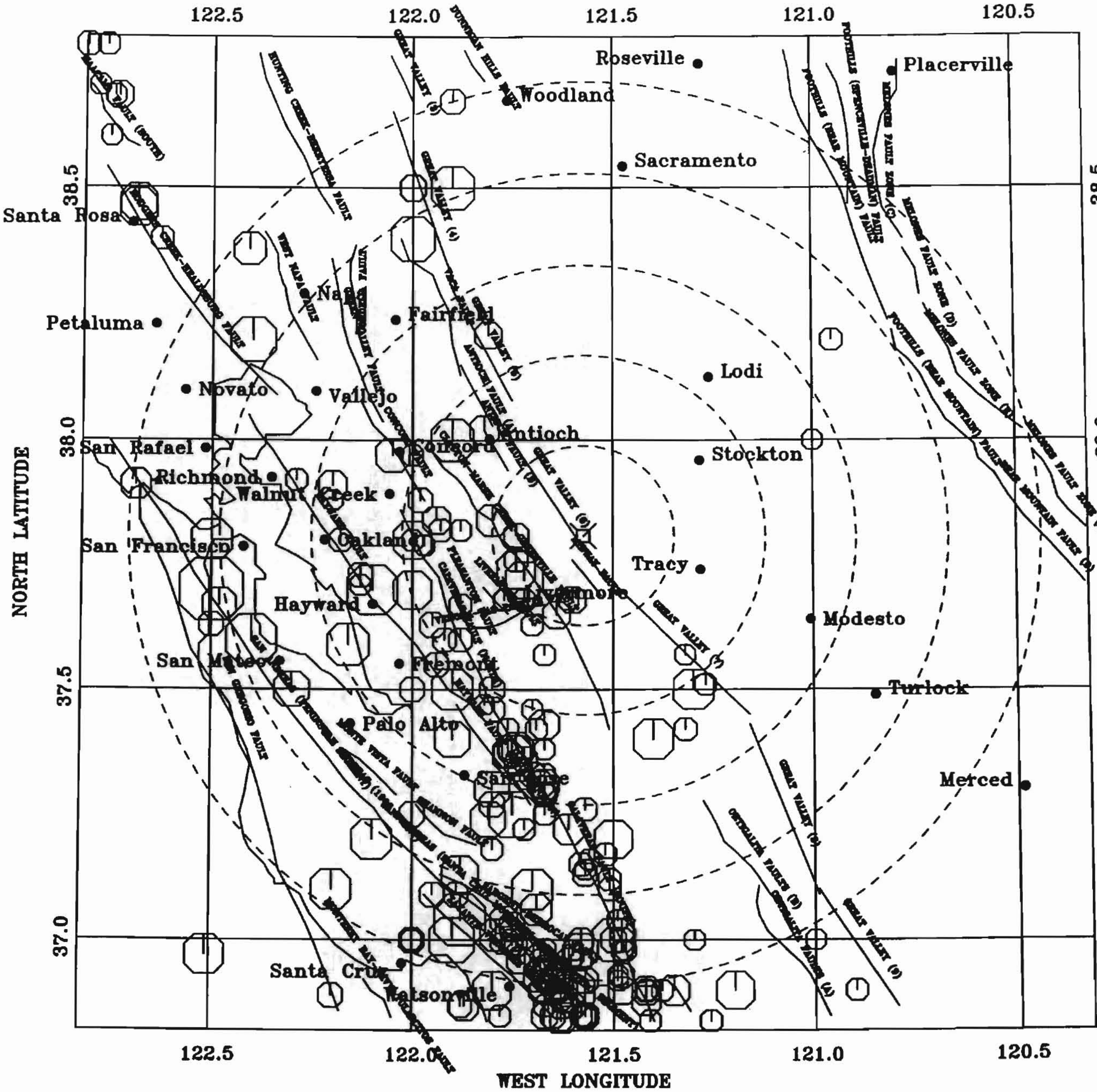
SCALE: 1:125,000

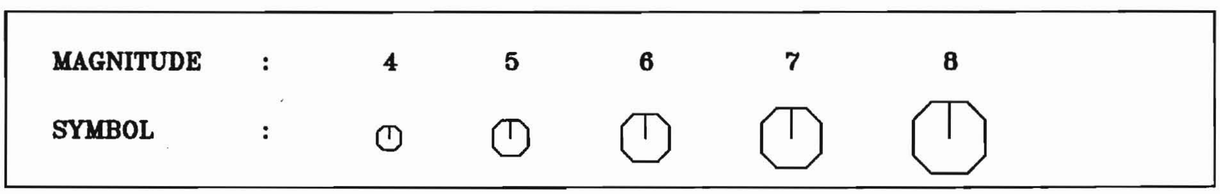
KLEINFELDER

GEOLOGIC MAP
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE NO. 3

DATE PRODUCED:8/23/2001	DATE REVISED:
PROJ. NO.20-4561-01	FILENAME: 2000D475.FH9





FAULT MAP AND EPICENTERS OF EARTHQUAKES

EAST ALTAMONT ENERGY CENTER, ALAMEDA COUNTY, CA

RADIUS OF LARGEST CIRCLE IS 100 KM

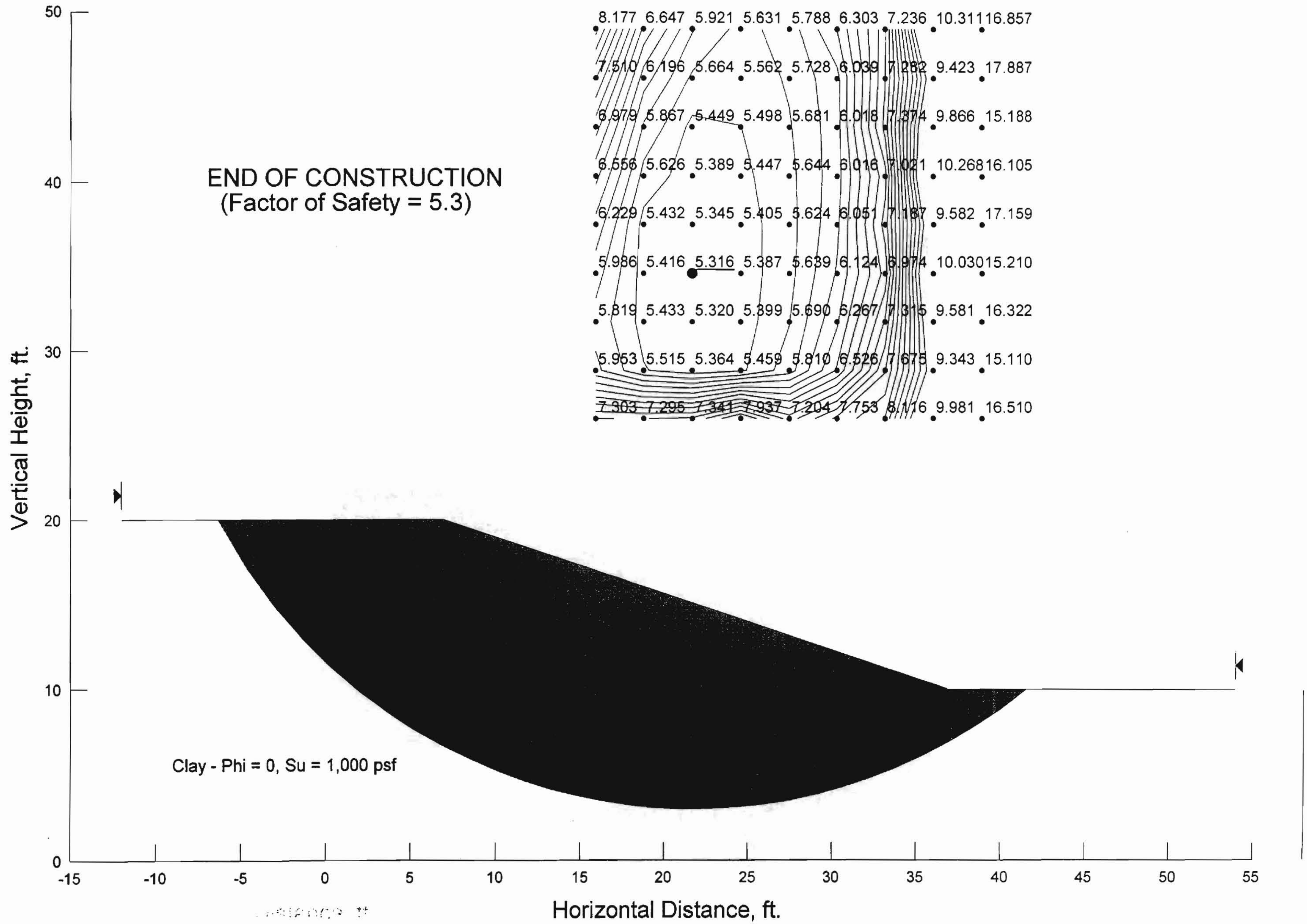
KLEINFELDER

2825 EAST MYRTLE STREET STOCKTON, CA 95205-4794

DATE PRODUCED:8/28/2001	DATE REVIEWED:
PROJ. No.:20-4565-01	FILE NAME:2011D488.CAD

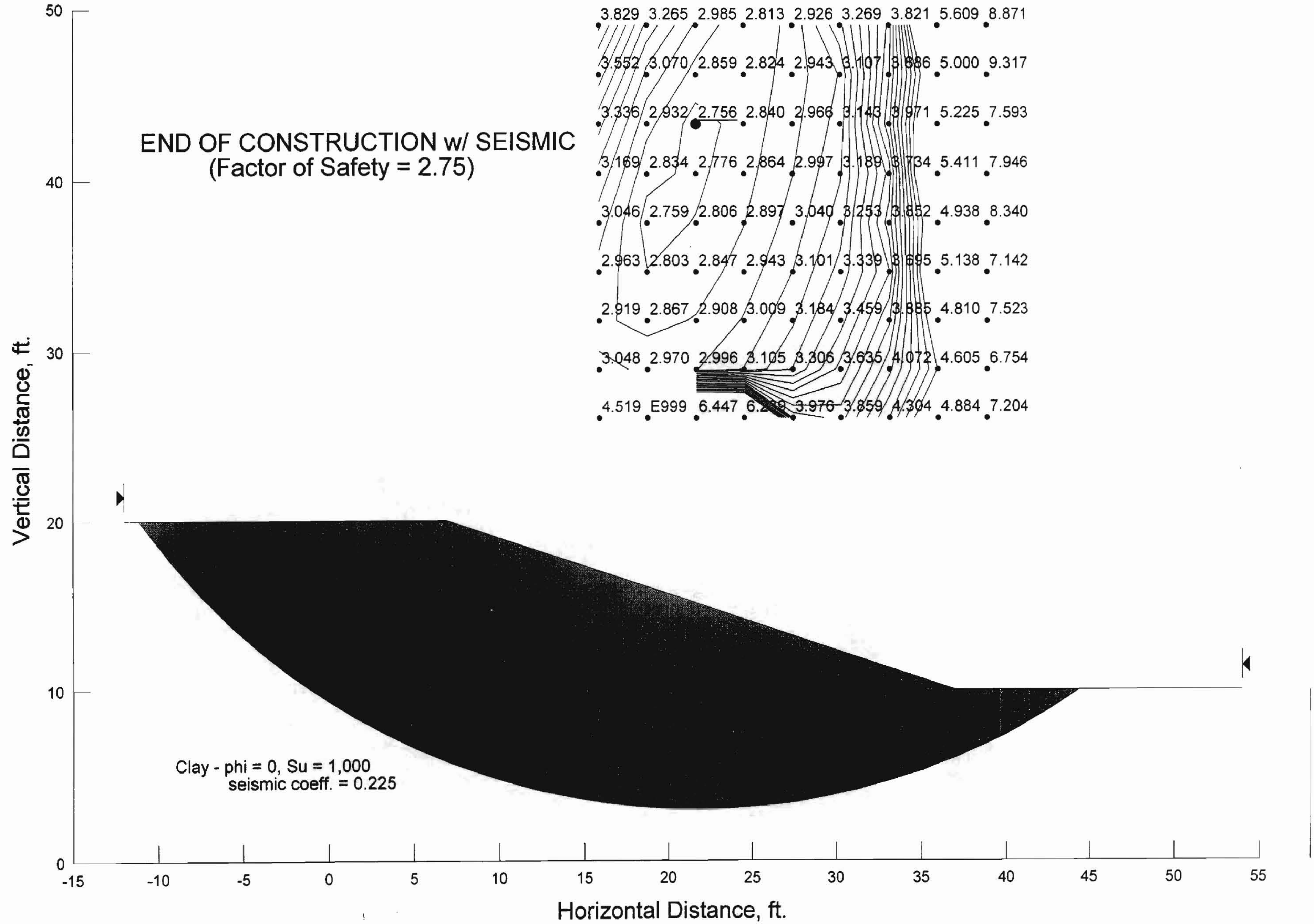
FAULT AND EPICENTER MAP
EAST ALTOMONT ENERGY CENTER

PLATE 4



END OF CONSTRUCTION
(Factor of Safety = 5.3)
8.177 6.647 5.921 5.631 5.788 6.303 7.236 10.311 16.857
7.510 6.196 5.664 5.562 5.728 6.039 7.282 9.423 17.887
6.979 5.867 5.449 5.498 5.681 6.018 7.374 9.866 15.188
6.556 5.626 5.389 5.447 5.644 6.016 7.021 10.268 16.105
6.229 5.432 5.345 5.405 5.624 6.051 7.187 9.582 17.159
5.986 5.416 5.316 5.387 5.639 6.124 6.974 10.030 15.210
5.819 5.433 5.320 5.399 5.690 6.267 7.315 9.581 16.322
5.953 5.515 5.364 5.459 5.810 6.526 7.675 9.343 15.110
7.303 7.295 7.341 7.937 7.204 7.753 8.116 9.981 16.510
Clay - Phi = 0, Su = 1,000 psf
Vertical Height, ft.
Horizontal Distance, ft.

PLATE 5


END OF CONSTRUCTION w/ SEISMIC
(Factor of Safety = 2.75)
3.829 3.265 2.985 2.813 2.926 3.269 3.821 5.609 8.871
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3.336 2.932 2.756 2.840 2.966 3.143 3.971 5.225 7.593
3.169 2.834 2.776 2.864 2.997 3.189 3.734 5.411 7.946
3.046 2.759 2.806 2.897 3.040 3.253 3.852 4.938 8.340
2.963 2.803 2.847 2.943 3.101 3.339 3.695 5.138 7.142
2.919 2.867 2.908 3.009 3.184 3.459 3.885 4.810 7.523
3.048 2.970 2.996 3.105 3.306 3.635 4.072 4.605 6.754
4.519 E999 6.447 6.269 3.976 3.859 4.304 4.884 7.204
Clay - phi = 0, Su = 1,000
seismic coeff. = 0.225
Vertical Distance, ft.
Horizontal Distance, ft.
50
40
30
20
10
0
-15
-10
-5
0
5
10
15
20
25
30
35
40
45
50
55

PLATE 6

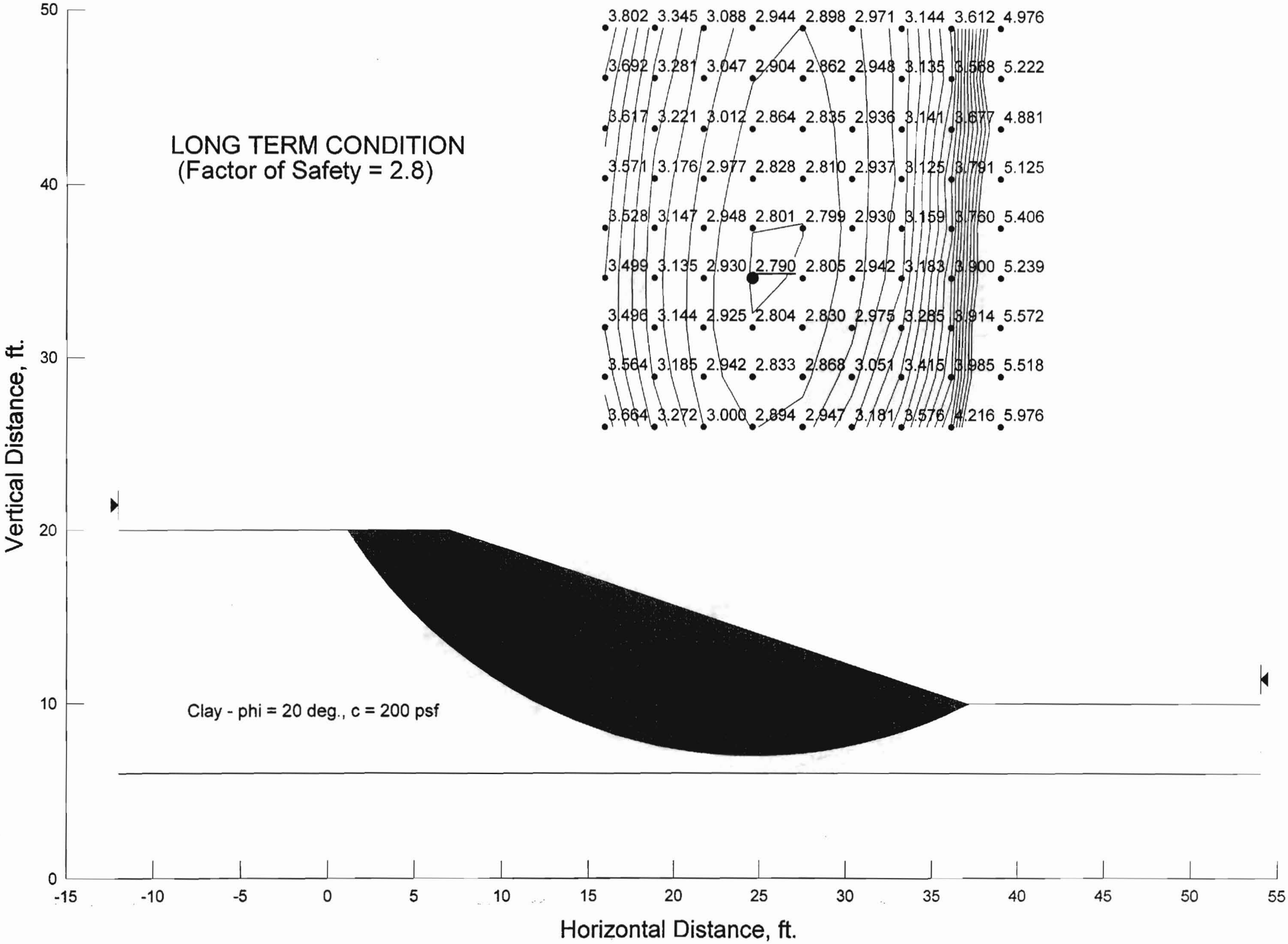
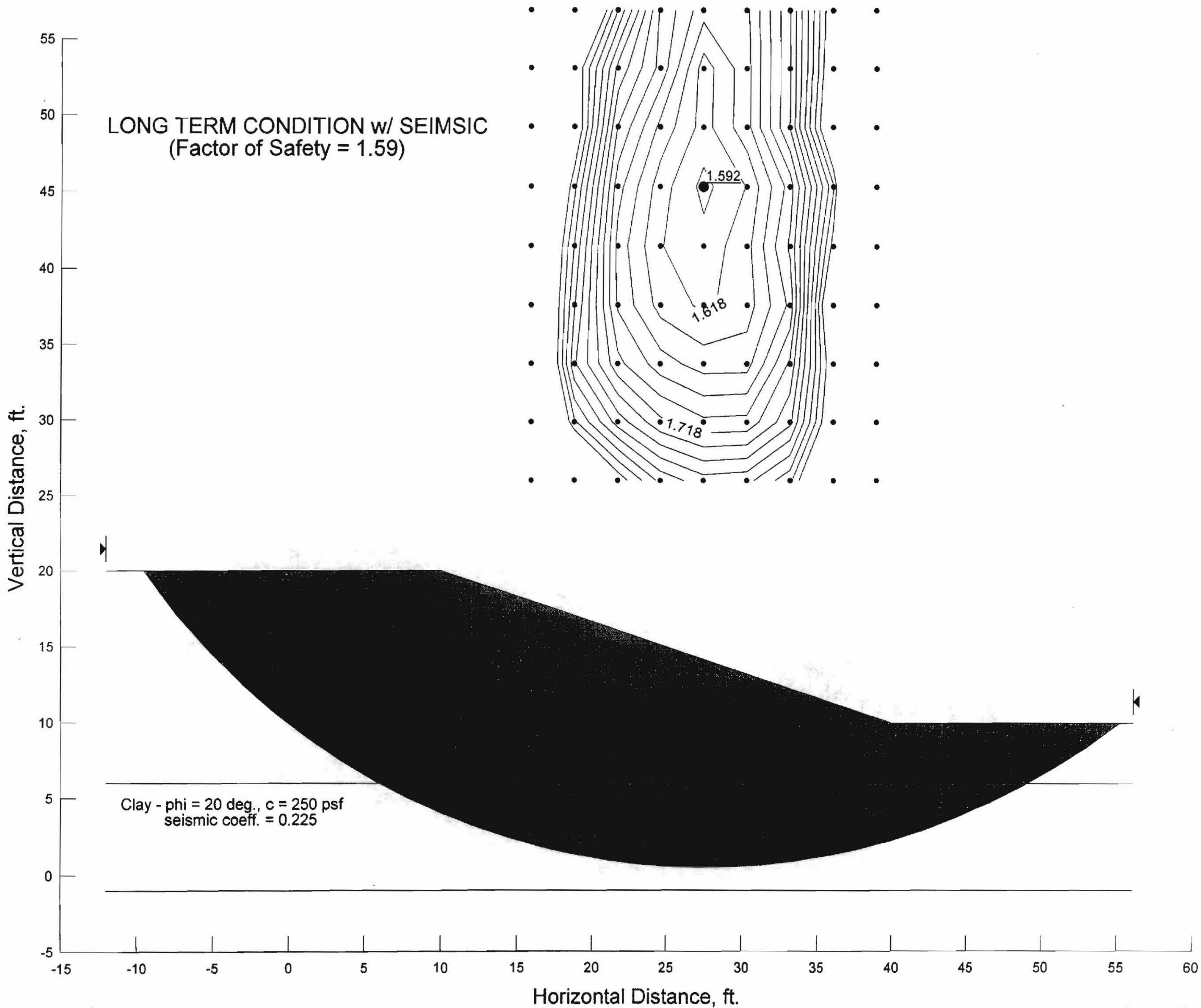
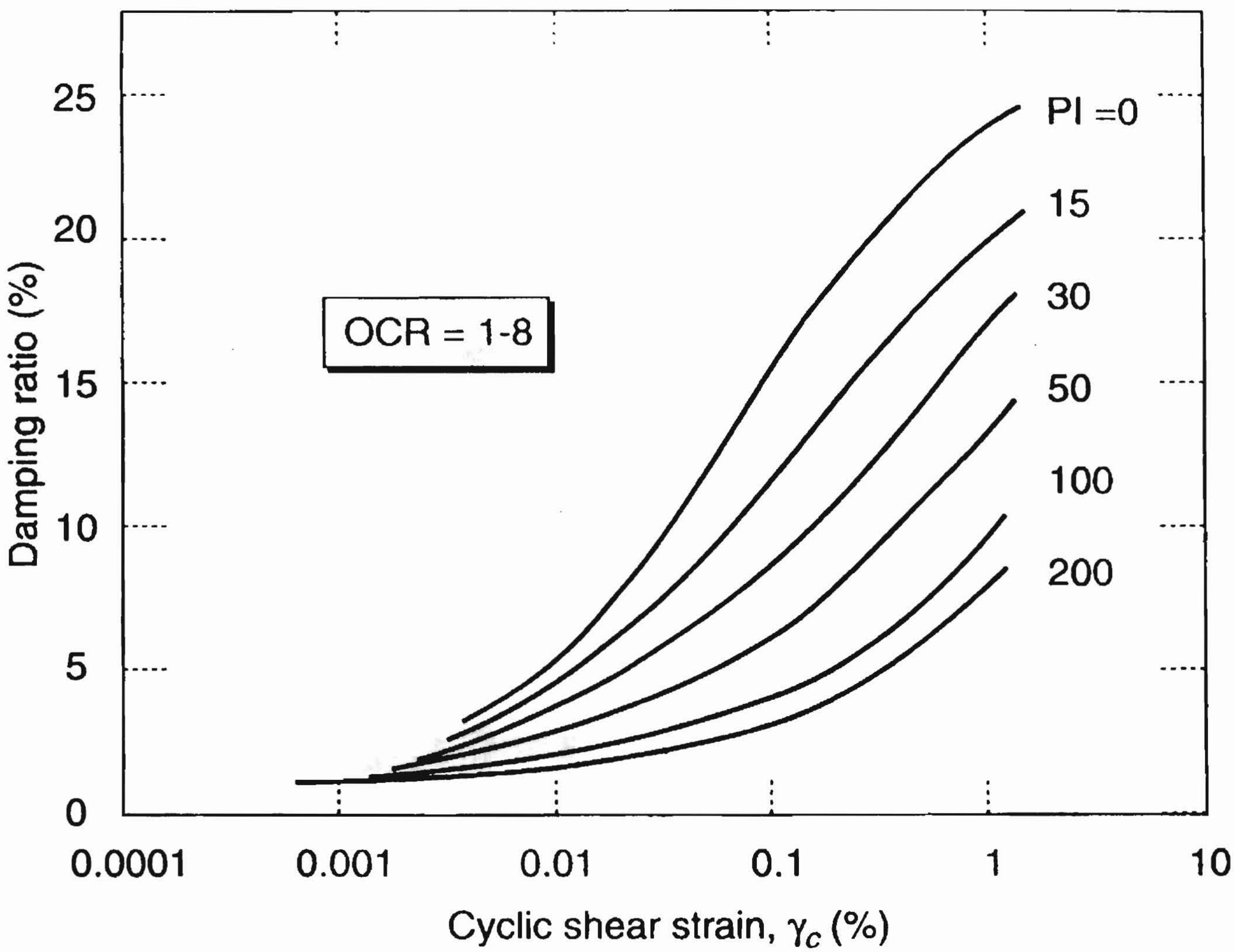

LONG TERM CONDITION
(Factor of Safety = 2.8)
3.802 3.345 3.088 2.944 2.898 2.971 3.144 3.612 4.976
3.692 3.281 3.047 2.904 2.862 2.948 3.135 3.568 5.222
3.617 3.221 3.012 2.864 2.835 2.936 3.141 3.677 4.881
3.571 3.176 2.977 2.828 2.810 2.937 3.125 3.791 5.125
3.528 3.147 2.948 2.801 2.799 2.930 3.159 3.760 5.406
3.499 3.135 2.930 2.790 2.805 2.942 3.183 3.900 5.239
3.496 3.144 2.925 2.804 2.830 2.975 3.285 3.914 5.572
3.564 3.185 2.942 2.833 2.868 3.051 3.415 3.985 5.518
3.664 3.272 3.000 2.894 2.947 3.181 3.576 4.216 5.976
Clay - phi = 20 deg., c = 200 psf
Vertical Distance, ft.
Horizontal Distance, ft.
0
10
20
30
40
50
-15
-10
-5
0
5
10
15
20
25
30
35
40
45
50
55

PLATE 7



LONG TERM CONDITION w/ SEIMSIC
(Factor of Safety = 1.59)
1.592
1.618
1.718
Clay - phi = 20 deg., c = 250 psf
seismic coeff. = 0.225
Vertical Distance, ft.
Horizontal Distance, ft.
55
50
45
40
35
30
25
20
15
10
5
0
-5
-15
-10
-5
0
5
10
15
20
25
30
35
40
45
50
55
60

PLATE 8



KLEINFELDER	EAST ALTAMONT ENERGY CENTER ALAMEDA COUNTY, CALIFORNIA	PLATE No. 9
DATE PRODUCED:8/29/2001 / DATE REVISED:		
PROJ. NO.:20-4561-01 / FILENAME:SHEAR.FH9		

Appendix A

APPENDIX A
LOGS OF BORINGS AND TEST PITS

LIST OF ATTACHMENTS

The following plates are attached and complete this appendix.

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)		ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY
LOAMS				UNDER USDA SOIL CLASSIFICATION SYSTEM, SOIL OF APPROXIMATELY EQUAL SAND/SILT/CLAY

KLEINFELDER

UNIFIED SOIL CLASSIFICATION SYSTEM
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
A-1

Drafted By: G. Gomez
Date: 10/31/2001
Project No.: 20-4561-01
File Number: 2011G045

KA-USCS 2011G045.GPJ 10/31/01

LOG SYMBOLS

	BULK / BAG SAMPLE	-4	PERCENT FINER THAN THE NO. 4 SIEVE (ASTM Test Method C 136)
	MODIFIED CALIFORNIA SAMPLER (2-1/2 inch outside diameter)	-200	PERCENT FINER THAN THE NO. 200 SIEVE (ASTM Test Method C 117)
	CALIFORNIA SAMPLER (3 inch outside diameter)	LL	LIQUID LIMIT (ASTM Test Method D 4318)
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 inch outside diameter)	PI	PLASTICITY INDEX (ASTM Test Method D 4318)
	CONTINUOUS CORE	EI	EXPANSION INDEX (UBC STANDARD 29-2)
	ROCK CORE	COL	COLLAPSE POTENTIAL
	WATER LEVEL (level where first encountered)	UC	UNCONFINED COMPRESSION (ASTM Test Method D 2166)
	WATER LEVEL (level after completion)		
	SEEPAGE	MC	MOISTURE CONTENT (ASTM Test Method D 2216)

GENERAL NOTES

1. *Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.*
2. *No warranty is provided as to the continuity of soil conditions between individual sample locations.*
3. *Logs represent general soil conditions observed at the point of exploration on the date indicated.*
4. *In general, Unified Soil Classification System designations presented on the logs were evaluated by visual methods only. Therefore, actual designations (based on laboratory tests) may vary.*

KA-LOG_KEY 2011G045.GPJ 10/31/01

KLEINFELDER

Drafted By: G. Gomez | Project No.: 20-4561-01
Date: 10/31/2001 | File Number: 2011G045

LOG KEY

EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE

A-2

Surface Conditions: OPEN FIELD WITH CUT HAY

Groundwater: Groundwater encountered at a depth of approximately 11.3 feet below existing site grade.

Date Completed: 5/9/2001

Logged By: RJO

Total Depth: 71.5 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
0													**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots, low to moderate plasticity
1													Brown
	■	1-1-1	22	>4.5									
	■	1-3-1	20	>4.5	108	14					UC = 5.3 ksf		
4.5													**(CL) SANDY CLAY** - Brown, moist, hard, moderate plasticity
5	■	1-5-1	23	>4.5	110	15				60			
10	■	1-10-1	10	0.4	110	20							Wet, soft
11.3											∇ (groundwater)		
13													Very stiff
15	■	1-15-1	21	2.5	110	18							
18.5													**(SC) CLAYEY SAND** - Brown, wet, loose, fine grained
20	■	1-20-1	9								UU = 0.89 ksf		
25	■	1-25-1	22	3.25									
26													**(CL) SILTY CLAY WITH SAND** - Brown, wet, very stiff, moderate plasticity

KLEINFELDER

LOG OF BORING B-1
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 3

A-3

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/29/01

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION Approximate Depth feet
													(SC) CLAYEY SAND - Brown, wet, medium dense,fine grained
30		1-30-1	25	2.5									**(CL) SILTY CLAY WITH SAND** - Brown, wet, very stiff, moderate plasticity
													(SC) CLAYEY SAND - Brown, wet, medium dense, low to moderate plasticity, fine grained
													Fine to medium grained
35		1-35-1	25		112	17							
40		1-40-1	44										**(SM) SILTY SAND** - Light brown, wet, medium dense, fine grained
													(SP-SM) SAND WITH SILT - Gray brown, wet, medium dense, fine to medium grained
45		1-45-1	22	2.5	93	30							**(CL) SILTY CLAY WITH SAND** - Olive brown, wet, very stiff, moderate plasticity
													(SP) SAND - Gray brown, wet, loose, fine to medium grained
50		1-50-1	11	1.5									**(CL) SANDY CLAY** - Brown, wet, stiff, low to moderate plasticity
													(SP) SAND - Gray brown, wet, medium dense, fine to medium grained
55		1-55-1	24										**(SC) CLAYEY SAND WITH GRAVEL** - Light brown, wet, medium dense, fine to coarse grained
													(SP-SC) SAND WITH CLAY - Gray brown, wet, very dense, scattered mica, fine grained
60													

KLEINFELDER

LOG OF BORING B-1
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 2 of 3

A-3

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/29/01

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
		1-60-1	79		100	23							
													Dense
65		1-65-1	50										
													(CL) SILTY CLAY WITH SAND - Olive brown, wet, very stiff, moderate plasticity
70		1-70-1	33	3.75									
													Boring completed at a depth of 71.5 FEET below existing site grade .
75													
80													
85													
90													

FIELD / LABORATORY

KLEINFELDER

LOG OF BORING B- 1
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
3 of 3
A-3

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/29/01

Surface Conditions: OPEN FIELD WITH CUT HAY (1 FOOT WEST OF SURVEY MARK)

Date Completed: 5/4/2001

Logged By: RJO

Groundwater: Groundwater encountered at a depth of approximately 11.2 feet below existing site grade.

Total Depth: 51.5 FEET

Depth (feet)	Sample Type	Sample No. (FIELD)	Blows/ft	Pen (tsf)	Dry Density (pcf) (LABORATORY)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
												CL	**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered root, moderate plasticity
		3-1-1	26	>4.5	116	9					Swell pressure = 360 psf	SC	**(SC) CLAYEY SAND** - Brown, moist, medium dense to dense, fine to medium grained
		3-3-1	27	>4.5	112	16						CL	**(CL) SILTY CLAY WITH SAND** - Brown, moist, hard, moderate plasticity
5													Grades less sand, very stiff
		3-5-1	24	3.25	112	15							
10		3-10-1	8		103	22							
											▽	SC	**(SC) CLAYEY SAND** - Brown, moist, loose, fine grained
												CL	**(CL) SILTY CLAY WITH SAND** - Brown, wet, very stiff, moderate plasticity
15		3-15-1	22	2.25	111	17							
													wet, medium stiff
20		3-20-1	9	0.75									
													Stiff
25		3-25-1	12	1.5	104	22					UC = 2.9 ksf		

KLEINFELDER

LOG OF BORING B- 2
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 2

A-4

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/29/01

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
30		3-30-1	26	>4.5									**(CL) SANDY CLAY** - Brown, wet, hard, moderate plasticity
35		3-35-1	26		118	15							**(SC) CLAYEY SAND** - Brown, wet, hard, moderate plasticity
40		3-40-1	17	1.5									**(CL) SANDY CLAY** - Brown, wet, stiff, scattered sand lenses, moderate plasticity; Light brown
45		3-45-1	20	3.0	90	30							**(CL) SILTY CLAY** - Brown, wet, very stiff, moderately plasticity
50		3-50-1	22	4.5									**(CL) SANDY CLAY** - Brown, wet, hard, moderate plasticity; Very stiff
													Boring completed at a depth of 51.5 FEET below existing site grade .
55													
60													

KA_2001 2011G045.GPJ 8/29/01

KLEINFELDER

Drafted By: G. Gomez
Date: 8/29/2001

Project No.: 20-4561-01
File Number: 2011G045

LOG OF BORING B- 2
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
2 of 2
A-4

Surface Conditions:	OPEN FIELD WITH BALED HAY	Date Completed:	5/9/2001
		Logged By:	RJO
Groundwater:	Groundwater encountered at a depth of approximately 10.9 deet below existing site grade.	Total Depth:	71.5 FEET

Depth (feet)	Sample Type	FIELD: Sample No.	FIELD: Blows/ft	FIELD: Pen (tsf)	LABORATORY: Dry Density (pcf)	LABORATORY: Moisture Content (%)	LABORATORY: Liquid Limit	LABORATORY: Plasticity Index	LABORATORY: Passing #4 Sieve (%)	LABORATORY: Passing #200 Sieve (%)	LABORATORY: Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
0													**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots, low to moderate plasticity
	■	5-1-1	23	>4.5							Specific Gravity = 2.72		
													Brown
													Very stiff, moderate plasticity
	■	5-3-1	21	3.75	106	18	32	15					
5	■	5-5-1	21	3.75			36	28					
													Soft
10	■	5-10-1	13	0.3	102	24					UC = 1.2 ksf	∇	
													(CL) SANDY CLAY - Brown, wet, very stiff, low plasticity
15	■	5-15-1	20	3.5	108	19							
20													Very soft
	■	5-20-1	4	<0.25									
													(SC) CLAYEY SAND - Brown, wet, loose, scattered gravel, fine to coarse grained
													(CL) SILTY CLAY WITH SAND - Olive brown, wet, hard, moderate plasticity
25	■	5-25-1	18	4.25									

KLEINFELDER

LOG OF BORING B- 3
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE

Drafted By: G. Gomez Project No.: 20-4561-01
Date: 8/29/2001 File Number: 2011G045

KA_2001 2011G045.GPJ 8/29/01

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
													(CL) SANDY CLAY - Brown, wet, very stiff, low plasticity
30		5-30-1	18	2.5	107	20				63			
													(CL) SANDY CLAY - Brown, wet, very stiff, low to moderate plasticity
35		5-35-1	19	2.25									
													(CL) SILTY CLAY WITH SAND - Brown, wet, very stiff, moderate plasticity
40		5-40-1	17	3.25 2.75									
													(CL) SANDY CLAY - Brown, wet, very stiff, low to moderate plasticity
													(CL) SILTY CLAY - Olive brown, wet, very stiff, low to moderate plasticity
45		5-45-1	20	2.25	96	26					UC = 1.1 ksf		
													(CL) SILTY CLAY WITH SAND - Brown, wet, hard, scattered decaying roots
50		5-50-1	24	>4.5									
													(SC) CLAYEY SAND - Brown, wet, medium dense, fine to medium grained
55		5-55-1	31	2.75									
													(CL) SANDY CLAY - Brown, wet, very stiff
													(SC/CL) SANDY CLAY/CLAYEY SAND - Brown, wet, scattered mica, fine grained
60													

KA_2001 2011G045.GPJ 8/29/01

KLEINFELDER

LOG OF BORING B-3
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

PLATE

A-5

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
		5-60-1	34	3.0									
													(SP-SC) SAND WITH CLAY - Gray brown, wet, very dense, scattered mica, fine grained
65		5-65-1	88										
70		5-70-1	56		104	22							
													Dense, fine to medium grained
													Boring completed at a depth of 71.5 FEET below existing site grade .
75													
80													
85													
90													

KLEINFELDER

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

LOG OF BORING B- 3
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
3 of 3
A-5

KA_2001 2011G045.GPJ 8/29/01

Surface Conditions: OPEN FIELD WITH CUT HAY (ON SURVEY MARK

Groundwater: Groundwater encountered at a depth of approximately 11.3 feet below existing site grade.

Date Completed: 5/3/2001

Logged By: RJO

Total Depth: 71.5 FEET

Depth (feet)	Sample No. (FIELD)	Blows/ft (FIELD)	Pen (tsf) (FIELD)	Dry Density (pcf) (LABORATORY)	Moisture Content (%) (LABORATORY)	Liquid Limit (LABORATORY)	Plasticity Index (LABORATORY)	Passing #4 Sieve (%) (LABORATORY)	Passing #200 Sieve (%) (LABORATORY)	Other Tests	DESCRIPTION (Approximate Depth feet)
											(CL) SILTY CLAY WITH SAND - Dark brown, moist, hard, scattered roots, moderate plasticity
	8-1-1	15	>4.5			48	33				
											Brown, very stiff
	8-3-1	17	3.5								
5											**(SC) CLAYEY SAND** - Brown, moist, medium dense, fine to medium grained
	8-5-1	12		104	12				29		
10											**(CL) SANDY CLAY WITH SAND** - Brown, moist, very stiff, moderate plasticity
	8-10-1	12	2.5	104	21					▽ (groundwater)	
											(CL) SANDY CLAY - Brown, moist, medium stiff, moderate plasticity
15	8-15-1	10	0.75	110	20					Specific Gravity = 2.72	
											(SC) CLAYEY SAND - Brown, moist, medium density, fine to medium grained
20											**(CL) SILTY CLAY WITH SAND** - Brown, moist, very soft
	8-20-1	13	0.75								**(SC) CLAYEY SAND** - Brown, moist, medium dense, fine grained
											(SP-SC) SAND WITH CLAY - Brown, wet, medium dense, fine to medium grained
25	8-25-1	19	<0.25	109	18						

KLEINFELDER

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

LOG OF BORING B- 4
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 3
A-6

KA_2001 2011G045.GPJ 8/29/01

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
30		8-30-1	20	3.75	107	21							(CL) **SILTY CLAY WITH SAND** - Brown, wet, very stiff, moderate plasticity
35		8-35-1	18										(SC) **CLAYEY SAND** - Brown, wet, medium dense, fine to medium grained
													(SP-SC) **SAND WITH CLAY** - Brown, wet, medium dense, fine to medium grained
40		8-40-1	30										(SM) **SILTY SAND** - Gray brown, wet, medium dense, fine grained
													(CL) **SILTY CLAY** - Light olive brown, wet, very stiff, moderate plasticity, trace of sand
45		8-45-1	13	2.25	81	39							
													(ML) **SILT WITH SAND** - Olive brown, wet, hard, low plasticity
50		8-50-1	35	>4.5 3.5									
													(CL) **SILTY CLAY WITH SAND** - Olive Gray, wet, very stiff, moderate plasticity
													(SC) **CLAYEY SAND** - Gray brown, wet, dense, fine grained
55		8-55-1	12	4.0									
													(CL) **SILTY CLAY** - Olive gray, wet, hard, moderate plasticity
60													(SC) **CLAYEY SAND** - Gray brown, wet, very dense, scattered mica, fine grained

KA_2001 2011G045.GPJ 8/29/01

KLEINFELDER

LOG OF BORING B-4
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 2 of 3

A-6

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
		8-60-1	73		103	22							
													(SM) **SILTY SAND** - Gray brown, wet, very dense, scattered mica, fine grained
65		8-65-1	17										
													(SC) **CLAYEY SAND** - Gray brown, wet, very dense, scattered mica, fine grained
													(CL) **SILTY CLAY** - Olive gray, wet, hard, moderate plasticity
70		8-70-1	30	4.0									
													Boring completed at a depth of 71.5 FEET below existing site grade .
75													
80													
85													
90													

KA_2001 2011G045.GPJ 8/29/01

KLEINFELDER

LOG OF BORING B- 4
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

Drafted By: G. Gomez | Project No.: 20-4561-01
Date: 8/29/2001 | File Number: 2011G045

Surface Conditions: OPEN FIELD WITH CUT HAY 1 FOOT EAST OF SURVEY MARK

Groundwater: Groundwater encountered at a depth of approximately 11.4 feet below existing site grade.

Date Completed: 5/4/2001

Logged By: RJO

Total Depth: 101.5 FEET

Depth (feet)	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests
	10-1-1	19	>4.5							
	10-3-1	19	3.5	113	16					Consolidation
5	10-5-1	17	2.5	104	19	35	20			
10	10-10-1	8	1.75	104	13					
15	10-15-1	12	2.25 to 3.0	98	23					
20	10-20-1	8	<0.75	106	24					UU = 0.89 ksf
25	10-25-1	21	3.25							

DESCRIPTION

Approximate Depth feet

(CL) SILTY CLAY WITH SAND - Dark brown, moist, hard, scattered roots, moderate plasticity

(SC) CLAYEY SAND - Brown, moist, loose, fine to medium grained

(CL) SANDY CLAY - Brown, moist, stiff, moderate plasticity

Very stiff

(CL) SILTY CLAY WITH SAND - Brown, moist, very stiff, medium plasticity

(CL) SANDY CLAY - Brown, wet, very soft, moderate plasticity

(CL) SILTY CLAY WITH SAND - Brown, wet, very stiff, moderate plasticity

KLEINFELDER

LOG OF BORING B- 5
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 4

A-7

Drafted By: G. Gomez Project No.: 20-4561-01
Date: 8/29/2001 File Number: 2011G045

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
													(SC) **CLAYEY SAND** - Gray brown, wet, medium dense
30		10-30-1	25		108	19							
													Brown, grades more clay
													Grades more sand
35		10-35-1	27										
													(CL) SILTY CLAY - Brown, wet, hard, moderate plasticity
													(SC) CLAYEY SAND - Brown, wet, medium dense, fine grained
40		10-40-1	23	2.0									
													(CL) SILTY CLAY WITH SAND - Olive brown, wet, stiff to very stiff, moderate plasticity
													(SC) CLAYEY SAND - Brown, wet, loose to medium dense, fine grained
45		10-45-1	18	1.75									
													(CL) SILTY CLAY WITH SAND - Olive brown, wet, stiff, moderate plasticity
													(SC) CLAYEY SAND - Gray brown, wet, medium dense, fine grained
50		10-50-1	20	2.25	104	21				69	UC = 3.2 ksf		**(CL) SANDY CLAY** - brown, wet, very stiff, moderate plasticity
													(SC) CLAYEY SAND - Gray brown, wet, fine grained, medium dense
55		10-55-1	13	1.25									**(CL) SANDY CLAY** - Brown, wet, stiff, moderate plasticity
													(CL) SILTY CLAY WITH SAND - Olive brown, wet, very stiff, moderate plasticity
60													

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LOG OF BORING B-5
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 2 of 4

A-7

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests
		10-60-1	39		98	26					
65		10-65-1	66								
70		10-70-1	26								
75		10-75-1	63	4.25							
80		10--80-1	52	3.75							
85		10-85-1	50 for 4"	>4.5							
90		10-90-1	55	4.5							

FIELD / LABORATORY / Lithography

DESCRIPTION

Approximate Depth feet

(SP-SC) SAND WITH CLAY - Gray brown, wet, dense, scattered mica, fine grained

(SP) SAND - Gray brown, wet, very dense, scattered mica, fine grained

(CL) SANDY CLAY Olive gray, wet, hard, moderate plasticity, scattered organics

(SC) CLAYEY SAND - Gray brown, wet, very dense, fine grained

(CL) SANDY CLAY - Olive brown, wet, hard, moderate plasticity

Red brown, very stiff

Hard

(SC) CLAYEY SAND - Brown, wet, dense, fine grained

(CL) SANDY CLAY - Brown, wet, hard, moderate plasticity

KA_2001 2011G045.GPJ 8/29/01

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Drafted By: G. Gomez Project No.: 20-4561-01
Date: 8/29/2001 File Number: 2011G045

LOG OF BORING B-5
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
3 of 4

A-7

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
					FIELD		LABORATORY						
													(CL) SILTY CLAY WITH SAND - Brown, wet, very stiff, moderate plasticity
95		10-95-1	52		108	19							
													(CL) SANDY CLAY - Brown, moist, hard, moderate plasticity
100		10-100-1	49										
													Boring completed at a depth of 101.5 FEET below existing site grade .
105													
110													
115													
120													

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Drafted By: G. Gomez
Date: 8/29/2001

Project No.: 20-4561-01
File Number: 2011G045

LOG OF BORING B- 5
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
4 of 4

A-7

KA_2001 2011G045.GPJ 8/29/01

Surface Conditions:	OPEN FIELD WITH BALED HAY (3 FT. WEST OF SURVEYED MARK)	Date Completed:	5/9/2001
		Logged By:	RJO
Groundwater:	Groundwater encountered at a depth of approximately 11 feet below existing site grade.	Total Depth:	41.5 FEET

Depth (feet)	Sample Type	Sample No. (FIELD)	Blows/ft (FIELD)	Pen (tsf) (FIELD)	Dry Density (pcf) (LABORATORY)	Moisture Content (%) (LABORATORY)	Liquid Limit (LABORATORY)	Plasticity Index (LABORATORY)	Passing #4 Sieve (%) (LABORATORY)	Passing #200 Sieve (%) (LABORATORY)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
													(CL) SILTY CLAY WITH SAND - Dark brown, moist, hard, scattered roots, low to moderate plasticity
		12-1-1	20	>4.5									Brown
													Very stiff, moderate plasticity
		12-3-1	19	2.75			29	16			Specific Gravity = 2.735		
5													
		12-5-1	16	2.25	111	16					UC = 5.3 ksf		
													Hard
													Wet, very stiff
10													
		12-10-1	20	3.75							Consolidation ▽		
15													
			13										
													(SC) CLAYEY SAND - Brown, wet, medium dense, fine to medium grained
20													
		12-20-1	22	2.75							Consolidation		**(CL) SILTY CLAY WITH SAND** - Brown, wet, very stiff, moderate plasticity
													Medium stiff
25													
		12-25-1	13										
													(SC) CLAYEY SAND - Brown, wet, medium dense, fine grained

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LOG OF BORING B- 6
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 2

A-8

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/24/01

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
													(CL) SILTY CLAY WITH SAND - Brown, wet, very stiff, moderate plasticity
30		12-30-1	25	3.75	111	18							
													(CL) SANDY CLAY - Brown, wet, very stiff, low to moderate plasticity
35		12-35-1	17	2.5									
													Hard
40		12-40-1	29	4.0									
													Boring completed at a depth of 41.5 FEET below existing site grade .
45													
50													
55													
60													

FIELD: Sample Type, Sample No., Blows/ft, Pen (tsf). LABORATORY: Dry Density through Other Tests.

KA_2001 2011G045.GPJ 8/24/01

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LOG OF BORING B- 6
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 2 of 2

A-8

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

Surface Conditions: FIELD WITH CUT HAY (4 FEET WEST OF SURVEY MARK)

Groundwater: Groundwater encountered at a depth of approximately 12 feet below existing site grade.

Date Completed: 5/2/2001

Logged By: RJO

Total Depth: 71.5 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests
		13-1-1	16	>4.5							
		13-3-1	29	>4.5	105	17			35	22	UC = 6.8 ksf
5		13-5-1	23	1.75	110	16					Specific Gravity = 2.72
10		13-10-1	4	0.75	103	19					
15		13-15-1	10	0.75	95	22	27	12			
20		13-20-1	13								
25		13-25-1	17	1.75	113	14					UC =3.6 ksf

DESCRIPTION (Approximate Depth feet)

- **(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots, moderate plasticity
  - Brown
- **(CL) SANDY CLAY** - Brown, moist, stiff, moderate plasticity
- **(SC) CLAYEY SAND** - Brown, moist, loose, fine grained
- **(CL) SILTY CLAY** - Brown, moist, medium stiff, moderate plasticity
- **(CL) SILTY CLAY WITH SAND** - Brown, wet, medium stiff, moderate plasticity
- **(SC) CLAYEY SAND** - Brown, wet, medium dense, with clay layers, fine to medium grained
- **(CL) SILTY CLAY WITH SAND** - Brown, wet, stiff, scattered sand lenses, moderate plasticity

KLEINFELDER

Drafted By: G. Gomez Project No.: 20-4561-01
Date: 8/29/2001 File Number: 2011G045

LOG OF BORING B-7
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
													Hard
30		13-30-1	27	>4.5									
													(CL) SANDY CLAY - Brown, wet, hard, moderate plasticity
35		13-35-1	28	>4.5									
													(SP-SM) SAND WITH SILT - Gray brown, wet, dense, fine grained
40		13-40-1	56		116	15							
45		13-45-1	42	2.5									**(CL) SILTY CLAY WITH SAND** - Brown, wet, very stiff, moderate plasticity
													Grades to light brown
50		13-50-1	50	>4.5	100	23							**(CL) SILTY CLAY WITH SAND** - Gray, wet, hard, moderate plasticity, with scattered organics
													(SP) SAND - Gray brown, wet, dense, fine to medium grained
55		13-55-1	50										**(SM) SILTY SAND** - Brown, wet, dense, scattered mica, fine grained
60													

KA_2001 2011G045.GPJ 8/29/01

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LOG OF BORING B- 7
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

PLATE 2 of 3

A-9

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
65		13-65-1	53										
													(CL) SILTY CLAY - Gray, wet, hard, moderate plasticity
													(SC) CLAYEY SAND - Light brown, wet, very dense, fine grained
70		13-70-1	65										
													Grades less clay
													Boring completed at a depth of 71.5 FEET below existing site grade .
75													
80													
85													
90													

KA_2001 2011G045.GPJ 8/29/01

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LOG OF BORING B- 7
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
3 of 3
A-9

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

Surface Conditions:	OPEN FIELD (1 FT. SOUTH OF SURVEYED MARK)	Date Completed:	5/10/2001
		Logged By:	RJO
Groundwater:	Groundwater encountered at a depth of approximately 12 feet below existing site grade.	Total Depth:	41.5 FEET

Depth (feet)	FIELD: Sample No.	FIELD: Blows/ft	FIELD: Pen (tsf)	LABORATORY: Dry Density (pcf)	LABORATORY: Moisture Content (%)	LABORATORY: Liquid Limit	LABORATORY: Plasticity Index	LABORATORY: Passing #4 Sieve (%)	LABORATORY: Passing #200 Sieve (%)	LABORATORY: Other Tests	DESCRIPTION (Approximate Depth feet)
0											**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots, low to moderate plasticity
	15-1-1	17	>4.5							Resistivity = 1450 ohms-cm	
	15-3-1	21	3.25	110	20					Swell = 0.52%	Brown, very stiff
5	15-5-1	21	4.25	105	19					UC = 4.6 ksf	Hard, moderate plasticity
											Stiff
10	15-10-1	13	3.0	105	20						Very stiff
											Wet, stiff
											(SC) CLAYEY SAND - Brown, wet, medium dense, fine grained
15	15-15-1	18	1.75	99	20	26	8				
											(CL) SANDY CLAY - Brown, wet, stiff, low to moderate plasticity
											Wet, very stiff
20	15-20-1	17	3.25								
											(CL) SILTY CLAY WITH SAND - Brown, wet, medium stiff, low to moderate plasticity
25	15-25-1	11	0.8								
											(SC) CLAYEY SAND - Brown, wet, loose, fine grained

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KLEINFELDER

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

LOG OF BORING B- 8
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE

A-10

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
													(CL) **SANDY CLAY** - Brown, wet, very stiff, low to moderate plasticity
30		15-30-1	31	3.0	113	20							
													(CL) **SILTY CLAY WITH SAND** - Brown, wet, medium stiff, moderate plasticity
35		15-35-1	20	0.75									
													Scattered sand lenses, hard
40		15-40-1	30	>4.5									
													Boring completed at a depth of 41.5 FEET below existing site grade .
45													
50													
55													
60													

FIELD / LABORATORY

KLEINFELDER

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

LOG OF BORING B- 8
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
2 of 2
A-10

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions:	FIELD WITH CUT HAY 5 FEET WEST OF STAKE (SURVEYED LOCATION)	Date Completed: 5/2/2001
		Logged By: RJO
Groundwater:	Groundwater encountered at a depth of approximately 11.8 feet below existing site grade.	Total Depth: 81.5 feet

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
												CL	**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots, moderate plasticity
		17-1-1	22	>4.5							Resistivity = 1450 ohms-cm		
													Brown
		17-3-1	26	>4.5	112	14					UC = 11.8 ksf		
5													Very stiff
		17-5-1	18	2.5	106	16	32	21					
												CL	**(CL) SILTY CLAY** - Brown, moist, very stiff, moderate plasticity
10													
		17-10-1	15	2.75								▽	
													Wet, stiff
15													
		17-15-1	14	1.75	105	21							
												CL	**(CL) SANDY CLAY** - Brown, wet, stiff, moderate plasticity
20												SC	**(SC) CLAYEY SAND** - Brown, wet, dense, fine to medium grained
		17-20-1	39	>4.5								CL	**(CL) SILTY CLAY WITH SAND** - Brown, wet, hard, moderate plasticity
												SM	**(SM) SILTY SAND** - Brown, wet, medium dense, fine to course grained
25													
		17-25-1	14	2.5									
												CL	**(CL) SANDY CLAY** - Light brown, wet, very stiff, moderate plasticity
												SM	**(SM) SILTY SAND** - Brown, wet, medium dense, fine grained

KLEINFELDER

LOG OF BORING B- 9
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 3
A-11

Drafted By: G. Gomez | Project No.: 20-4561-01
Date: 8/24/2001 | File Number: 2011G045

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
30		17-30-1	39	>4.5	112	18							**(CL) SILTY CLAY WITH SAND** - Brown, wet, hard, moderate plasticity
													(SM) SILTY SAND - Brown, wet, medium dense, fine grained
35		17-35-1	22	4.5									**(CL) SILTY CLAY WITH SAND** - Light brown, wet, hard, moderate plasticity
													(SM) SILTY SAND - Brown, wet, medium dense, fine grained
40		17-40-1	30	2.5									**(CL) SANDY CLAY** - Brown, wet, very stiff, moderate plasticity
													(SC) CLAYEY SAND - Brown, wet, medium dense, fine grained
													(CL) SILTY CLAY WITH SAND - Light brown, wet, very stiff, moderate plasticity
45		17-45-1	30	3.0	104	21							
													(SC) CLAY SAND - Brown, wet, medium dense, scattered mica, fine grained
50		17-50-1	44										
													(CL) SILTY CLAY - Olive gray, wet, hard, moderate plasticity, scattered decaying roots
55		17-55-1	37	4.5	100	23					UC = 10. 7 ksf		
													(CL) SANDY CLAY - Brown, wet, very stiff, scattered mica, moderate plasticity
60													

KA_2001 2011G045.GPJ 8/24/01

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LOG OF BORING B- 9
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
2 of 3
A-11

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
		17-60-1	28	3.5							Specific Gravity		
													Hard
65		17-65-1	35	4 to 4.25									**(CL) SILTY CLAY** - Olive brown, wet, hard, moderate plasticity
70		17-70-1	39	4.25	116	19							
													(SC) CLAYEY SAND - Brown, wet, very dense, fine grained
75		17-75-1	86										**(SP-SC) SAND WITH CLAY** - Brown, wet, dense, poorly graded, fine grained
													(CL) SILTY CLAY - Light brown, wet, hard, moderate plasticity
													Red brown
80		17-80-1	39	>4.5									**(CL) SILTY CLAY WITH SAND** - Red brown, wet, hard, low to moderate plasticity
													(SC) CLAYEY SAND - Red brown, wet, dense, fine grained
													Boring completed at a depth of 81.5 feet below existing site grade .
85													
90													

KA_2001 2011G045.GPJ 8/24/01

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LOG OF BORING B- 9
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
3 of 3
A-11

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

Surface Conditions:	Field	Date Completed:	5/29/2001
		Logged By:	RJO
Groundwater:	Groundwater encountered at a depth of approximately 12.4 feet below existing site grade.	Total Depth:	15 FEET

Depth (feet)	FIELD: Sample Type	FIELD: Sample No.	FIELD: Blows/ft	FIELD: Pen (tsf)	LABORATORY: Dry Density (pcf)	LABORATORY: Moisture Content (%)	LABORATORY: Liquid Limit	LABORATORY: Plasticity Index	LABORATORY: Passing #4 Sieve (%)	LABORATORY: Passing #200 Sieve (%)	LABORATORY: Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
													(CL) SILTY CLAY WITH SAND - Dark brown, moist, hard, scattered roots, moderate plasticity
		20-1-1	22	>4.5	118	14							**(CL) SILTY CLAY** - Brown, moist, hard, moderate plasticity
													Very stiff
5		20-5-1	18	3.5							Consolidation		
													(SC) CLAYEY SAND - Brown, moist, medium dense, fine grained
10		20-10-	32								Resistivity = 1450 ohms-cm		
													(SM) SILTY SAND - Brown, moist, medium dense, low plasticity, fine grained
												∇	**(CL) SILTY CLAY** - Brown, moist, moderate plasticity, stiff
													(CL) SILTY CLAY WITH SAND - Brown, moist, stiff, moderate plasticity
15													Boring completed at a depth of 15 FEET below existing site grade .
20													
25													

KA_2001 2011G045.GPJ 8/24/01

KLEINFELDER

Drafted By: G. Gomez Project No.: 20-4561-01
Date: 8/24/2001 File Number: 2011G045

LOG OF BORING B-10
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1
A-12

Surface Conditions:	Field	Date Completed:	5/29/2001
		Logged By:	RJO
Groundwater:	Groundwater encountered at a depth of approximately 12.6 feet below existing site grade.	Total Depth:	30 FEET

Depth (feet)	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Approximate Depth feet / DESCRIPTION
0											**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, moderate plasticity, scattered roots
1	21-1-1	15	>4.5			42	27				Brown
5	21-5-1	27	3.0	114	17						
6.5											**(SC) CLAYEY SAND** - Brown, moist, medium dense, fine grained
8.5											**(SM) SILTY SAND** - Brown, moist, medium dense, scattered clay layers, fine grained
10	21-10-1	30		115	15						
12.6											▽ (groundwater)
13.5											**(CL) SILTY CLAY WITH SAND** - Brown, moist, hard, moderate plasticity
15	21-15-1	27		113	16					UC = 7.9 ksf	
18											Scattered sand layers, very soft
20	21-20-1	12	.5 to<.25								
21											Stiff
25											**(CL) SILTY CLAY WITH SAND** - Olive brown, wet, medium stiff

KLEINFELDER

Drafted By: G. Gomez Project No.: 20-4561-01
Date: 8/24/2001 File Number: 2011G045

LOG OF BORING B-11
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 2
A-13

KA_2001 2011G045.GPJ 8/24/01

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
													Brown, hard
30													Boring completed at a depth of 30 FEET below existing site grade .
35													
40													
45													
50													
55													
60													

FIELD / LABORATORY

KA_2001 2011G045.GPJ 8/24/01

KLEINFELDER

Drafted By: G. Gomez
Date: 8/24/2001

Project No.: 20-4561-01
File Number: 2011G045

LOG OF BORING B-11
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

Surface Conditions: FIELD 2' NORTH OF SURVEY MARK

Groundwater: Groundwater encountered at a depth of approximately 12 feet below existing site grade.

Date Completed: 5/29/2001

Logged By: RJO

Total Depth: 30 FEET

Depth (feet)	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	DESCRIPTION (Approximate Depth feet)
0											**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots, moderate plasticity
	22-1-1	32	>4.5								
											Brown
											Very stiff
5		23	3.75								
10	22-10-1	32		114	16					Direct Shear	**(SM) SILTY SAND** - Red brown, moist, medium dense, with clay layers, fine grained
▽ (12)											
											(CL) SILTY CLAY - Olive brown, moist, medium stiff to stiff, moderate plasticity
15	22-15-1	22	1.0								
											(SM) SILTY SAND - Brown, moist, medium dense, fine grained
											(CL) SILTY CLAY - Olive brown, wet, medium stiff, moderate plasticity
20	22-20-1	10	0.75	102	25					Consolidation	
25											

KA_2001 2011G045.GPJ 8/24/01

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LOG OF BORING B-12
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 2

A-14

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION Approximate Depth feet
30													Boring completed at a depth of 30 FEET below existing site grade .
35													
40													
45													
50													
55													
60													

KLEINFELDER

LOG OF BORING B-12
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 2 of 2

A-14

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions:	1' SOUTH OF SURVEYED MARK	Date Completed:	5/29/2001
		Logged By:	RJO
Groundwater:	Groundwater encountered at a depth of approximately 13 feet below existing site grade.	Total Depth:	20 FEET

Depth (feet)	Sample Type	Sample No. (FIELD)	Blows/ft (FIELD)	Pen (tsf) (FIELD)	Dry Density (pcf) (LABORATORY)	Moisture Content (%) (LABORATORY)	Liquid Limit (LABORATORY)	Plasticity Index (LABORATORY)	Passing #4 Sieve (%) (LABORATORY)	Passing #200 Sieve (%) (LABORATORY)	Other Tests (LABORATORY)	Lithography	DESCRIPTION (Approximate Depth feet)
													(CL) SILTY CLAY WITH SAND - Dark brown, moist, hard, scattered roots, moderate plasticity
		24-1-1	18	>4.5			48	28					
													Brown
		24-3-1	22	4.5							Combined sample		
													(CL) SANDY CLAY - Brown, moist, hard, low to moderate plasticity
5													**(CL) SILTY CLAY WITH SAND** - Dark brown to brown, moist, hard, moderate plasticity
		24-5-1	21	4.5									
													Brown, very stiff
10													
		24-10-1	24	3.25									**(SM) SILTY SAND** - Brown, moist, medium dense, fine grained
													(CL) SILTY CLAY WITH SAND - Brown, moist, very stiff, moderate plasticity
											▽		
15													
20													Boring completed at a depth of 20 FEET below existing site grade .
25													

KA_2001 2011G045.GPJ 8/24/01

KLEINFELDER

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

LOG OF BORING B-13
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1

A-15

Surface Conditions: 7' NORTH OF SURVEYED MARK

Groundwater: Groundwater encountered at a depth of approximately 12.7 feet below existing site grade.

Date Completed: 5/29/2001

Logged By: RJO

Total Depth: 20 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
													(CL) SILTY CLAY WITH SAND - Dark brown, moist, hard, moderate plasticity, scattered roots
		25-2-1	16	>4.5									Brown
5		25-5-1	15	2.25	110	15							**(ML) SILT WITH SAND** - Brown, moist, very stiff, slight plasticity
													(SP-SM) SAND WITH SILT - Brown, moist, medium dense, with clay layers, fine to coarse grained
10		25-10-1	31										
												▽	**(CL) SILTY CLAY WITH SAND** - Brown, moist, moderate plasticity
15													
20													Boring completed at a depth of 20 FEET below existing site grade .
25													

KA_2001 2011G045.GPJ 8/24/01

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LOG OF BORING B-14
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 1

A-16

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

Surface Conditions: FIELD

Groundwater: Groundwater encountered at a depth of approximately 14 feet below existing site grade.

Date Completed: 5/29/2001

Logged By: RJO

Total Depth: 20 FEET

Depth (feet)	Sample Type	FIELD Sample No.	Blows/ft	Pen (tsf)	LABORATORY Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
0													**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, moderate plasticity, scattered roots
		26-1-1	21	>4.5									
2													Brown
		26-3-1	16	>4.5									
5		26-5-1	20	3.0	100	22					Resistivity = 989 ohms-cm		**(CL) SANDY CLAY** - Brown, moist, very stiff, low plasticity
8													Moist, stiff, moderate plasticity
10		26-10-1	13	1.5	100	22							
12.5													**(CL) SILTY CLAY WITH SAND** - Brown, moist, moderate plasticity
14											▽ (groundwater)		
18.5													Olive brown
20													Boring completed at a depth of 20 FEET below existing site grade .
25													

KLEINFELDER

Drafted By: G. Gomez

Date: 8/24/2001

Project No.: 20-4561-01

File Number: 2011G045

LOG OF BORING B-15
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 1

A-17

Surface Conditions:	OPEN FIELD (1/2 FT. NORTH OF SURVEYED MARK)	Date Completed:	5/10/2001
		Logged By:	RJO
Groundwater:	Groundwater encountered at a depth of approximately 14.2 feet below existing site grade.	Total Depth:	41.5 FEET

Depth (feet)	Sample Type	FIELD: Sample No.	FIELD: Blows/ft	FIELD: Pen (tsf)	LABORATORY: Dry Density (pcf)	LABORATORY: Moisture Content (%)	LABORATORY: Liquid Limit	LABORATORY: Plasticity Index	LABORATORY: Passing #4 Sieve (%)	LABORATORY: Passing #200 Sieve (%)	LABORATORY: Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
0													**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, low to moderate plasticity
	■	30-1-1	21	>4.5			35	15					
													Brown
	■	30-3-1	18	4.25	97	11	30	14					
5													Very stiff to hard, moderate plasticity
	■	30-5-1	18	4.0						84			
													Hard
10	■	30-10-1	22	4.5	109	17					UC = 5.9 ksf		
												▽	**(SP-SM) SAND WITH SILT** - brown, wet, medium dense, scattered clay layer, fine grained
15	■	30-15-1	26										
													Fine to medium grained
													(SC) CLAYEY SAND - Brown, wet, medium dense, fine to medium grained
20	■	30-20-1	17										
													(SP) SAND - Gray brown, wet, medium dense, scattered mica, scattered gravel, fine to coarse grained
25	■	30-25-1	25										

KA_2001 2011G045.GPJ 8/24/01

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LOG OF BORING B-16
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 2

A-18

Drafted By: G. Gomez — Project No.: 20-4561-01
Date: 8/24/2001 — File Number: 2011G045

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
30		30-30-1	10	0.75	102	22							**(CL) SANDY CLAY** - Brown, wet, medium stiff, low to medium plasticity
													Hard
35		30-35-1	24	>4.5	117	15							
													Very stiff
40		30-40-1	18	2.5									Stiff, grades less sand
													Boring completed at a depth of 41.5 FEET below existing site grade .
45													
50													
55													
60													

KLEINFELDER

Drafted By: G. Gomez
Date: 8/24/2001

Project No.: 20-4561-01
File Number: 2011G045

LOG OF BORING B-16
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
2 of 2
A-18

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions: OPEN FIELD (1 1/2 FT. WEST OF SURVEYED MARK)

Groundwater: Groundwater encountered at a depth of approximately 14 feet below existing site grade.

Date Completed: 5/10/2001

Logged By: RJO

Total Depth: 41.5 FEET

Depth (feet)	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Description (Approximate Depth feet)
											(CL) SILTY CLAY WITH SAND - Dark brown, moist, hard, scattered roots, low to moderate plasticity
	31-1-1	24	>4.5								Brown, very stiff
	31-3-1	20	3.0	104	16					UC = 8.2 ksf	
5											(SC) CLAYEY SAND - Brown, moist, medium dense, fine grained
	31-5-1	14	3.75								(CL) SANDY CLAY - Brown, moist, very stiff, low to moderate plasticity
											(CL) SILTY CLAY WITH SAND - Brown, moist, very stiff, scattered sand layers, moderate plasticity
10	31-10-1	6	2.1	101	17	30	15				
▽ (14)											(SC) CLAYEY SAND - Brown, moist, medium dense, low plasticity, fine grained
15	31-15-1	13							47		
20	31-20-1	8									
											(CL) SILTY CLAY WITH SAND - Brown, wet, hard, low to moderate plasticity
25	31-25-1	20	>4.5	105	20						

KLEINFELDER

LOG OF BORING B-17
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 2

A-19

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/24/01

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
30	■	31-30-1	19										(SC) **CLAYEY SAND** - Brown, wet, medium dense, fine grained
													(CL) **SILTY CLAY WITH SAND** - Brown, wet, very stiff, medium plasticity
35	■	31-35-1	20	3.0									
													(CL) **SANDY CLAY** - Brown, wet, stiff
40	■	31-40-1	19	1.25									
													Boring completed at a depth of 41.5 FEET below existing site grade .
45													
50													
55													
60													

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LOG OF BORING B-17
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
2 of 2
A-19

Drafted By: G. Gomez | Project No.: 20-4561-01
Date: 8/24/2001 | File Number: 2011G045

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions: FIELD

Groundwater: Groundwater encountered at a depth of approximately 11.6 feet below existing site grade.

Date Completed: 5/29/2001

Logged By: RJO

Total Depth: 20 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
0												CL	**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots, moderate plasticity
1.5		33-1-1	19	>4.5									
2													Brown
5.5		33-5-1	19	3.5									
6												SM/ML	**(SM/ML) SILTY SAND/SANDY SILT** - Brown, moist, fine grained
8.5												CL	**(CL) SILTY CLAY WITH SAND** - Brown, moist, moderate plasticity
11.6											▽ (groundwater)		
17													Olive brown, soft
20													Boring completed at a depth of 20 FEET below existing site grade .

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LOG OF BORING B-18
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 1

A-20

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions: FIELD

Groundwater: Groundwater encountered at a depth of approximately 10.6 feet below existing site grade.

Date Completed: 5/29/2001

Logged By: RJO

Total Depth: 21.5 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
0												CL	**(CL) SILT CLAY WITH SAND** - Dark brown, moist, hard, scattered roots, moderate plasticity
	■	36-1-1	22	>4.5									
3.5													Brown, very stiff
5	■	36-5-1	9	3.25									
8												SM	**(SM) SILTY SAND** - Brown, moist, loose, clay layers, fine grained
10.6											▽	SC	**(SC) CLAYEY SAND** - Brown, moist, loose, scattered gravel, fine to coarse grained
	■	36-10-1	9								Sieve analysis		
13.5												CL	**(CL) SILTY CLAY WITH SAND** - Brown, moist, very stiff, moderate plasticity
15	■	36-15-1	12	2.5								SC	**(SC) CLAYEY SAND** - Brown, moist, loose to medium dense, fine grained
16.5												CL	**(CL) SILTY CLAY WITH SAND** - Brown, moist, medium stiff, moderate plasticity
19													Very stiff
20	■	36-20-1	22										
21.5													Boring completed at a depth of 21.5 FEET below existing site grade .
25													

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Drafted By: G. Gomez
Date: 8/24/2001

Project No.: 20-4561-01
File Number: 2011G045

LOG OF BORING B-19
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1

A-21

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions:	OPEN FIELD (1/2 FT. SOUTH OF SURVEYED MARK)	Date Completed:	5/10/2001
		Logged By:	RJO
Groundwater:	Groundwater encountered at a depth of approximately 14.5 feet below existing site grade.	Total Depth:	41.5 FEET

Depth (feet)	Sample Type (FIELD)	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf) (LABORATORY)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
													(CL) SILTY CLAY WITH SAND - Dark brown, moist, hard, low to moderate plasticity
		39-1-1	14	>4.5									
		39-3-1	13	4.5	104	16	32	17					Brown, grades more silt
5		39-5-1	10	>4.5									
													(CL) SANDY CLAY - Brown, moist, medium stiff, low to moderate plasticity
10		39-10-1	6	0.75						58			
												▽	**(CL) SANDY CLAY** - Brown, wet, soft, low to moderate plasticity
15		39-15-1	9	0.3	118	14							
													Grades to stiff
20													**(SP) SAND** - Brown, wet, medium dense, fine to coarse grained
		39-20-1	21	2.75									**(CL) SILTY CLAY WITH SAND** - Brown, wet, very stiff, moderate plasticity
													(SP-SM) SAND WITH SILT - Gray brown, wet, medium dense, scattered clay layers, fine to medium grained
25			22										

KA_2001 2011G045.GPJ 8/29/01

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Drafted By: G. Gomez | Project No.: 20-4561-01
Date: 8/29/2001 | File Number: 2011G045

LOG OF BORING B-20
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE

A-22

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
30		39-30-1	29	4.5									**(CL) SILTY CLAY WITH SAND** - Brown, wet, hard, moderate plasticity
													(SM) SILTY SAND - Gray brown, wet, medium dense, scattered clay layers, fine to medium grained
35		39-35-1	19	4.5									**(CL) SILTY CLAY WITH SAND** - Brown, wet, hard, moderate plasticity
													(SM) SILTY SAND - Gray brown, wet, medium dense, fine to medium grained
40		39-40-1	21	1.5									**(CL) SANDY CLAY** - Brown, wet, stiff, low to moderate plasticity
													Boring completed at a depth of 41.5 FEET below existing site grade .
45													
50													
55													
60													

KLEINFELDER

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

LOG OF BORING B-20
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
2 of 2
A-22

KA_2001 2011G045.GPJ 8/29/01

Surface Conditions: FIELD 1' EAST OF SURVEY MARK

Groundwater: Groundwater encountered at a depth of approximately 11.7 feet below existing site grade.

Date Completed: 5/29/2001

Logged By: RJO

Total Depth: 30 FEET

Depth (feet)	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	DESCRIPTION
0											**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, moderate plasticity, scattered roots
1	41-1-1	27	>4.5								
2.5											Brown, grades more sand @ 5'
5	41-5-1	24	>4.5	109	17					UC = 11.9 ksf	
10	41-10-1	2									**(SP) SAND** - Brown, moist,very loose, fine grained
11.5											**(CL) SANDY CLAY** - Brown, wet, very soft, moderate plasticity
14											**(SC) CLAYEY SAND** - Olive brown, wet, medium stiff, fine grained
15		6									
18.5											**(SP) SAND** - Brown, wet, medium dense, fine to coarse grained
20.5											**(SM) SILTY SAND** - Brown, wet, medium dense, fine to coarse grained
20	41-20-1	27	3.25	105	19						
21.5											**(CL) SILTY CLAY WITH SAND** - Brown, wet, very stiff, moderate plasticity

KA_2001 2011G045.GPJ 8/29/01

KLEINFELDER

Drafted By: G. Gomez Project No.: 20-4561-01
Date: 8/29/2001 File Number: 2011G045

LOG OF BORING B-21
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 2

A-23

Depth (feet)	FIELD: Sample Type	FIELD: Sample No.	FIELD: Blows/ft	FIELD: Pen (tsf)	LABORATORY: Dry Density (pcf)	LABORATORY: Moisture Content (%)	LABORATORY: Liquid Limit	LABORATORY: Plasticity Index	LABORATORY: Passing #4 Sieve (%)	LABORATORY: Passing #200 Sieve (%)	LABORATORY: Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
30													Boring completed at a depth of 30 FEET below existing site grade .
35													
40													
45													
50													
55													
60													

KLEINFELDER

LOG OF BORING B-21
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
2 of 2
A-23

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/29/01

Surface Conditions:	FIELD	Date Completed:	5/29/2001
		Logged By:	RJO
Groundwater:	Groundwater encountered at a depth of approximately 13.4 feet below existing site grade.	Total Depth:	30 FEET

Depth (feet)	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	DESCRIPTION (Approximate Depth feet)
0											**(CL) SILTY CLAY WITH SAND** - dark brown, moist, hard, scattered roots, moderate plasticity
	43-1-1	12	>4.5								
											Brown
											(CL/ML) SILTY CLAY WITH SAND - Brown, moist, very stiff, low plasticity
5	43-5-1	6	3.0							Direct Shear	
											(SM) SILTY SAND - Brown, moist, loose, fine to coarse grained
											Medium dense, with clay seams and scattered gravel
10	43-10-1	23		114	7						
13.4 (groundwater ▽)											
15	43-15-1	12	0.75							Specific Gravity = 2.71	**(CL) SANDY CLAY** - Brown, moist, medium stiff, moderate plasticity
											(CL) SILTY CLAY WITH SAND - Brown, moist, stiff, moderate plasticity
											Very stiff
20	43-20-1	24	3.5	115	17						
25											
											Olive brown

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Drafted By: G. Gomez Project No.: 20-4561-01
Date: 8/29/2001 File Number: 2011G045

LOG OF BORING B-22
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 2
A-24

KA_2001 2011G045.GPJ 8/29/01

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
30													Boring completed at a depth of 30 FEET below existing site grade .
35													
40													
45													
50													
55													
60													

KA_2001 2011G045.GPJ 8/29/01

KLEINFELDER

Drafted By: G. Gomez
Date: 8/29/2001
Project No.: 20-4561-01
File Number: 2011G045

LOG OF BORING B-22
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
2 of 2
A-24

Surface Conditions:	OPEN FIELD	Date Completed:	5/29/2001
		Logged By:	RJO
Groundwater:	Groundwater encountered at a depth of approximately 12.6 feet below existing site grade.	Total Depth:	20 FEET

Depth (feet)	FIELD: Sample Type	FIELD: Sample No.	FIELD: Blows/ft	FIELD: Pen (tsf)	LABORATORY: Dry Density (pcf)	LABORATORY: Moisture Content (%)	LABORATORY: Liquid Limit	LABORATORY: Plasticity Index	LABORATORY: Passing #4 Sieve (%)	LABORATORY: Passing #200 Sieve (%)	LABORATORY: Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
0													**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots, moderate plasticity
2.5													Brown
6.5													**(CL) SANDY CLAY** - Dark brown, moist, very soft, moderate plasticity
7.75		44-7-1	4	<0.25	111	16					UC = 1.6 ksf		
8.5													**(CL) SILTY CLAY WITH SAND** - Dark brown, stiff, moist, stiff, moderate plasticity
12.6													▽ (groundwater)
15.5													**(CL) SILTY CLAY** - Brown, moist, moderate plasticity
20													Boring completed at a depth of 20 FEET below existing site grade .

KLEINFELDER

Drafted By: G. Gomez | Project No.: 20-4561-01
Date: 8/29/2001 | File Number: 2011G045

LOG OF BORING B-23
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1
A-25

KA_2001 2011G045.GPJ 8/29/01

Surface Conditions: OPEN FIELD

Groundwater: Groundwater encountered at a depth of approximately 10.9 feet below existing site grade.

Date Completed: 5/4/2001

Logged By: RJO

Total Depth: 20 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
0												CL	**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots, moderate plasticity
2.5													Brown
5													Stiff
10	■	45-10-2	15	1.5	103	18					▽		
17													Olive brown
20													Boring completed at a depth of 20 FEET below existing site grade .
25													

KLEINFELDER

LOG OF BORING B-24
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 1

A-26

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions:	OPEN FIELD	Date Completed:	5/29/2001
		Logged By:	RJO
Groundwater:	Groundwater encountered at a depth of approximately 11.5 feet below existing site grade.	Total Depth:	20 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
0												CL	**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots, moderate plasticity
													Brown
												ML	**(ML) SANDY SILT** - Brown, moist, very stiff, low plasticity
5	■	46-5-1	15	2.25	104	18							
												CL	**(CL) SANDY CLAY** - Brown, moist, stiff, moderate plasticity
10												CL	**(CL) SILTY CLAY WITH SAND** - Brown, moist, moderate plasticity
											▽		
												CL	**(CL) SILTY CLAY** - Brown, moist, moderate plasticity
15												CL	**(CL) SILTY CLAY WITH SAND** - Brown, moist, moderate plasticity
													Olive brown
20													Boring completed at a depth of 20 FEET below existing site grade .
25													

KLEINFELDER

LOG OF BORING B-25
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1
A-27

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions: HAY FIELD

Groundwater: No free groundwater encountered.

Date Completed: 5/16/2001

Logged By: RJO

Total Depth: 8.5 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
	FIELD				LABORATORY								
				>4.5								CL	**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard
	☒	1-2			107	17					UC = 3.2 ksf		
	☒	1-3.5											Brown, moist
5													
	☒	1-5.5										SC	**(SC) CLAYEY SAND** - Brown, moist, fine grained
													Grades more clay
													Test Pit completed at a depth of 8.5 FEET below existing site grade .
10													
15													
20													
25													

KLEINFELDER

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

LOG OF TEST PIT TP- 1
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1
A-28

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions: HAY FIELD

Groundwater: No free groundwater encountered.

Date Completed: 5/16/2001

Logged By: RJO

Total Depth: 7.5 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
				>4.5								CL	**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots
				4.5									
	X	2-2											
													Brown, grades more sand
	X	2-3.5											
5													
												SC	**(SC) CLAYEY SAND** - Brown, moist, fine grained
	X	2-7											
													Test Pit completed at a depth of 7.5 FEET below existing site grade .
10													
15													
20													
25													

KLEINFELDER

LOG OF TEST PIT TP- 2
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 1

A-29

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

Surface Conditions: HAY FIELD

Groundwater: No free groundwater encountered.

Date Completed: 5/16/2001

Logged By: RJO

Total Depth: 8 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
0				>4.5								CL	**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots
3												CL	Brown
5	X	3-4.5										SC	**(SC) CLAYEY SAND** - Moist, fine grained
	X	3-5										CL	**(CL) SILTY CLAY WITH SAND** - Brown, moist
												SP	**(SP) SAND** - Light brown, moist, fine to medium grained
	X	3-7.5										SM	**(SM) SILTY SAND** - Brown, moist, fine grained
8													Test Pit completed at a depth of 8 FEET below existing site grade .
10													
15													
20													
25													

KLEINFELDER

LOG OF TEST PIT TP- 3
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 1

A-30

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions: HAY FIELD

Groundwater: No free groundwater encountered.

Date Completed: 5/16/2001

Logged By: RJO

Total Depth: 8 FEET

Depth (feet)	Sample Type (FIELD)	Sample No. (FIELD)	Blows/ft (FIELD)	Pen (tsf) (FIELD)	Dry Density (pcf) (LABORATORY)	Moisture Content (%) (LABORATORY)	Liquid Limit (LABORATORY)	Plasticity Index (LABORATORY)	Passing #4 Sieve (%) (LABORATORY)	Passing #200 Sieve (%) (LABORATORY)	Other Tests (LABORATORY)	Lithography	DESCRIPTION (Approximate Depth feet)
				>4.5									**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots
				3.7									Brown, very stiff, grades more sand
5													**(CL) SANDY CLAY** - Brown, very stiff
	☒	4-5.5		3.0									
													Test Pit completed at a depth of 8 FEET below existing site grade .
10													
15													
20													
25													

KLEINFELDER

Drafted By: G. Gomez
Date: 8/24/2001

Project No.: 20-4561-01
File Number: 2011G045

LOG OF TEST PIT TP- 4
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1

A-31

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions:	HAY FIELD	Date Completed:	5/16/2001
		Logged By:	RJO
Groundwater:	No free groundwater encountered.	Total Depth:	7.5 FEET

Depth (feet)	FIELD: Sample Type	Sample No.	Blows/ft	Pen (tsf)	LABORATORY: Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
				>4.5									**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots
	☒	5-4		2.75	103	20					UC = 1.9 ksf		Gray brown, very stiff
5													
				2.5									Brown
													Test Pit completed at a depth of 7.5 FEET below existing site grade .
10													
15													
20													
25													

KLEINFELDER

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

LOG OF TEST PIT TP- 5
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1
A-32

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions: GRAIN FIELD

Groundwater: No free groundwater encountered.

Date Completed: 5/16/2001

Logged By: RJO

Total Depth: 8 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
				>4.5									**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots
	X	6-3		>4.5									Brown
				4.25									**(CL) SANDY CLAY** - Brown, moist, hard
5	X	6-6											**(SC) CLAYEY SAND** - Brown, moist
				3.25									**(CL) SILTY CLAY WITH SAND** - Brown, moist, very stiff
	X	6-7.5											Test Pit completed at a depth of 8 FEET below existing site grade .
10													
15													
20													
25													

KA_2001 2011G045.GPJ 8/24/01

KLEINFELDER

Drafted By: G. Gomez
Date: 8/24/2001

Project No.: 20-4561-01
File Number: 2011G045

LOG OF TEST PIT TP- 6
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1
A-33

Surface Conditions: GRAIN FIELD

Groundwater: No free groundwater encountered.

Date Completed: 5/16/2001

Logged By: RJO

Total Depth: 7.5 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
				>4.5									**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots
													Brown
	X	7-3.5		3.0									**(CL) SANDY CLAY** - Brown, moist, scattered roots
5				4.5									**(CL) SILTY CLAY WITH SAND** - Brown, moist, very stiff
				4.5									**(CL) SANDY CLAY** - Brown, moist, with sand layers
													Test Pit completed at a depth of 7.5 FEET below existing site grade .
10													
15													
20													
25													

KLEINFELDER

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

LOG OF TEST PIT TP- 7
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1
A-34

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions:	GRAIN FIELD	
Groundwater:	No free groundwater encountered.	
Date Completed:	5/16/2001	
Logged By:	RJO	
Total Depth:	8.5 FEET	

Depth (feet)	FIELD: Sample Type	FIELD: Sample No.	FIELD: Blows/ft	FIELD: Pen (tsf)	LABORATORY: Dry Density (pcf)	LABORATORY: Moisture Content (%)	LABORATORY: Liquid Limit	LABORATORY: Plasticity Index	LABORATORY: Passing #4 Sieve (%)	LABORATORY: Passing #200 Sieve (%)	LABORATORY: Other Tests	Lithography	DESCRIPTION / Approximate Depth feet
				>4.5									**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots
				>4.5									Brown
5				3.5									**(CL) SANDY CLAY** - Brown, moist, very stiff
	X	8-6.5											**(SC) CLAYEY SAND** - Brown, moist, fine grained
													Test Pit completed at a depth of 8.5 FEET below existing site grade .
10													
15													
20													
25													

KLEINFELDER

LOG OF TEST PIT TP- 8
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1
A-35

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions:	GRAIN FIELD	Date Completed:	5/16/2001
		Logged By:	RJO
Groundwater:	No free groundwater encountered.	Total Depth:	7.5 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION
	FIELD				LABORATORY								Approximate Depth feet
												CL	**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard
				>4.5									
		9-3		>4.5	107	17					UC = 3.8 ksf		Brown, moist
5				3.0									Very stiff
				4.5									Hard
													Test Pit completed at a depth of 7.5 FEET below existing site grade .
10													
15													
20													
25													

KLEINFELDER

LOG OF TEST PIT TP- 9
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1
A-36

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

KA_2001 2011G045.GPJ 8/24/01

Surface Conditions: HAY FIELD

Date Completed: 5/16/2001

Logged By: RJO

Groundwater: No free groundwater encountered.

Total Depth: 7.5 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
				>4.5								CL	**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots
	X	10-3										SM	**(SM) SILTY SAND** - Brown, moist, weakly cemented
5	X	10-5										CL	**(CL) SILTY CLAY WITH SAND** - Brown
													Grades more sand
													Test Pit completed at a depth of 7.5 FEET below existing site grade .
10													
15													
20													
25													

KA_2001 2011G045.GPJ 8/24/01

KLEINFELDER

LOG OF TEST PIT TP-10
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1
A-37

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

Surface Conditions: HAY FIELD

Groundwater: No free groundwater encountered.

Date Completed: 5/16/2001

Logged By: RJO

Total Depth: 8.5 FEET

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate Depth feet)
				>4.5									**(CL) SILTY CLAY WITH SAND** - Dark brown, moist, hard, scattered roots
				4.5									Brown, grades more sand
5													
	X	11-7		1.75									Stiff
													Test Pit completed at a depth of 8.5 FEET below existing site grade .
10													
15													
20													
25													

KLEINFELDER

Drafted By: G. Gomez
Date: 8/24/2001
Project No.: 20-4561-01
File Number: 2011G045

LOG OF TEST PIT TP-11
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
1 of 1
A-38

KA_2001 2011G045.GPJ 8/24/01

Appendix B

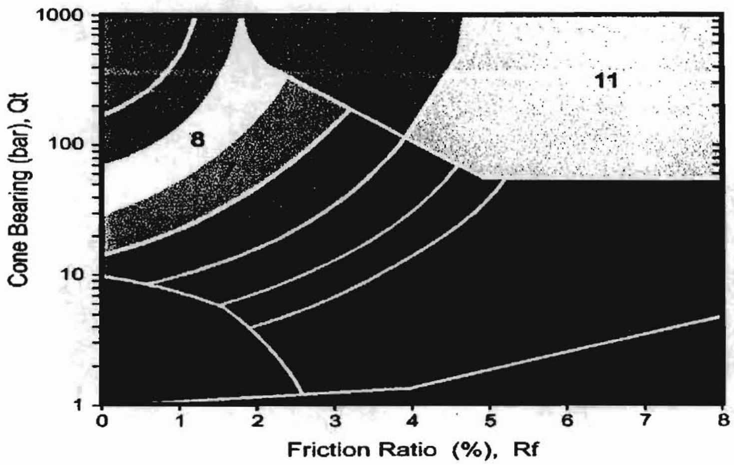
APPENDIX B
CONE PENETRATION TEST RESULTS

LIST OF ATTACHMENTS

The following plates are attached and complete this appendix.

CPT Classification Chart
(after Robertson 1990)

Non-Normalized Classification Chart



Zone	Q_t / N	Soil Behaviour Type
1	2	sensitive fine grained
2	1	organic material
3	1	clay
4	1.5	silty clay to clay
5	2	clayey silt to silty clay
6	2.5	sandy silt to clayey silt
7	3	silty sand to sandy silt
8	4	sand to silty sand
9	5	sand
10	6	gravelly sand to sand
11	1	very stiff fine grained *
12	2	sand to clayey sand *

* overconsolidated or cemented

GREGG

Geotechnical and Environmental In Situ Testing Contractors

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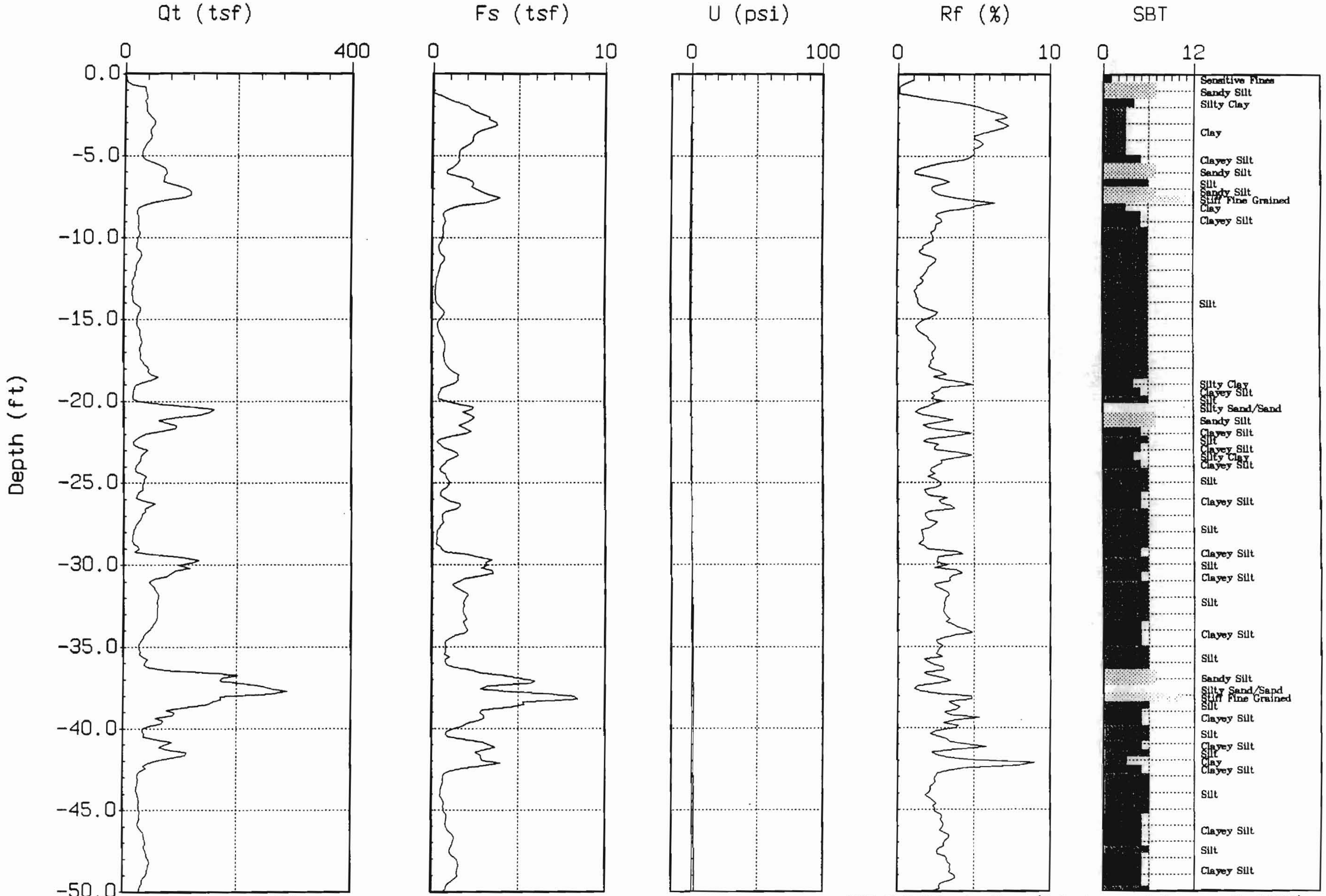
Tel: (925)313-5800 · Fax: (925)313-0302 · E-mail: gregg@ecis.com

GREGG | KLEINFELDER | Site : CALPINE | Engineer: R. HEINZEN
Location : CPT-1 | Date : 05:02:01 12:03



Max. Depth: 70.05 (ft)

Depth Inc.: 0.164 (ft)

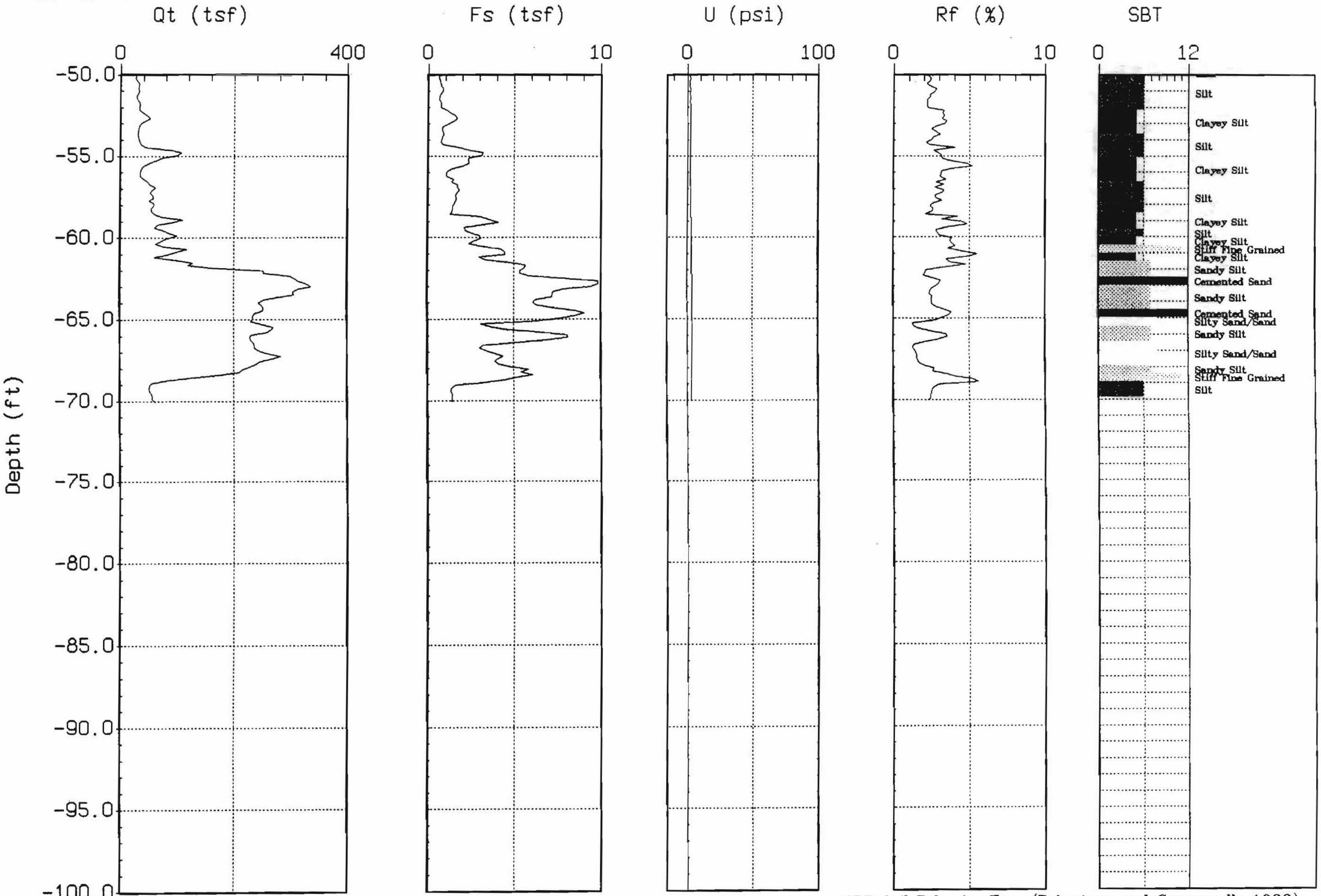
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-1

Engineer: R. HEINZEN
Date : 05:02:01 12:03



Max. Depth: 70.05 (ft)

Depth Inc.: 0.164 (ft)

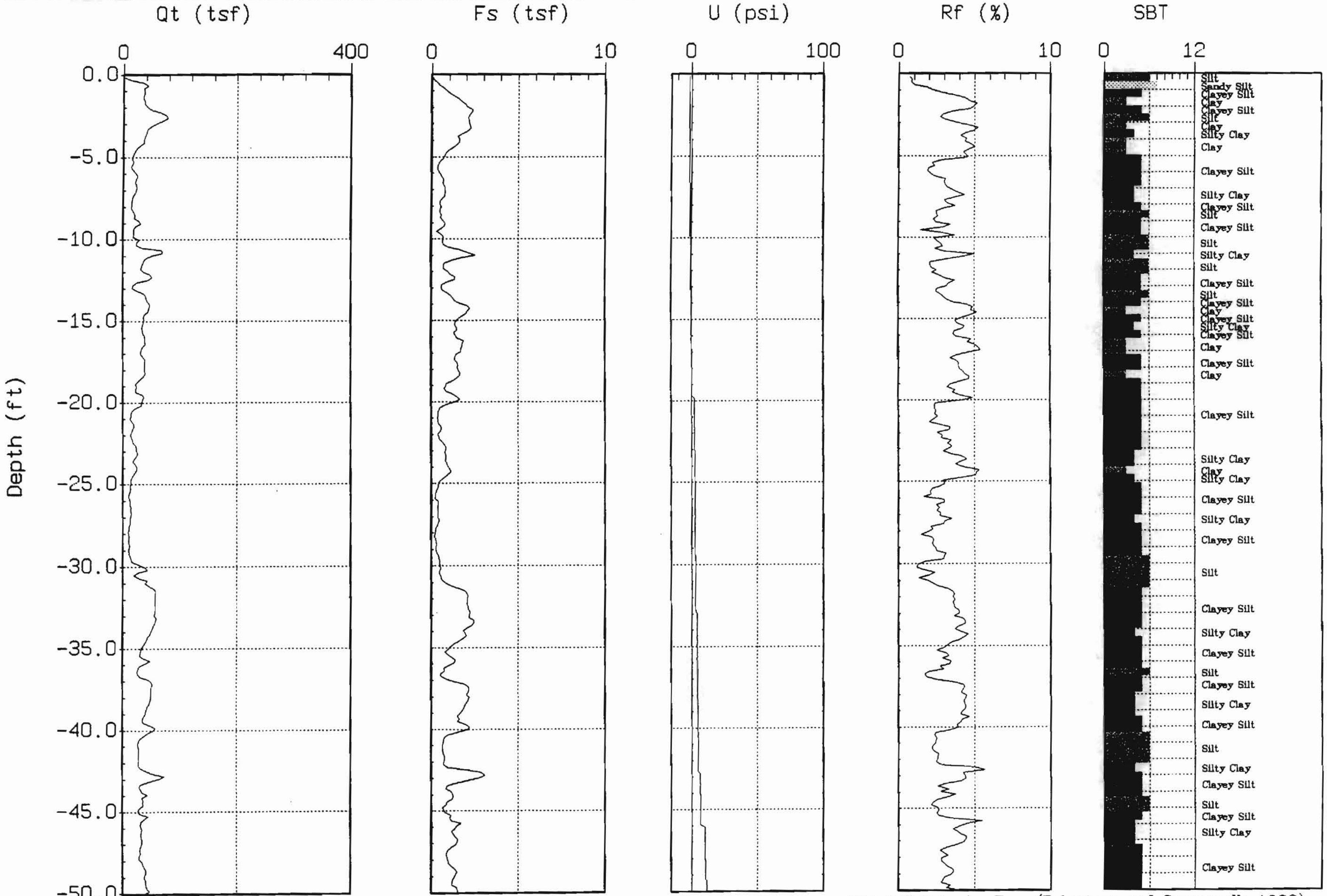
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-2

Engineer: R. HEINZEN
Date : 05:03:01 07:49



Max. Depth: 100.06 (ft)

Depth Inc.: 0.164 (ft)

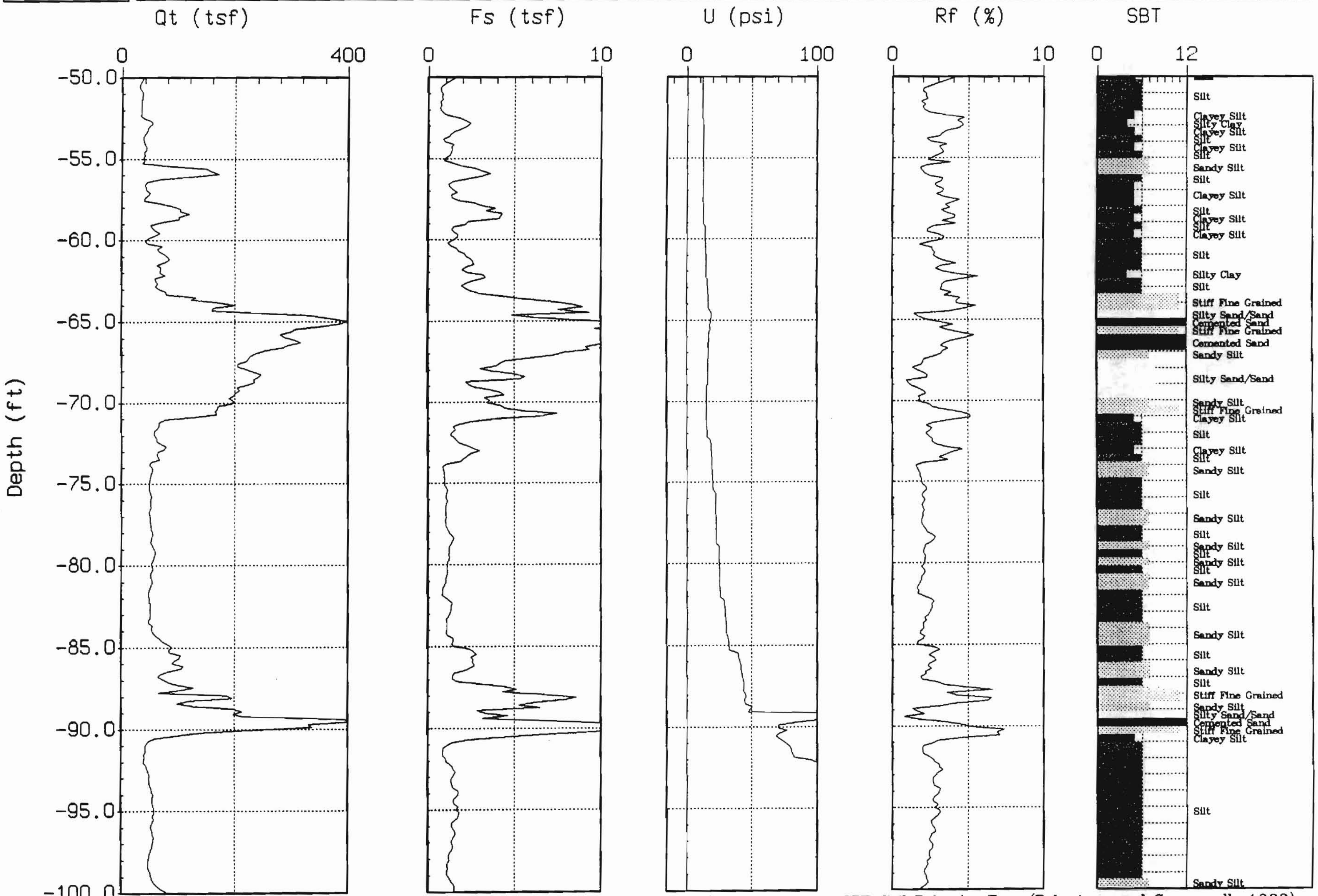
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-2

Engineer: R. HEINZEN
Date : 05:03:01 07:49



Max. Depth: 100.06 (ft)

Depth Inc.: 0.164 (ft)

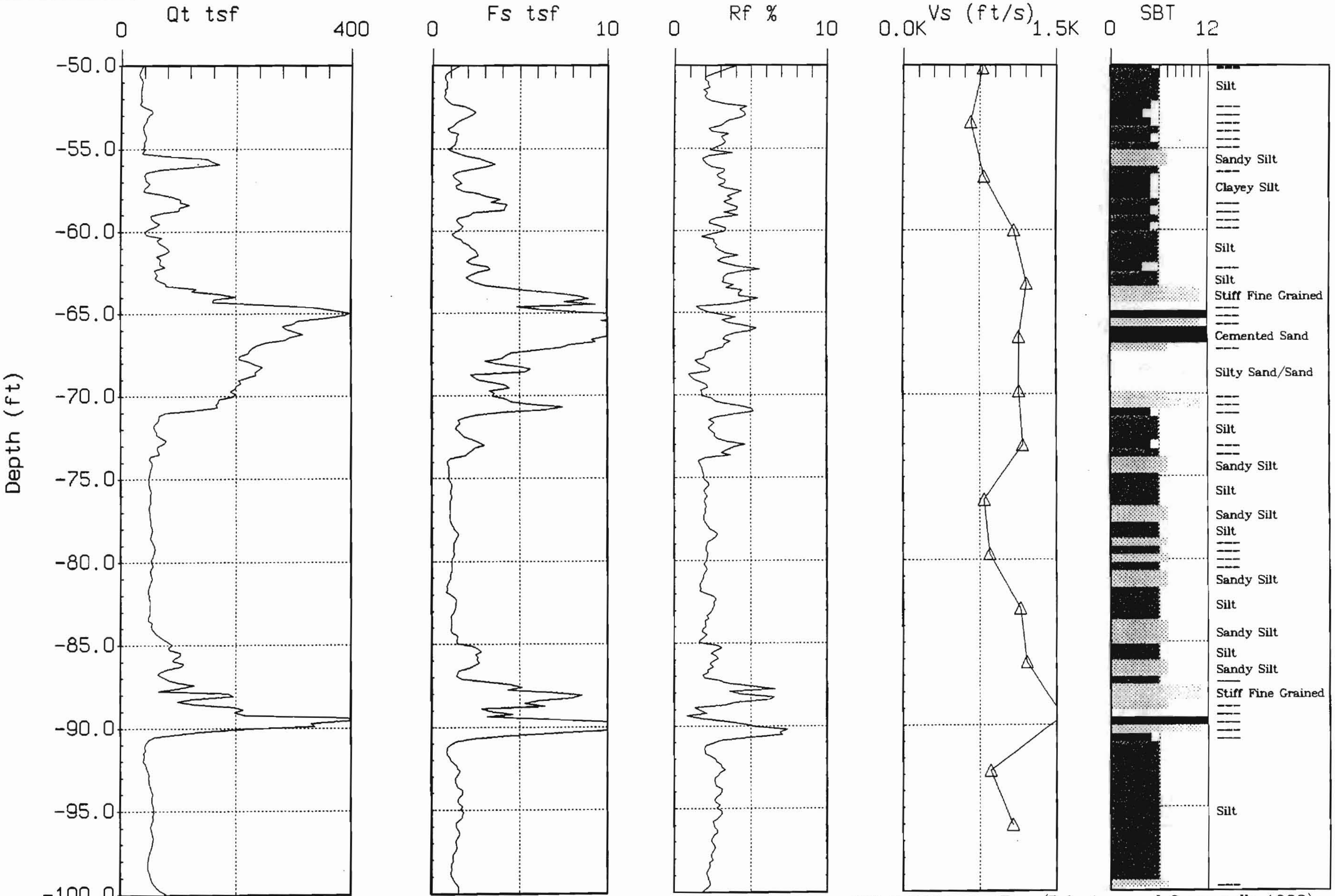
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site: CALPINE
Location: CPT-2.a

Engineer: R. HEINZEN
Date: 05:03:01 07:49



Max. Depth: 100.06 (ft)

Depth Inc.: 0.164 (ft)

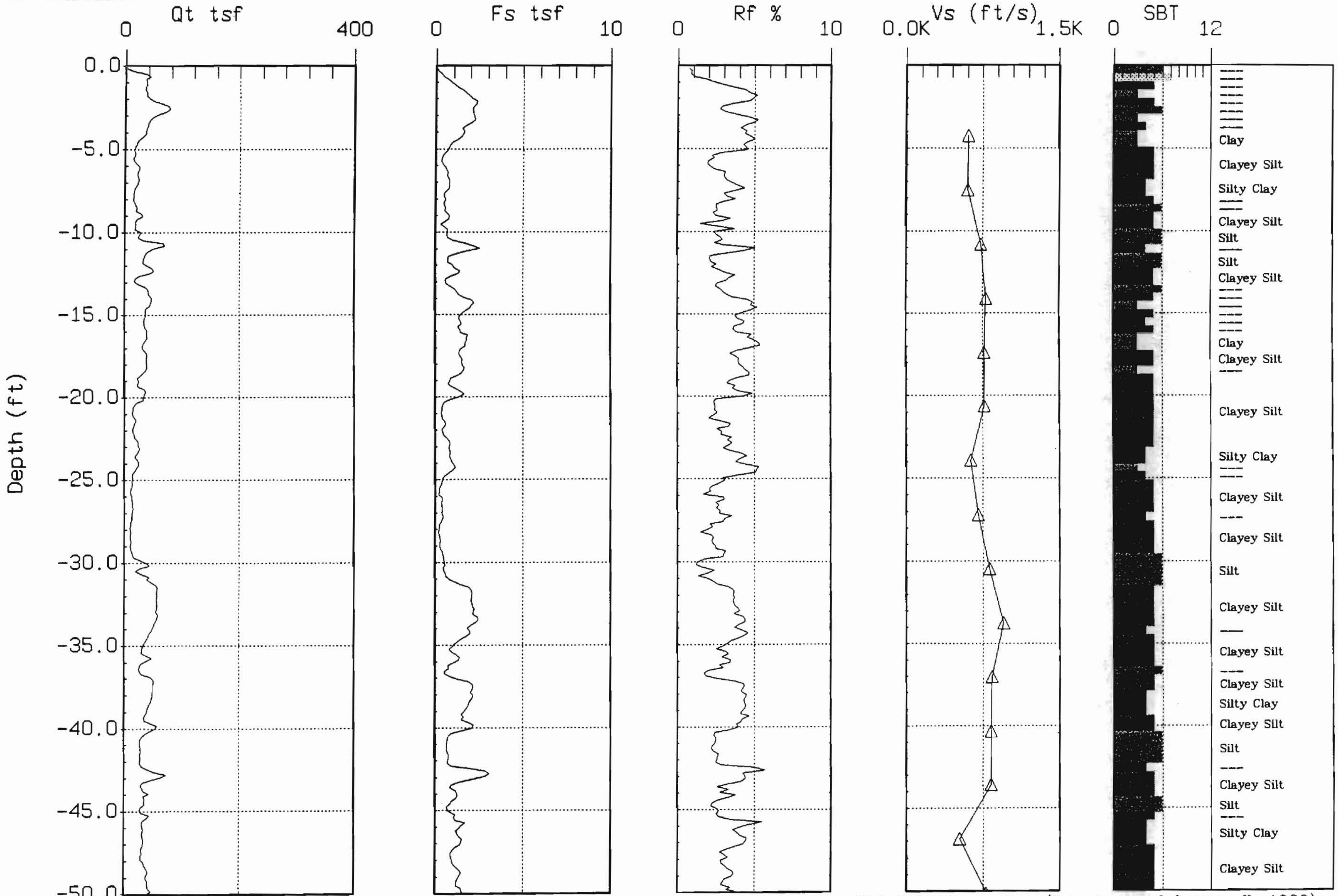
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site: CALPINE
Location: CPT-2 a

Engineer: R. HEINZEN
Date: 05:03:01 07:49



Max. Depth: 100.06 (ft)

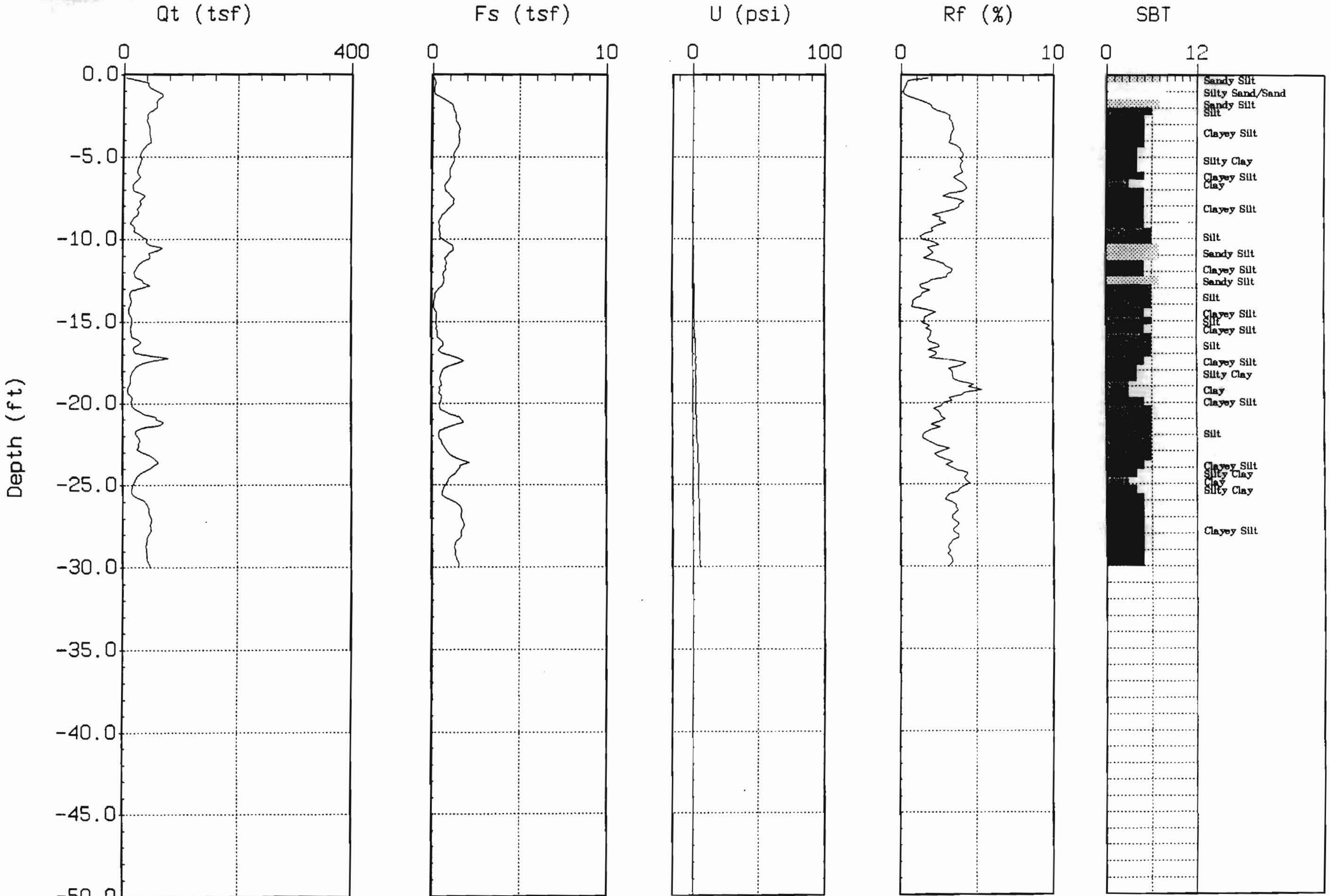
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

KLEINFELDER

Site : CALPINE
Location : CPT-3

Engineer: R. HEINZEN
Date : 05:02:01 11:27



Max. Depth: 30.02 (ft)

Depth Inc.: 0.164 (ft)

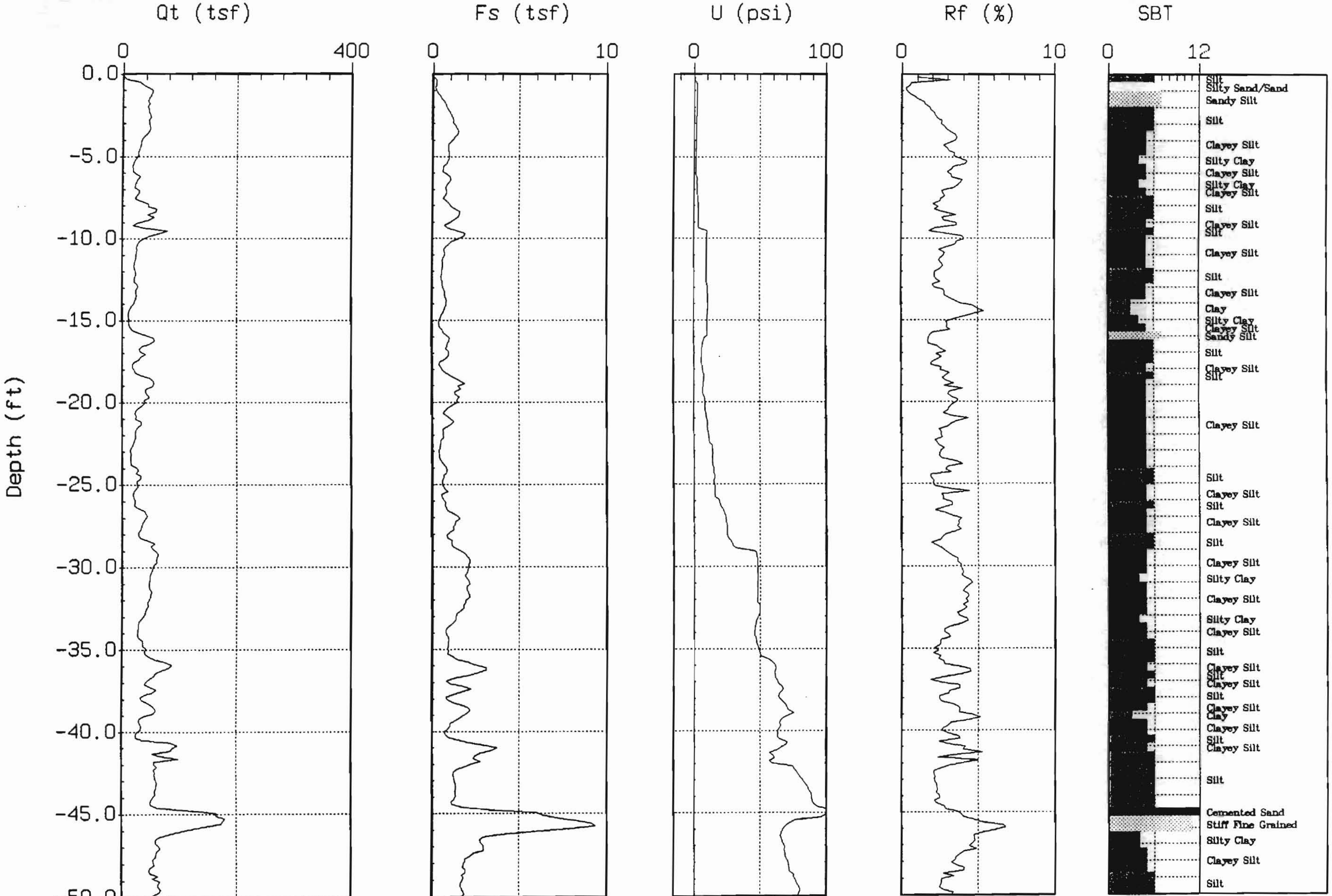
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-4

Engineer: R. HEINZEN
Date : 05:02:01 13:06



Max. Depth: 70.05 (ft)

Depth Inc.: 0.164 (ft)

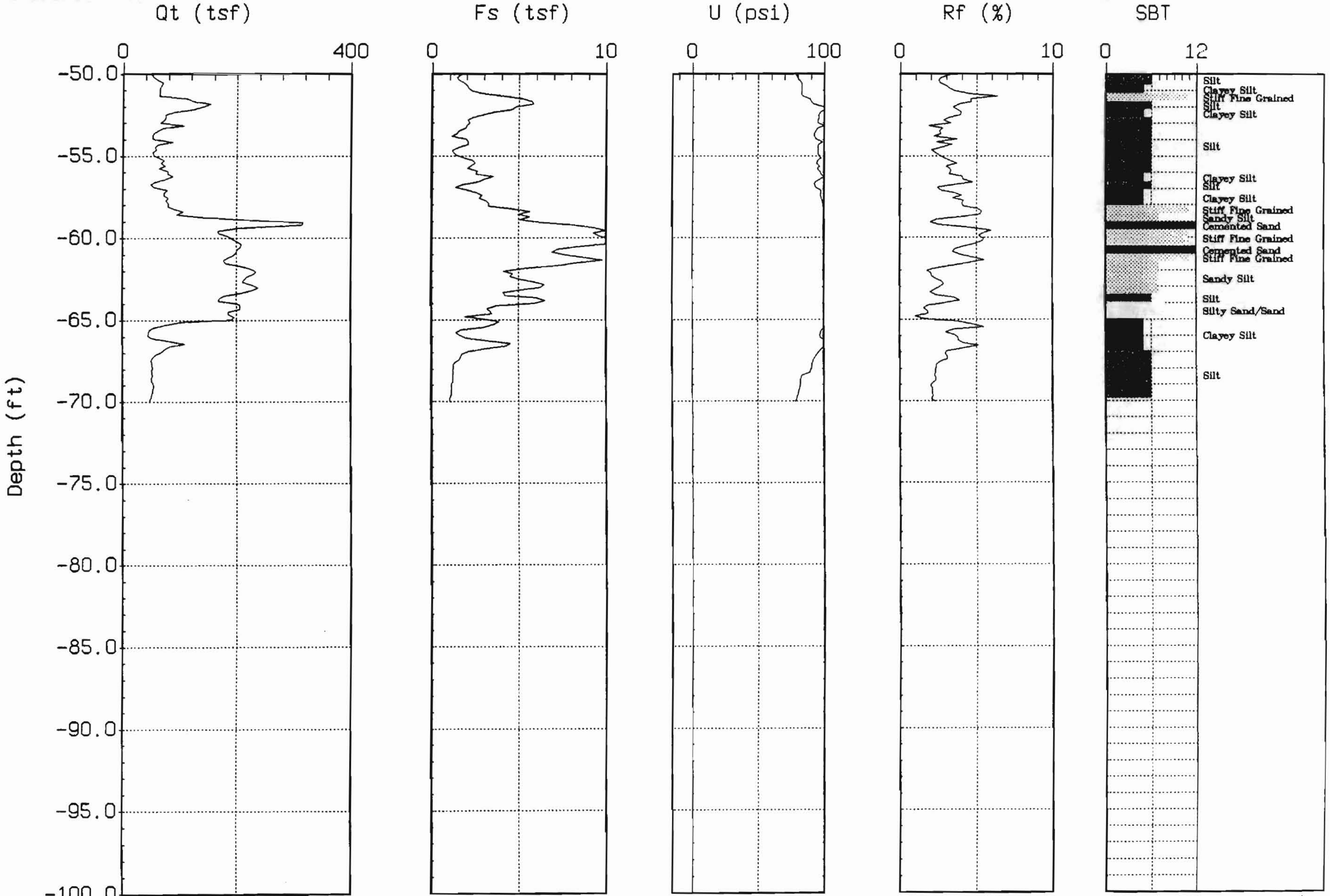
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-4

Engineer: R. HEINZEN
Date : 05:02:01 13:06



Max. Depth: 70.05 (ft)

Depth Inc.: 0.164 (ft)

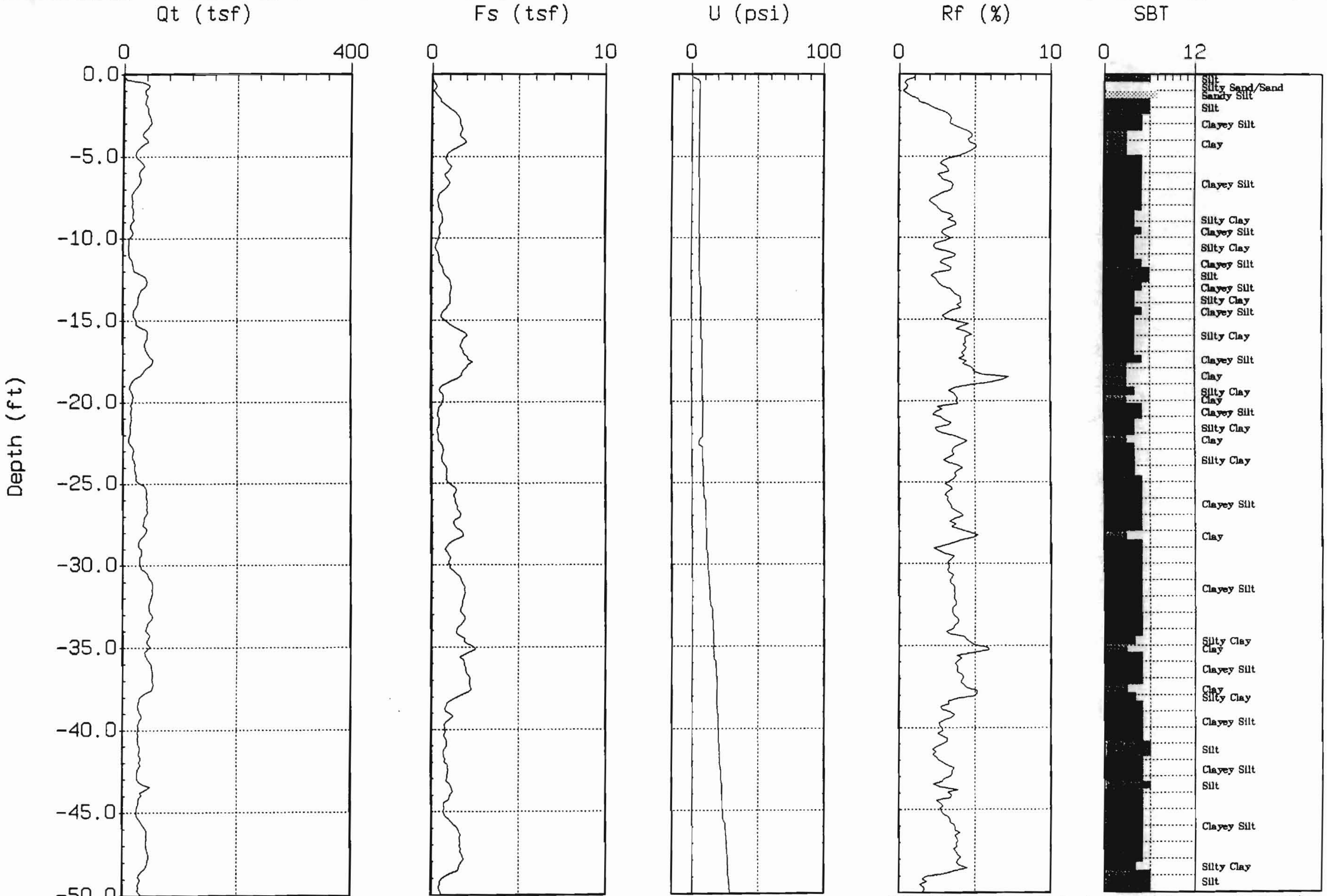
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-5

Engineer: R. HEINZEN
Date : 05:03:01 10:59



Max. Depth: 70.05 (ft)

Depth Inc.: 0.164 (ft)

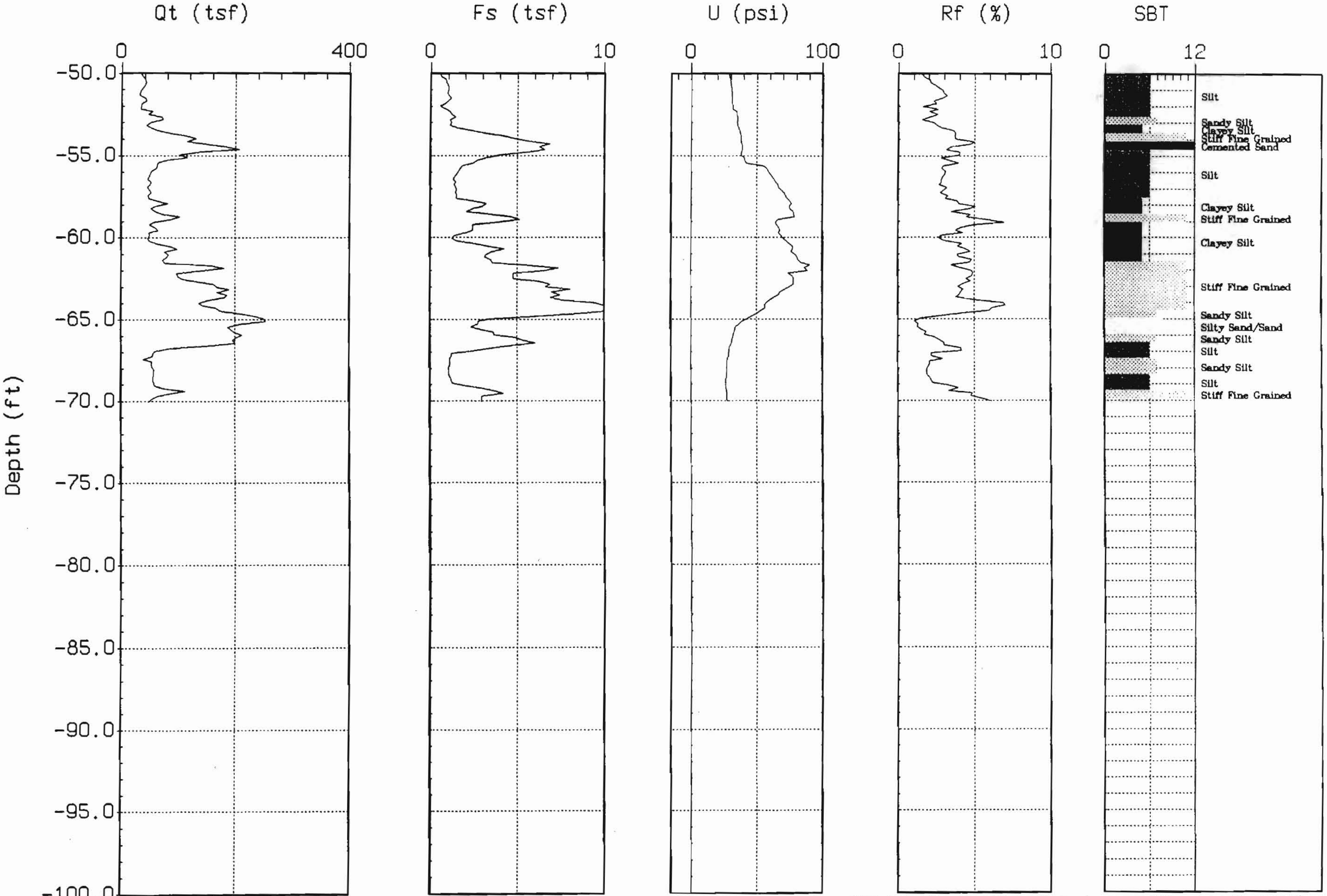
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-5

Engineer: R. HEINZEN
Date : 05:03:01 10:59



Max. Depth: 70.05 (ft)

Depth Inc.: 0.164 (ft)

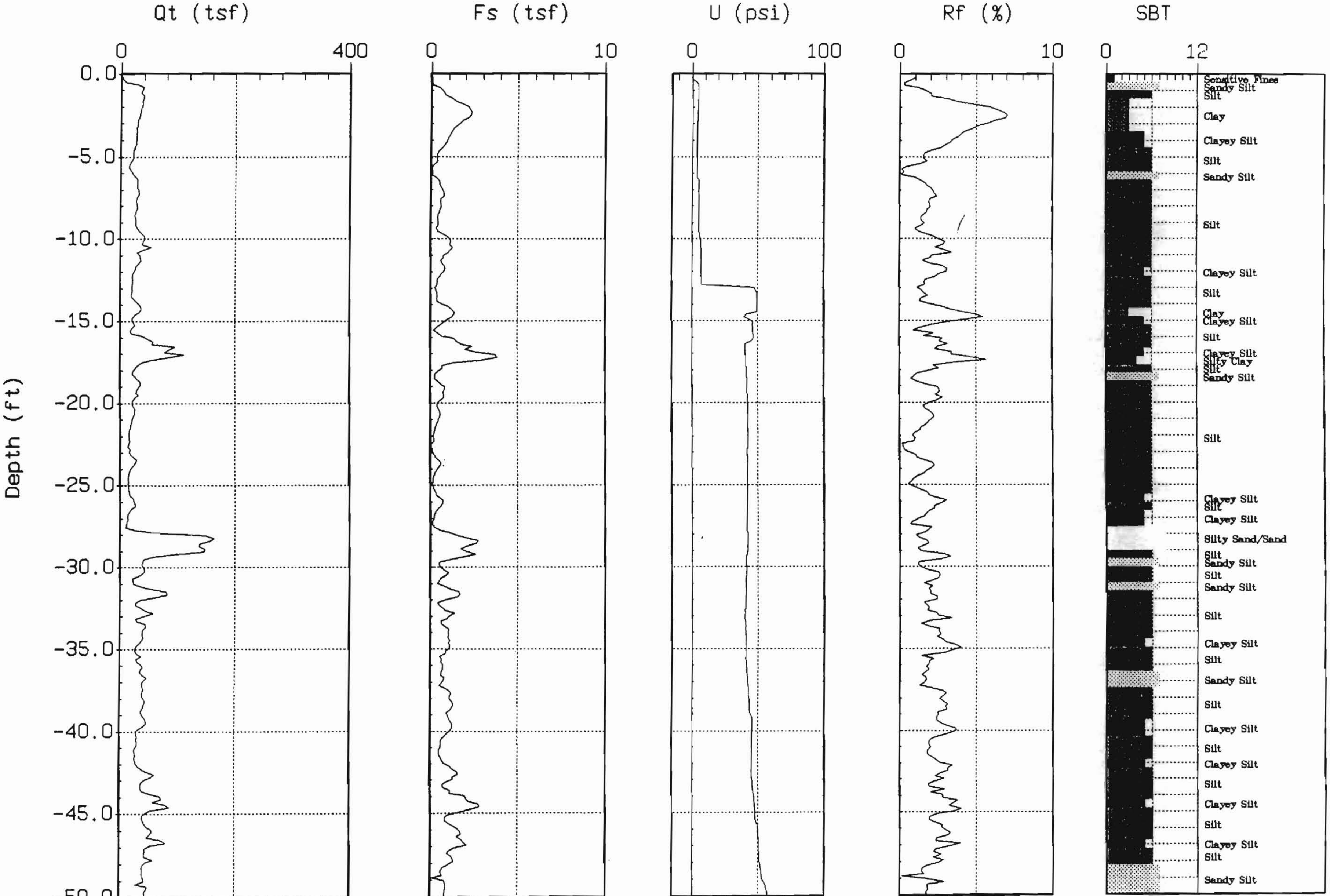
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-6

Engineer: R. HEINZEN
Date : 05:03:01 09:45



Max. Depth: 100.06 (ft)

Depth Inc.: 0.164 (ft)

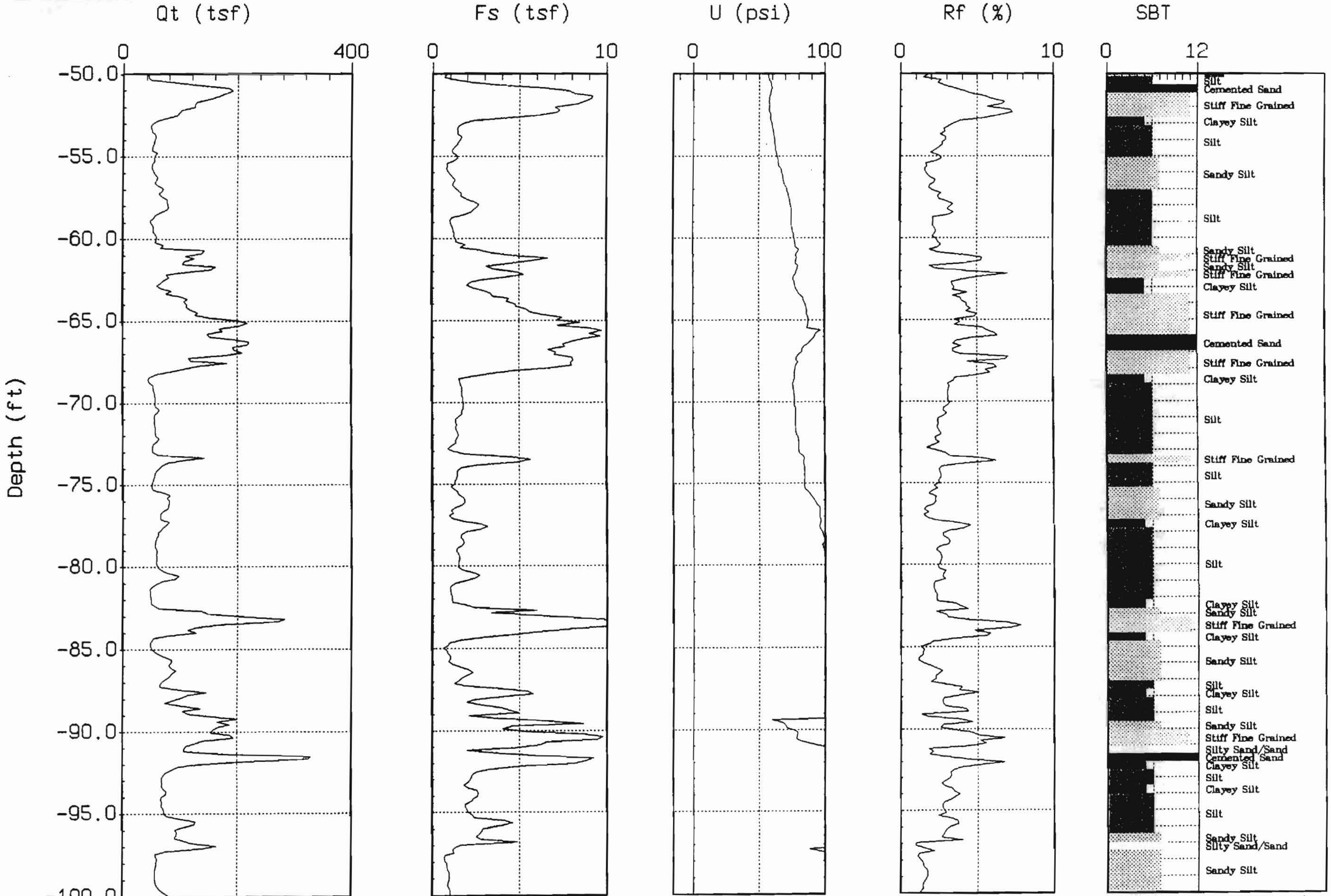
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-6

Engineer: R. HEINZEN
Date : 05:03:01 09:45



Max. Depth: 100.06 (ft)

Depth Inc.: 0.164 (ft)

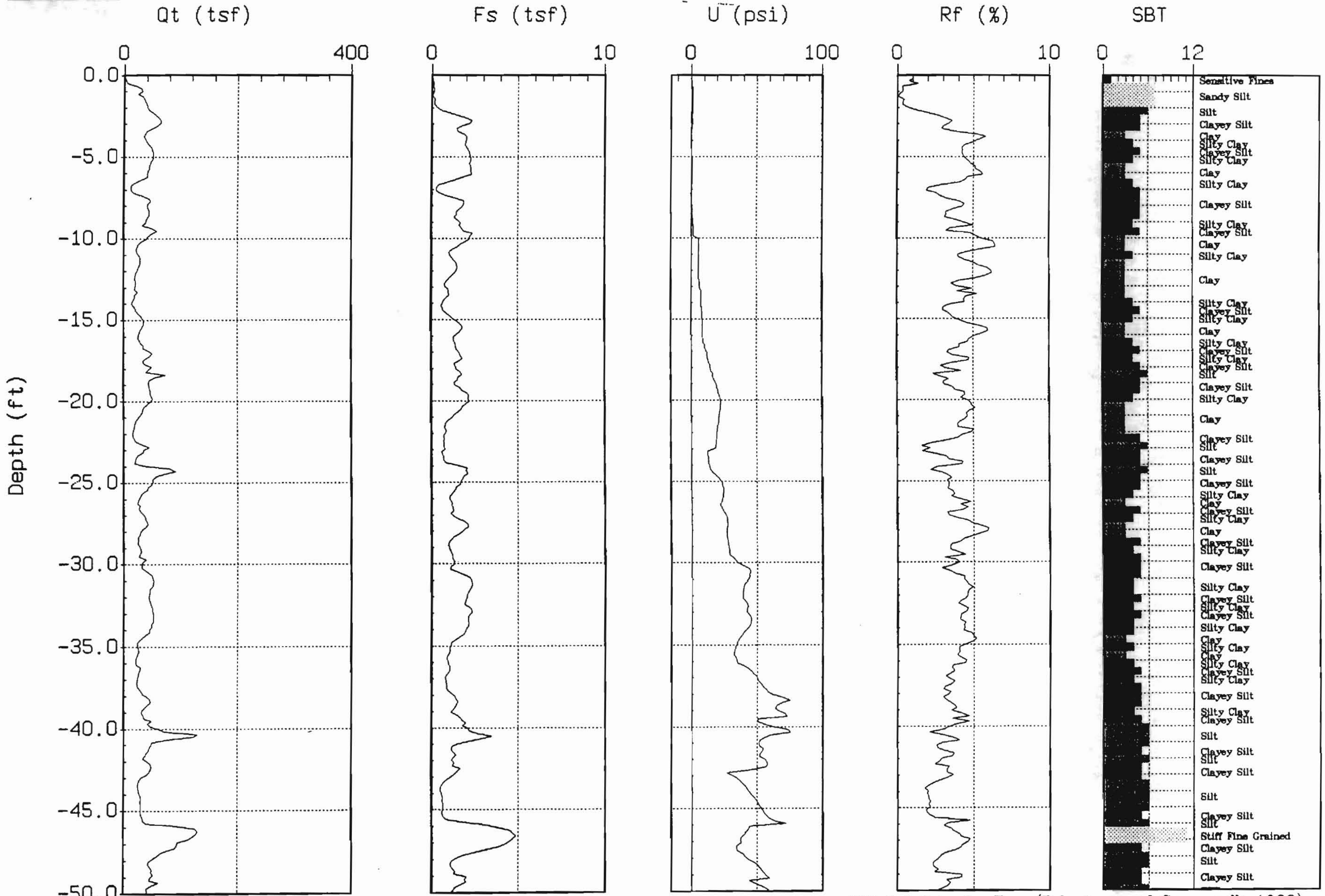
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-7

Engineer: R. HEINZEN
Date : 05:02:01 08:51



Max. Depth: 83.17 (ft)

Depth Inc.: 0.164 (ft)

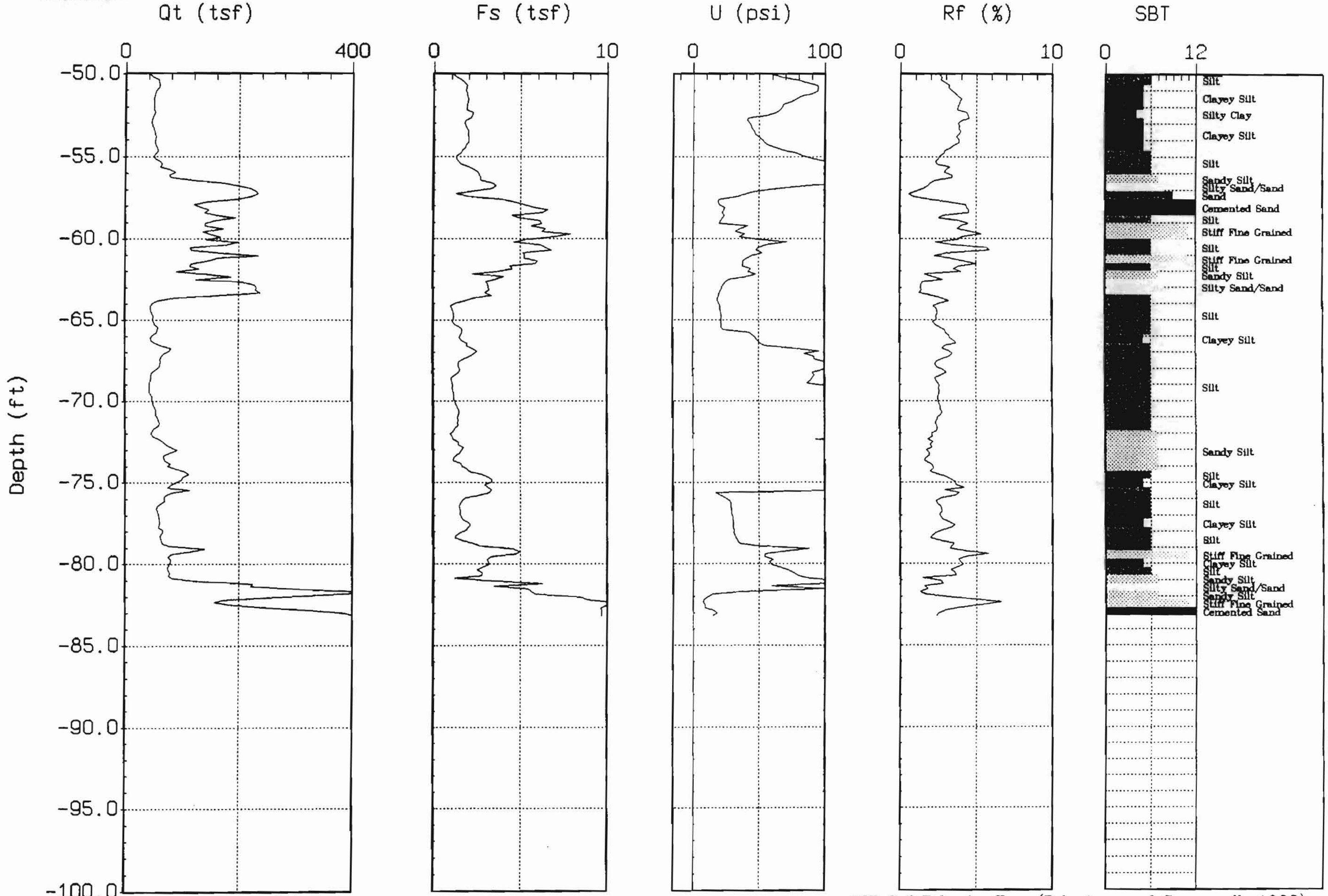
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-7

Engineer: R. HEINZEN
Date : 05:02:01 08:51



Max. Depth: 83.17 (ft)

Depth Inc.: 0.164 (ft)

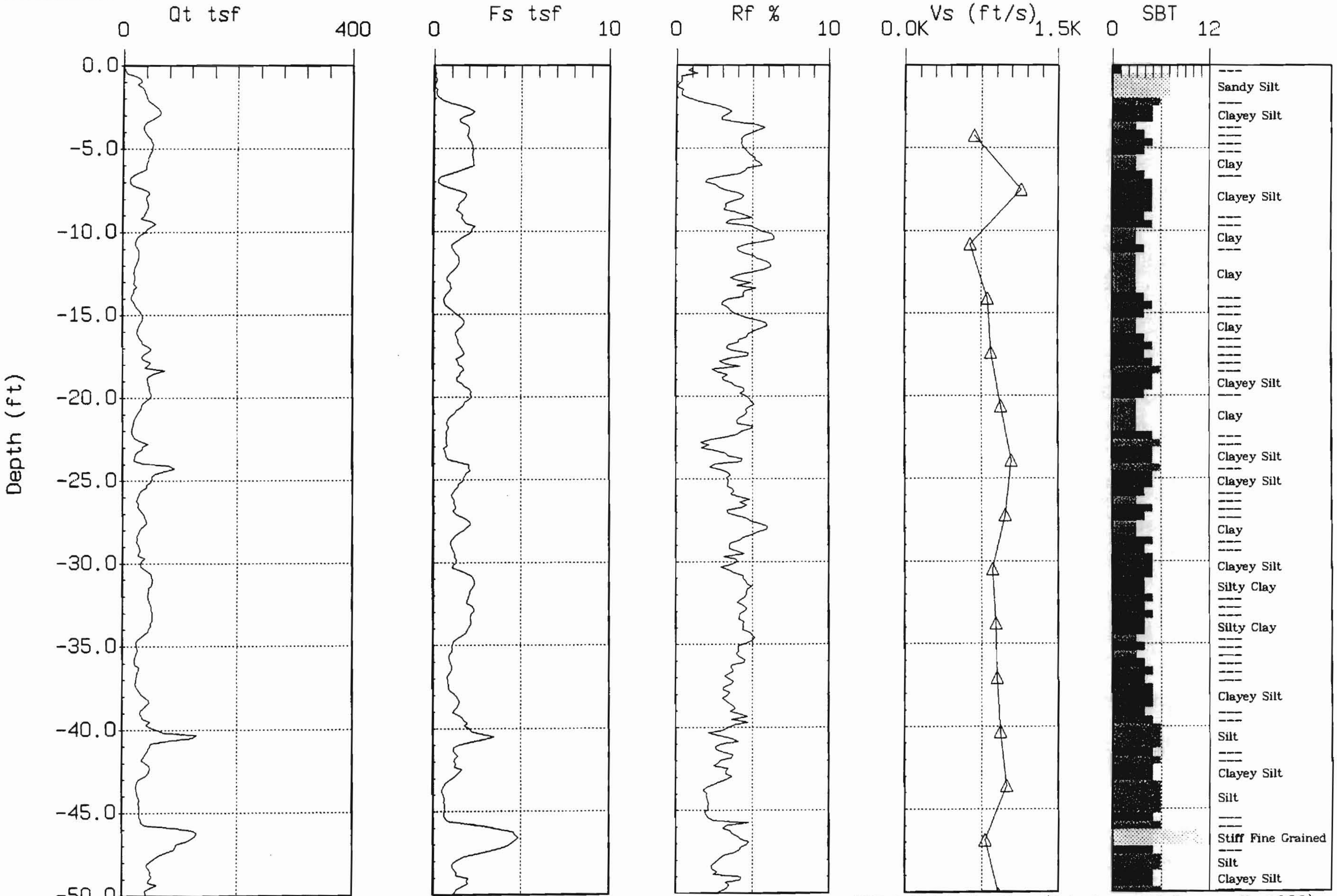
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site: CALPINE
Location: CPT-7 a

Engineer: R. HEINZEN
Date: 05:02:01 08:51



Max. Depth: 83.17 (ft)

Depth Inc.: 0.164 (ft)

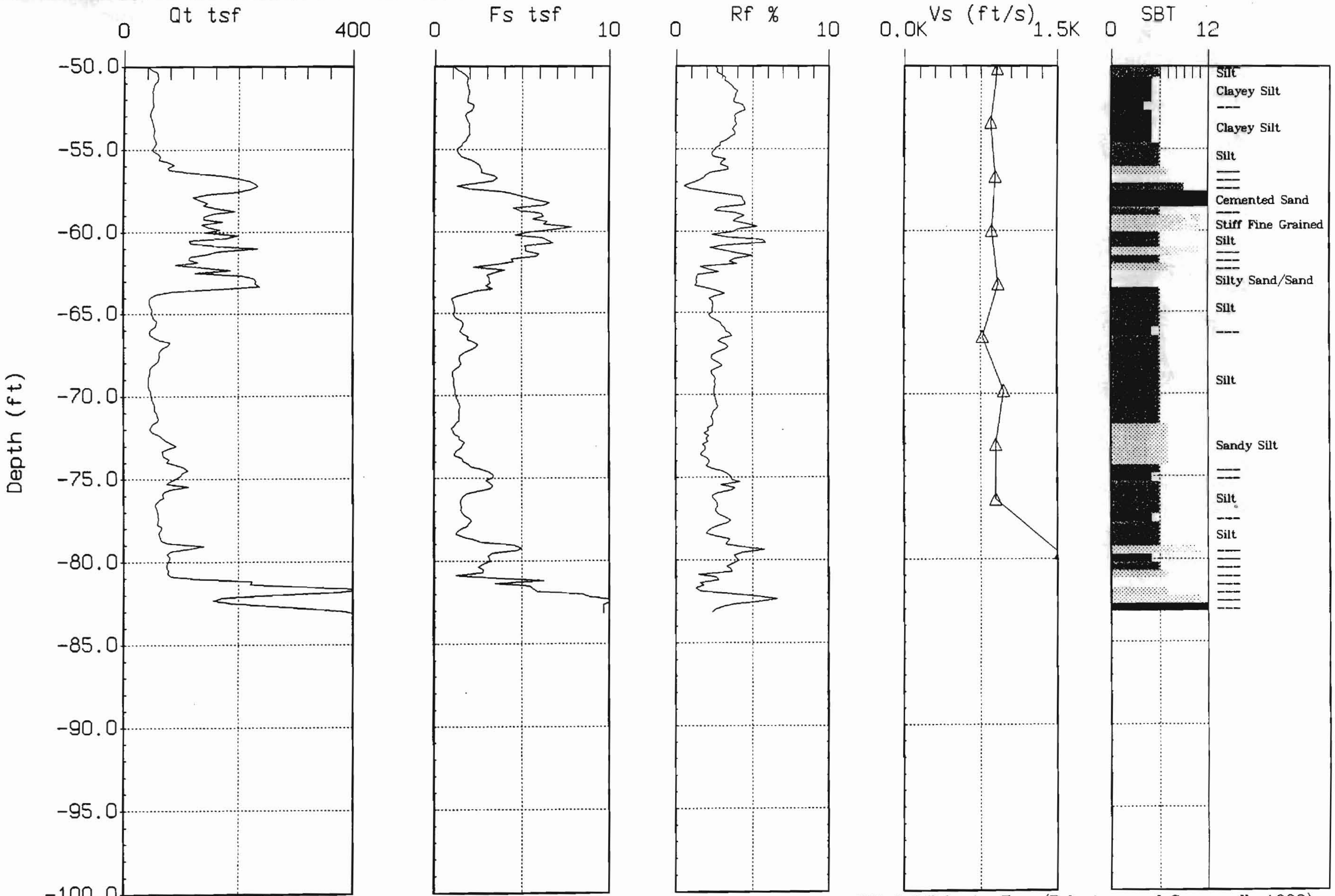
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site: CALPINE
Location: CPT-7 a

Engineer: R. HEINZEN
Date: 05:02:01 08:51



Max. Depth: 83.17 (ft)

Depth Inc.: 0.164 (ft)

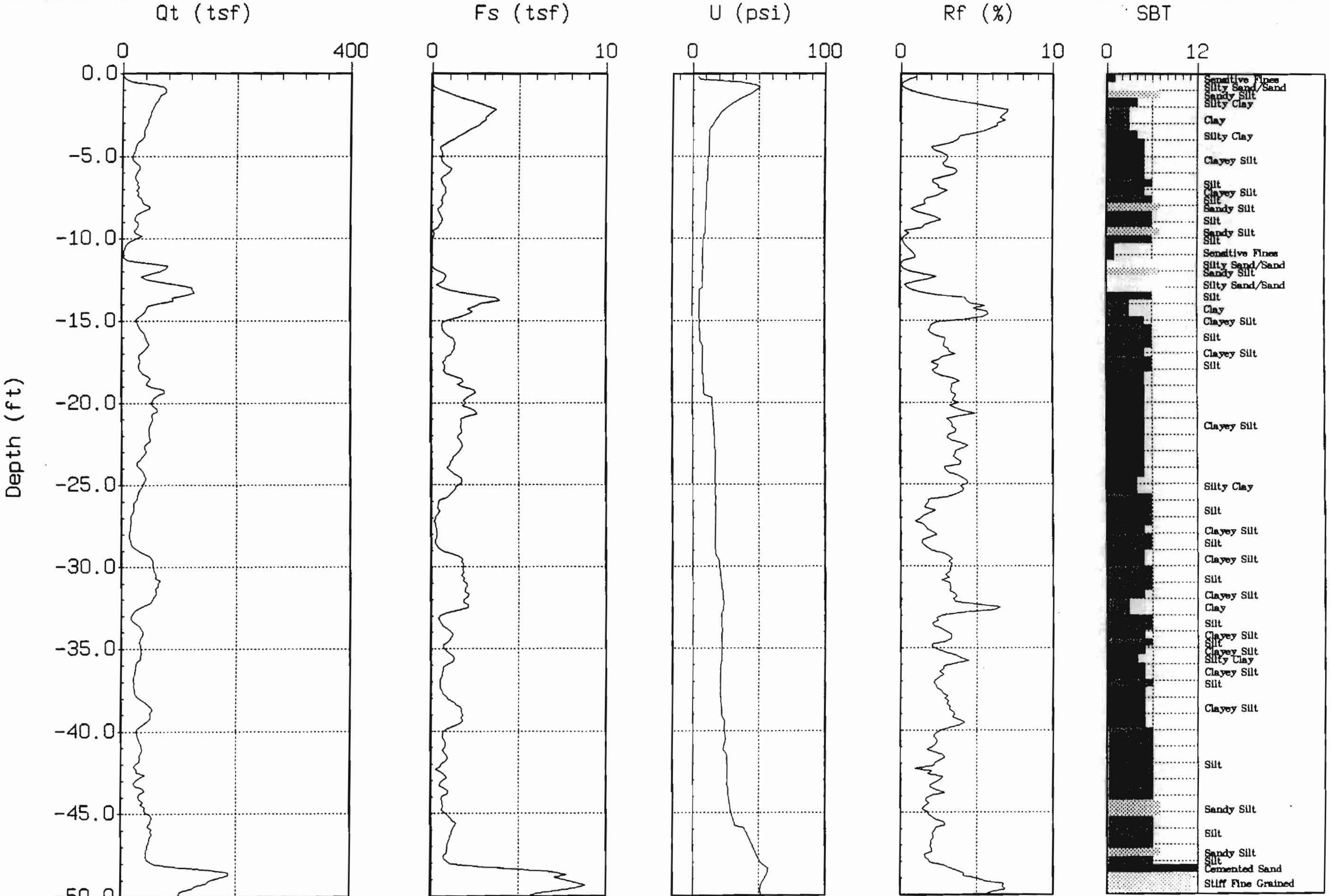
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-8

Engineer: R. HEINZEN
Date : 05:03:01 11:33



Max. Depth: 70.37 (ft)

Depth Inc.: 0.164 (ft)

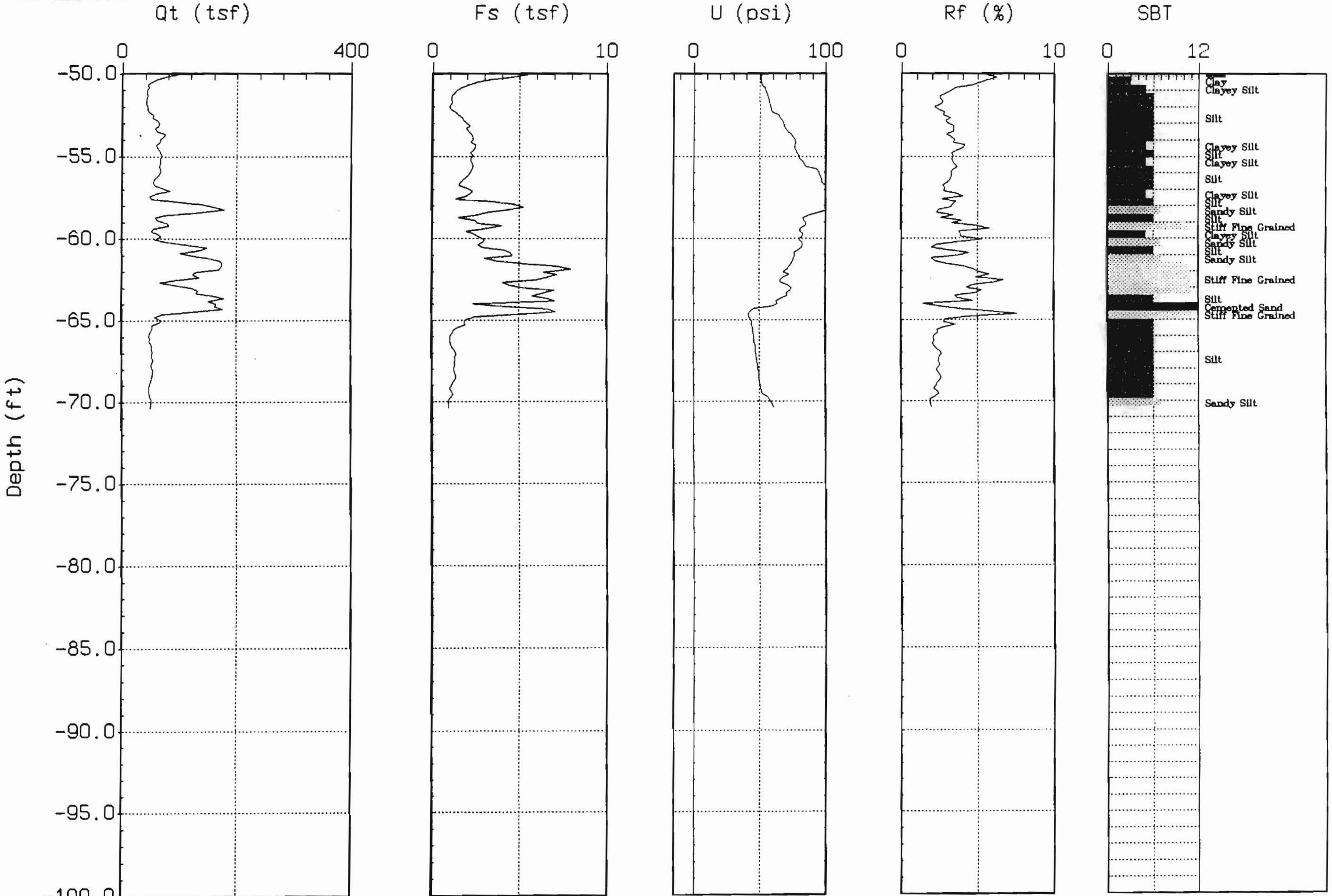
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-8

Engineer: R. HEINZEN
Date : 05:03:01 11:33



Max. Depth: 70.37 (ft)

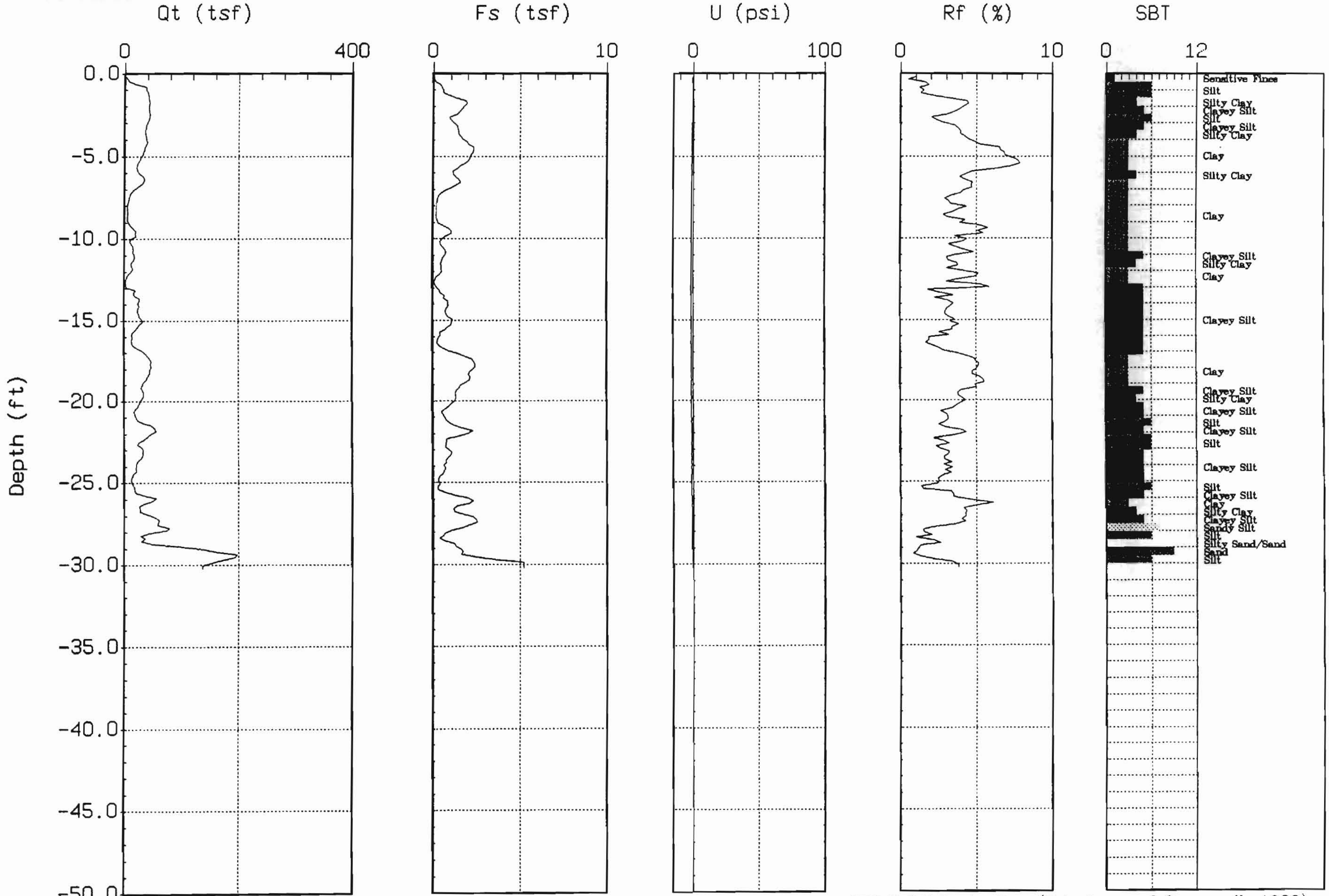
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

KLEINFELDER

Site : CALPINE
Location : CPT-9

Engineer: R. HEINZEN
Date : 05:02:01 13:57



Max. Depth: 30.18 (ft)

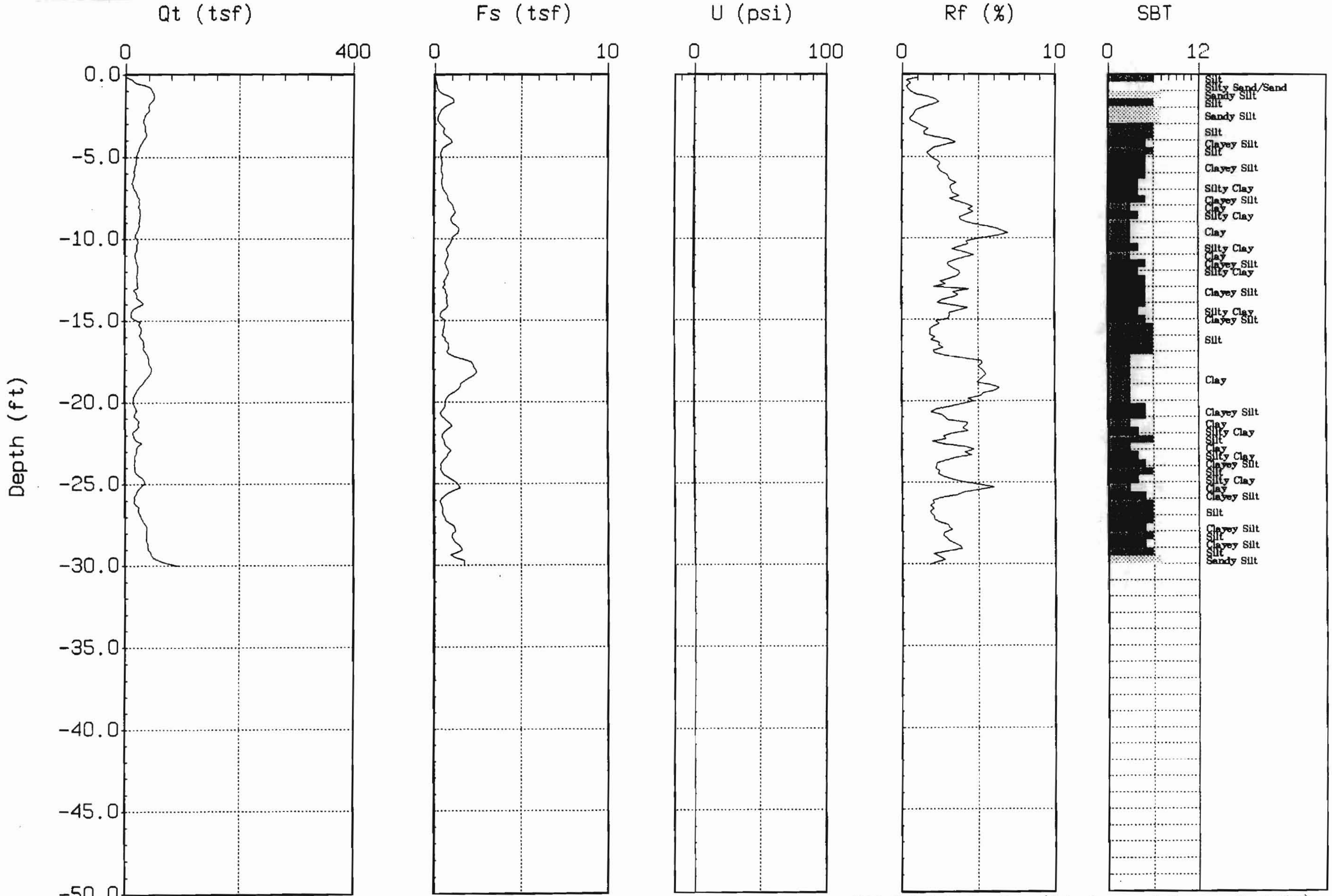
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

KLEINFELDER

Site : CALPINE
Location : CPT-10

Engineer: R. HEINZEN
Date : 05:02:01 14:30



Max. Depth: 30.02 (ft)

Depth Inc.: 0.164 (ft)

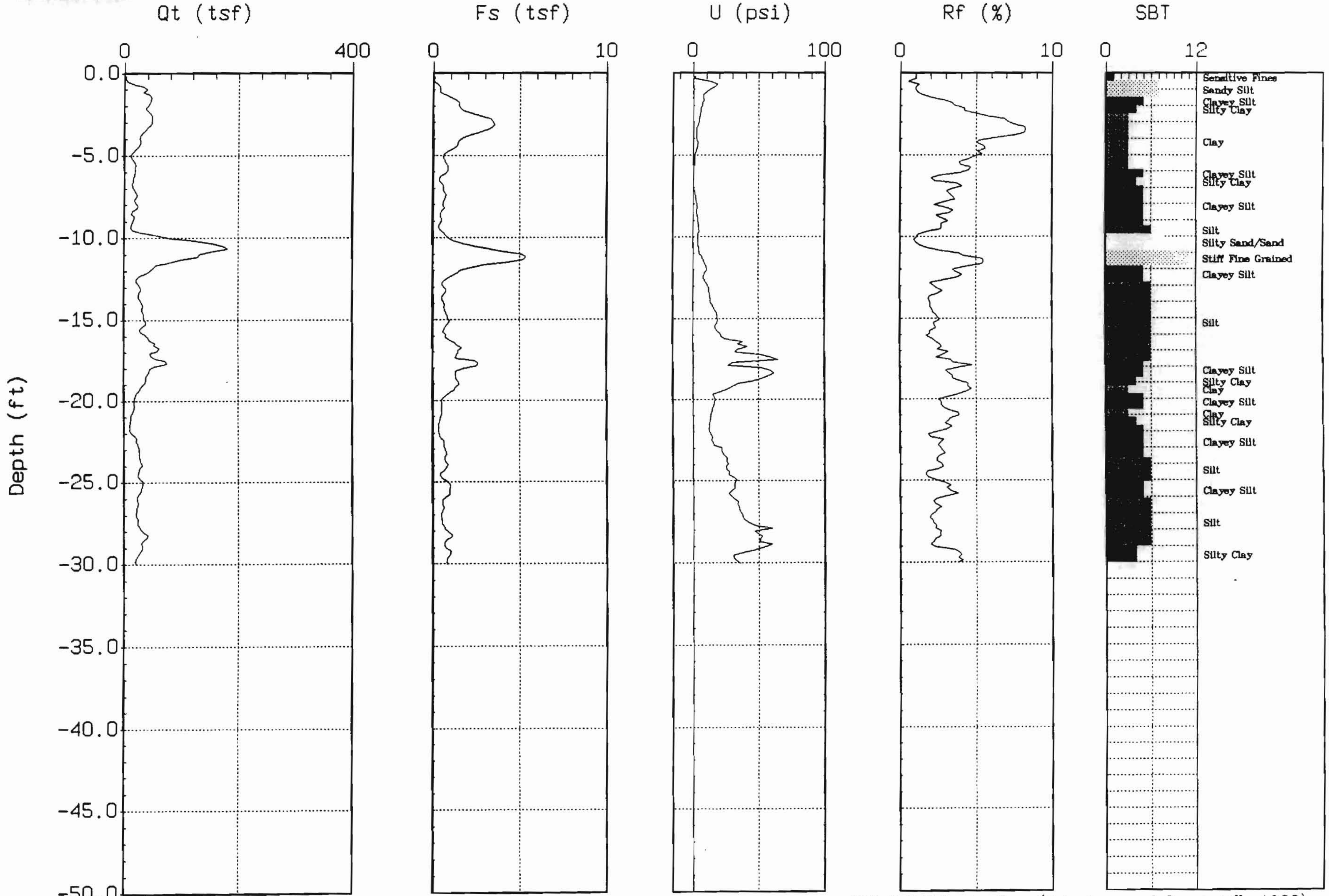
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-11

Engineer: R. HEINZEN
Date : 05:03:01 12:59



Max. Depth: 30.02 (ft)

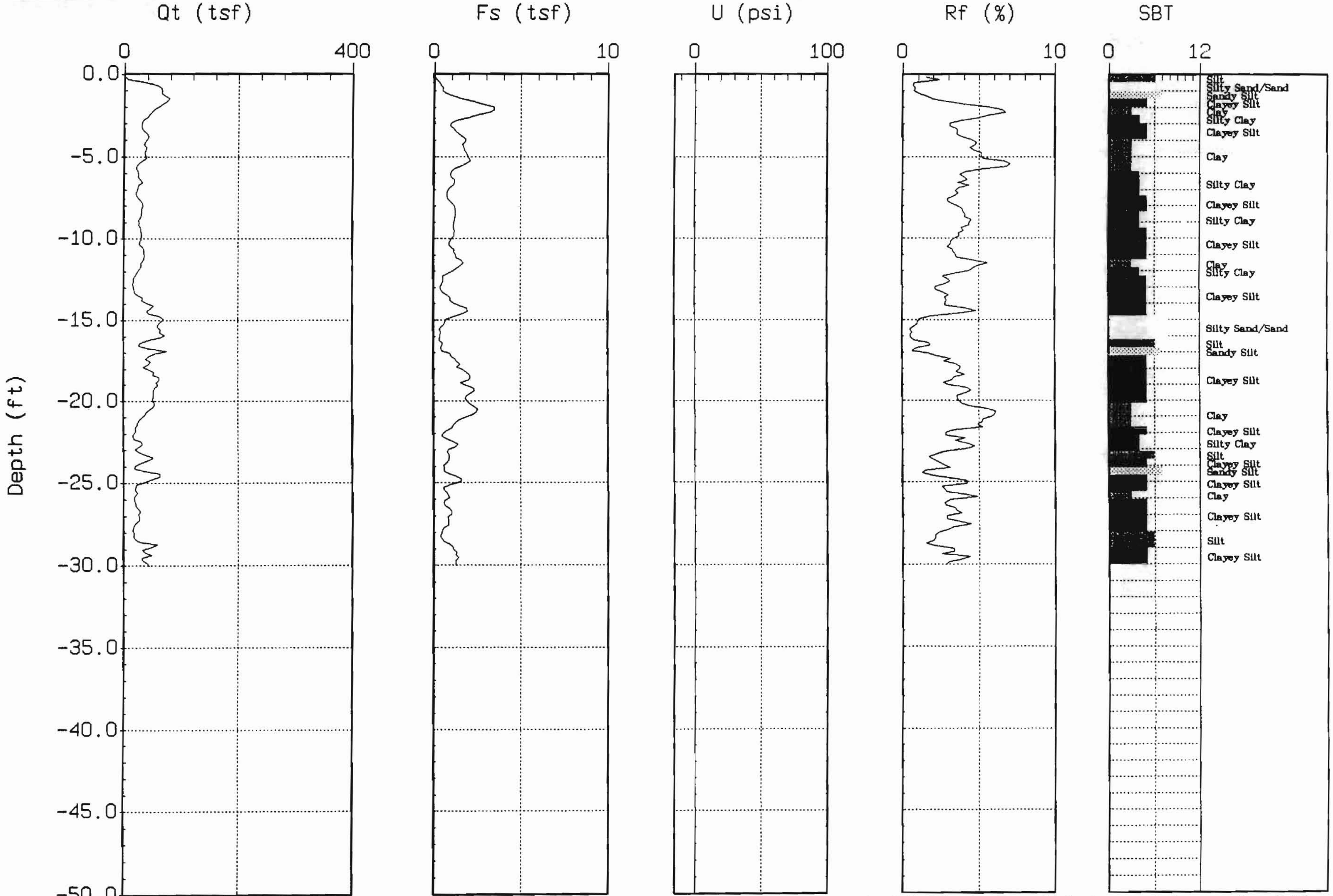
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

KLEINFELDER

Site : CALPINE
Location : CPT-12

Engineer: R. HEINZEN
Date : 05:02:01 14:58



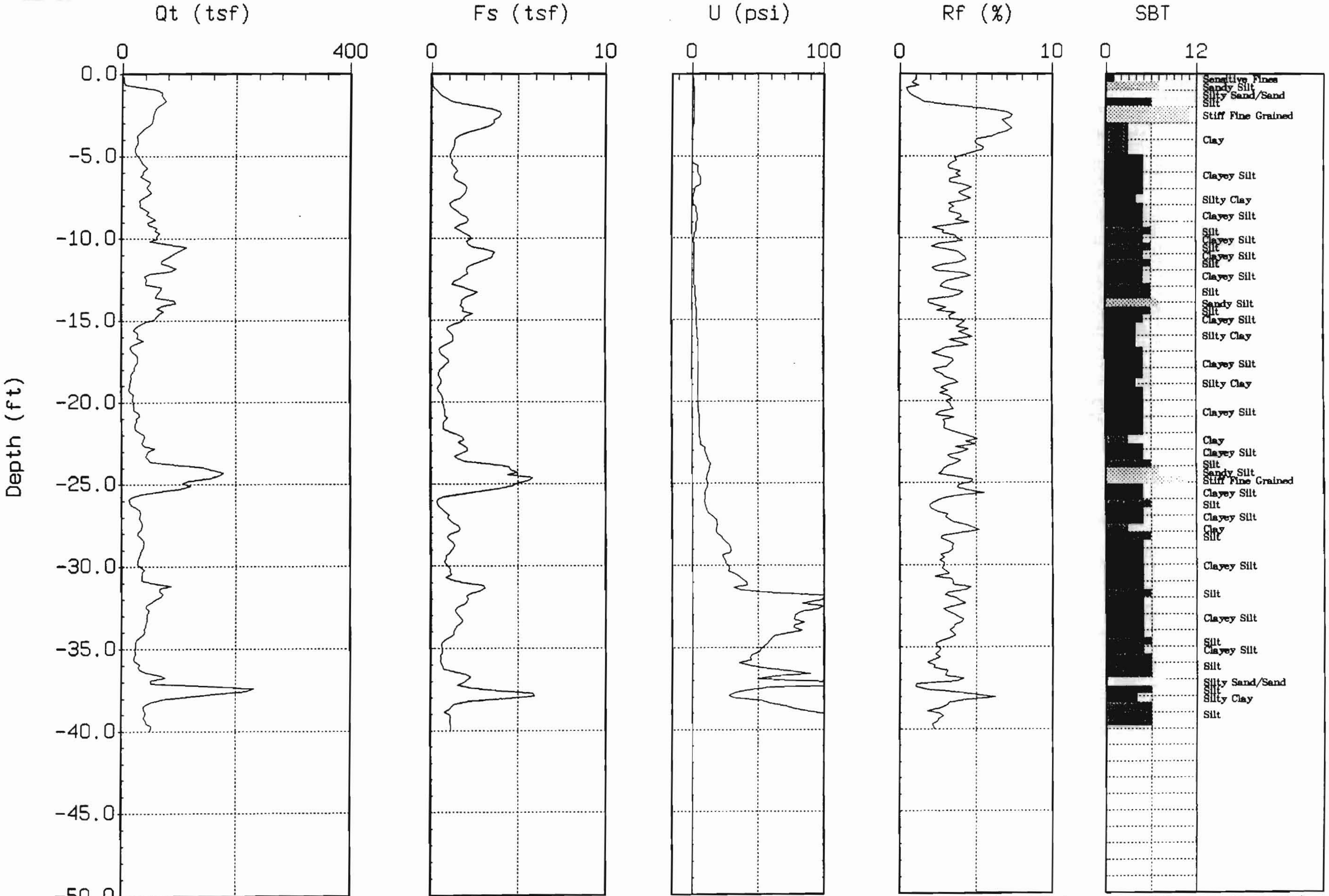
Max. Depth: 30.02 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

KLEINFELDER

Site : CALPINE
Location : CPT-13

Engineer: R. HEINZEN
Date : 05:03:01 13:44



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

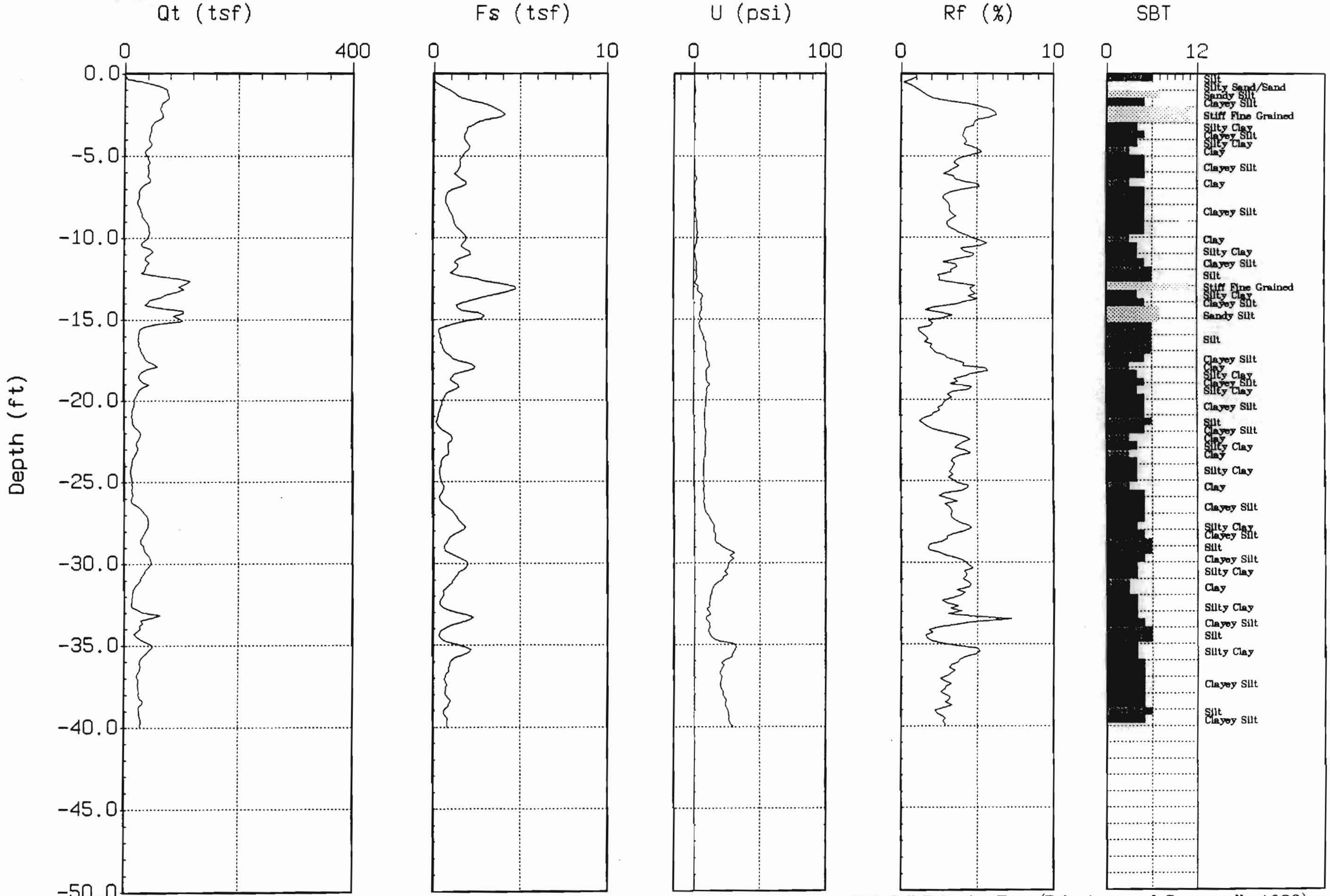
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-14

Engineer: R. HEINZEN
Date : 05:03:01 13:20



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

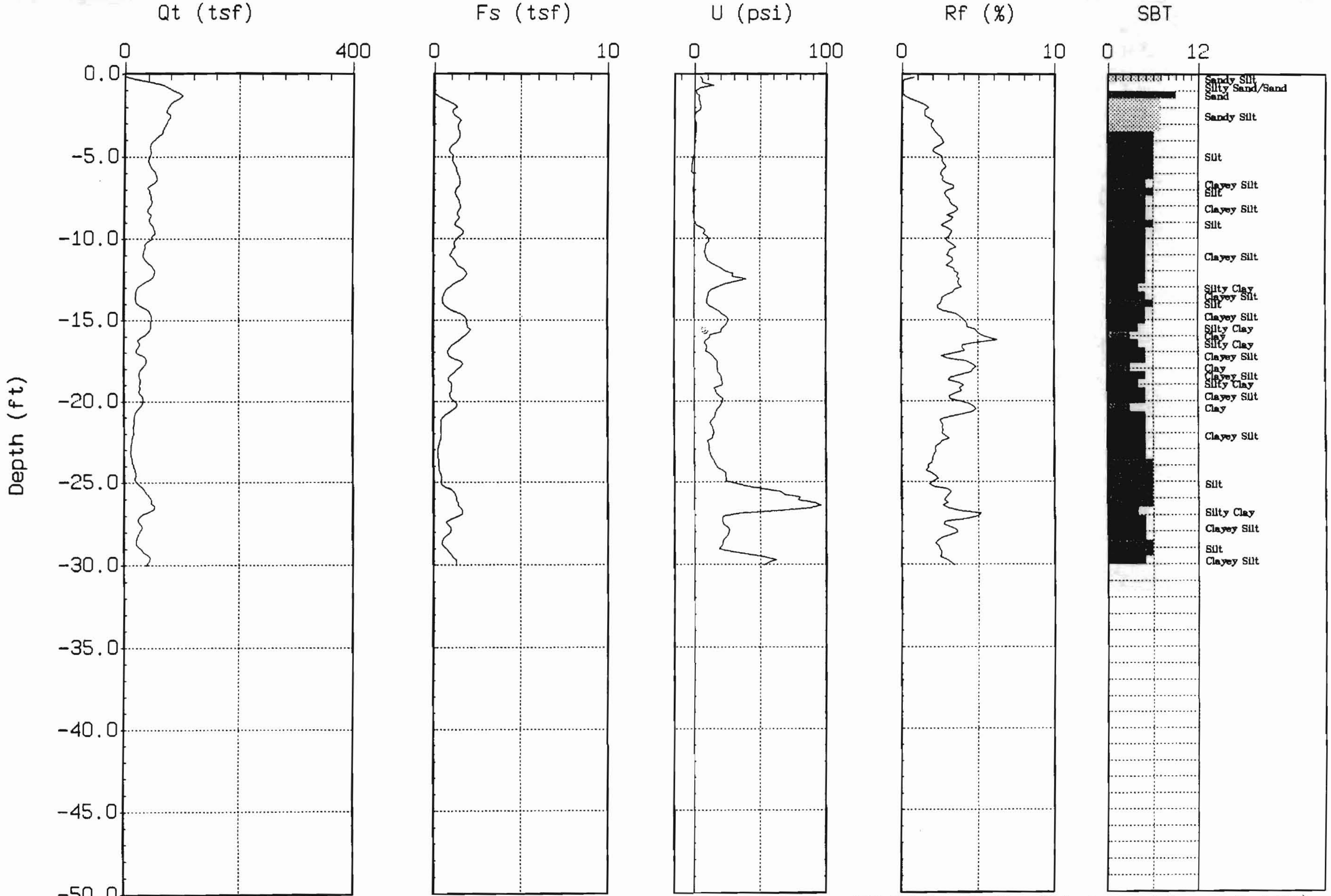
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-15

Engineer: R. HEINZEN
Date : 05:03:01 12:15



Max. Depth: 30.02 (ft)

Depth Inc.: 0.164 (ft)

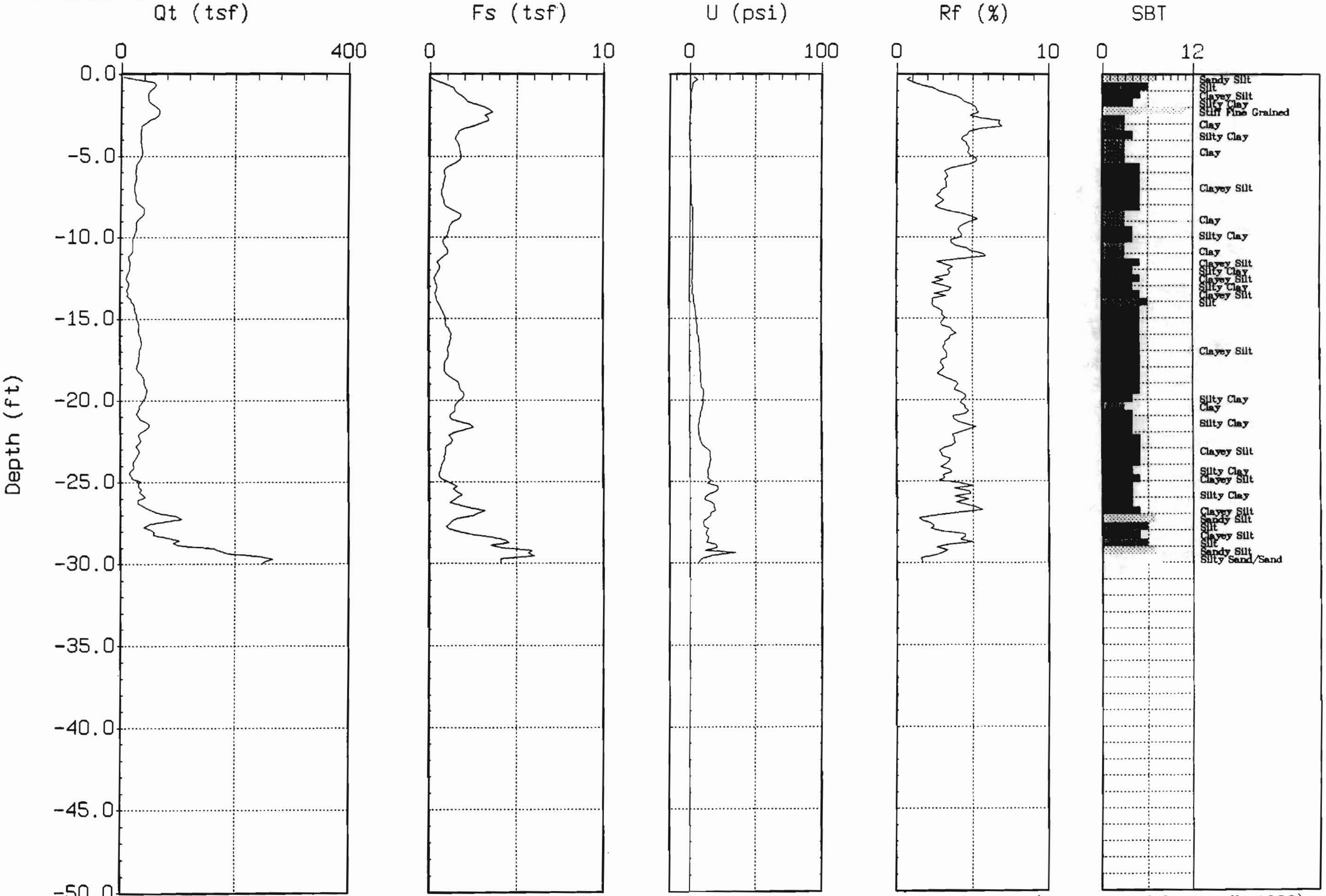
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-16

Engineer: R. HEINZEN
Date : 05:03:01 12:36



Max. Depth: 30.02 (ft)

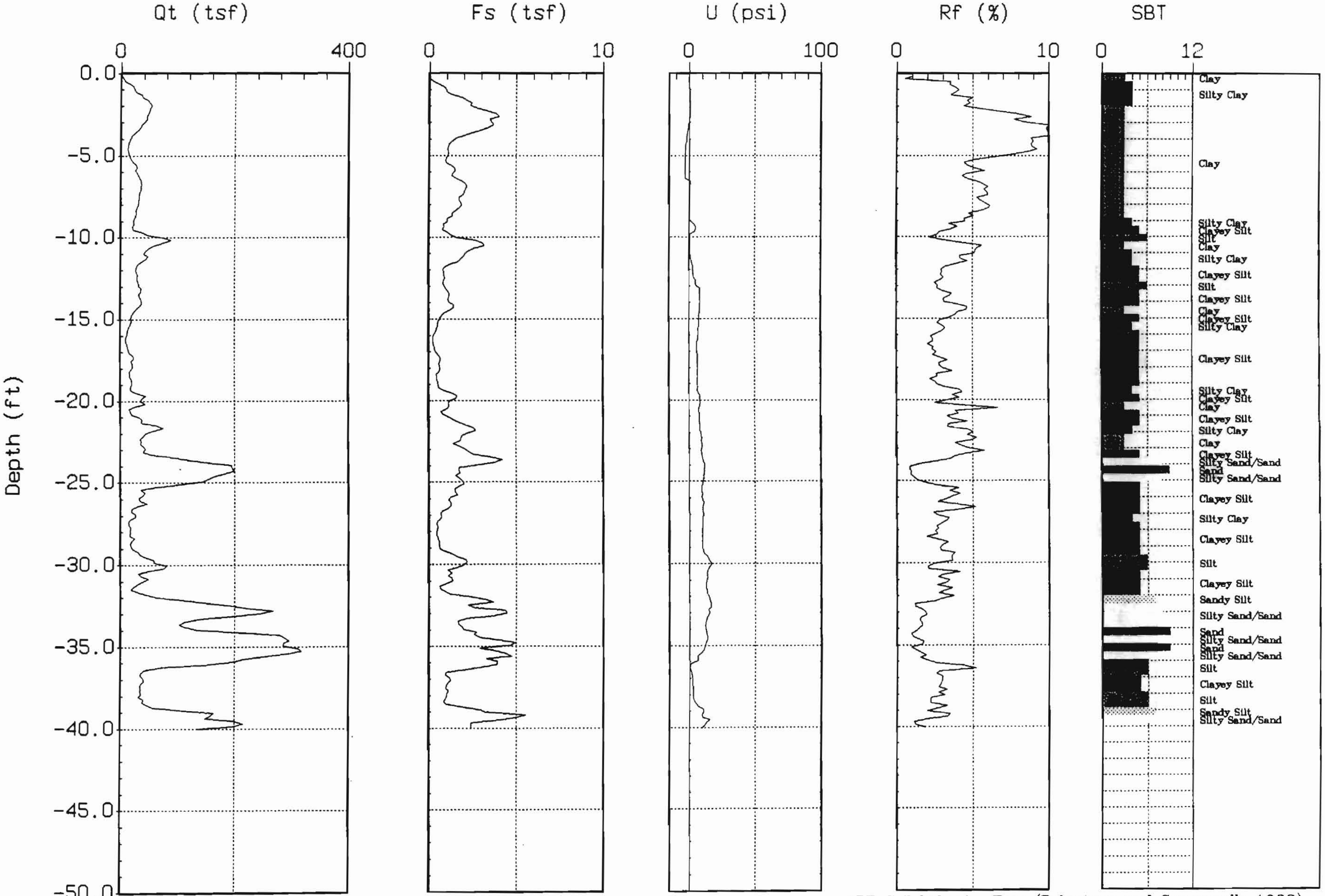
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

KLEINFELDER

Site : CALPINE
Location :CPT-17

Engineer: R. HEINZEN
Date : 05:03:01 14:58



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

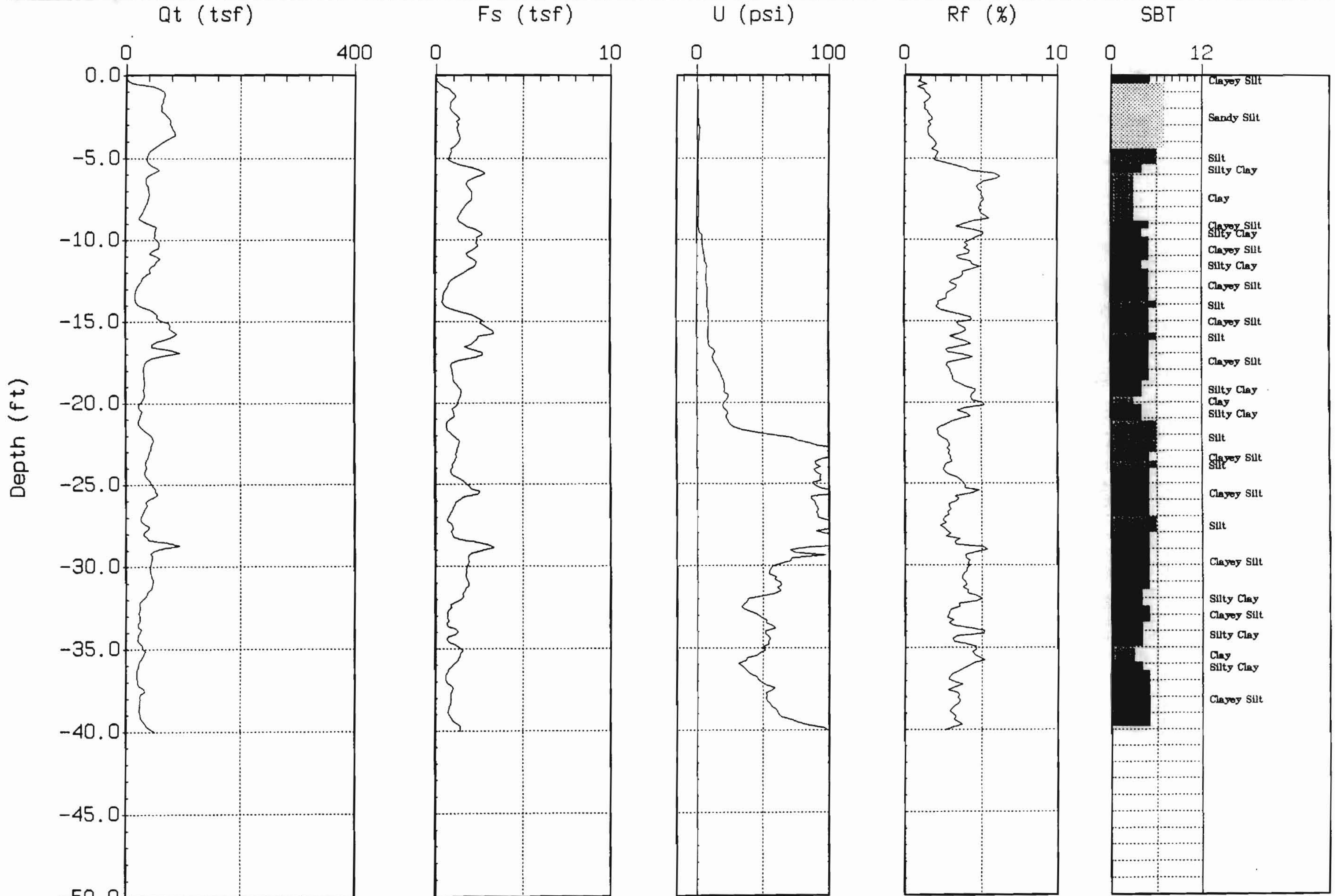
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-18

Engineer: R. HEINZEN
Date : 05:03:01 14:37



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

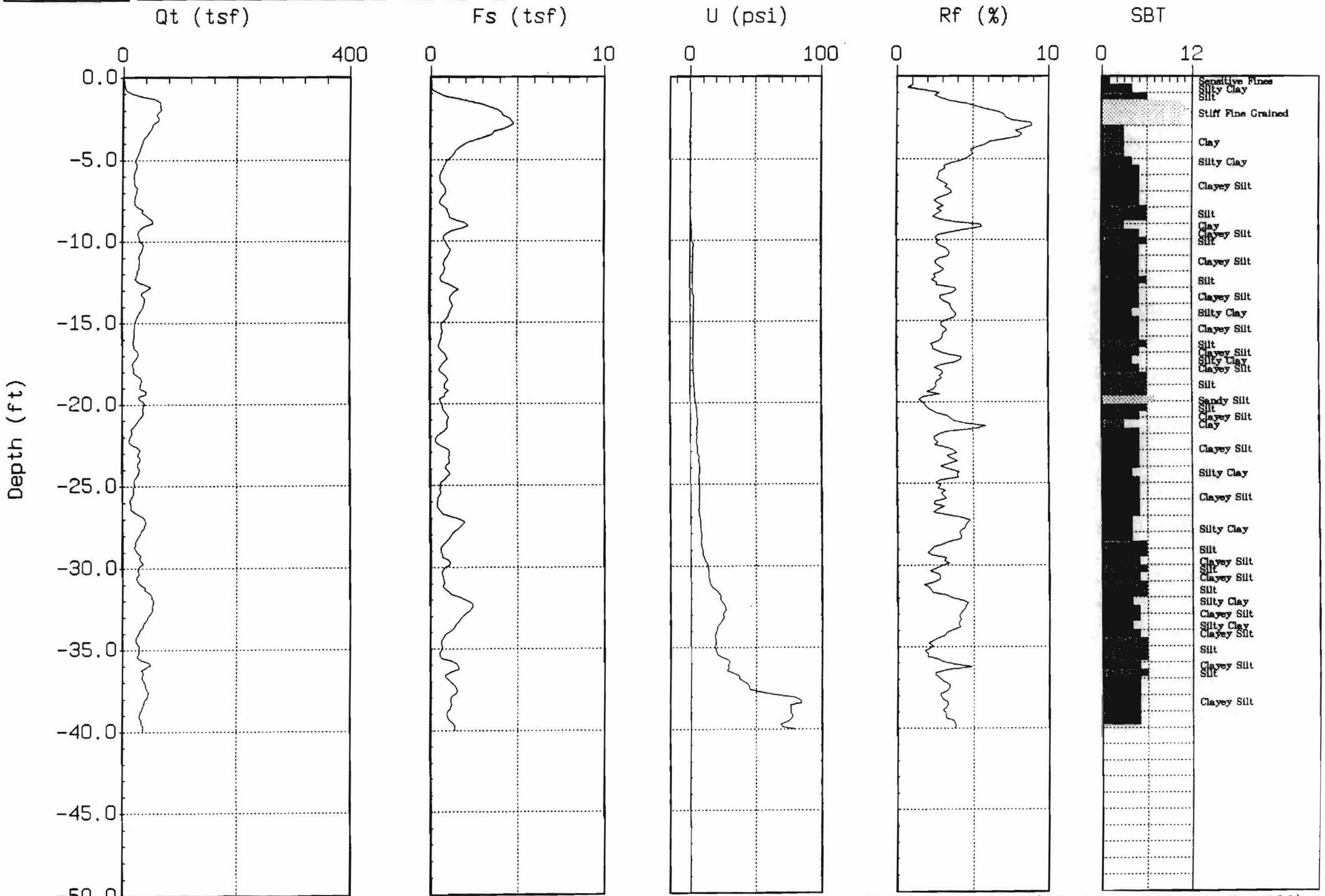
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

KLEINFELDER

Site : CALPINE
Location : CPT-19

Engineer: R. HEINZEN
Date : 05:03:01 14:15



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

Gregg In Situ. Inc. Page: 1
Interpretat Output - Release 1.00.19c
Run No: 01-0509-2123-3306
Job No: 97-100
Client: KLEINFELDER
Project: Calpine Energy. East Altamont Energy Center
Site: CALPINE
Location: CPT-1
Engineer: R. HEINZEN
CPT Date: 5-2-01
CPT Time: 12:03
CPT File: 068B02.COR
Northing (m): 0
Easting (m): 0
Elevation (m): 0

Su Nkt used: 15
Averaging Increment (m): 0.3
Phi Method : Robertson and Campanel 1983
Dr Method : Jamiolko - All Sands
State Paramete M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60	(N1)60cs
0.49	15	0.02	0.13	-1.4	6	0.03	2	5.7	11.5	1	48	63.4	10	0	11.5
1.48	37.3	1	2.68	-1	6	0.08	2	14.3	28.6	2.48	48	73.8	10	1.00E+09	1.00E+09
2.46	44.3	2.93	6.62	-0.7	3	0.14	2	42.4	84.9	2.95	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
3.44	47.2	2.85	6.04	-1.9	3	0.2	2	45.2	90.5	3.14	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	35	1.84	5.26	-2	3	0.25	2	33.5	67.1	2.32	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
5.41	53.8	1.29	2.39	-2.1	6	0.31	1.81	20.6	37.3	3.57	44	65.9	10	6.1	43.4
6.4	76.9	1.84	2.39	-2.2	6	0.36	1.66	29.5	49	5.1	46	73.7	10	6.6	55.6
7.3	105.6	3.22	3.05	-2.2	6	0.41	1.56	40.5	62.9	7.01	46	80.9	10	1.00E+09	1.00E+09
8.2	28.8	1.29	4.47	-2.3	3	0.46	1.47	27.6	40.5	1.89	1.00E+09	1.00E+09	10	32.6	73.1
9.19	25.4	0.65	2.57	-2.4	5	0.52	1.39	12.1	16.8	1.66	1.00E+09	1.00E+09	6	10.2	27
10.17	23.2	0.48	2.06	-2.3	6	0.58	1.32	8.9	11.7	1.51	38	32.7	6	7.1	18.8
11.15	27	0.56	2.08	-2.3	6	0.63	1.26	10.3	13	1.76	38	35.7	6	7.5	20.5
12.14	18.4	0.33	1.81	-2.3	6	0.69	1.2	7.1	8.5	1.18	34	30	6	7.3	15.8
13.21	14.6	0.19	1.29	-2.3	6	0.75	1.15	5.6	6.5	0.93	32	30	6	6.4	12.8
14.27	24.6	0.49	1.99	-2.1	6	0.81	1.11	9.4	10.5	1.58	36	30	6	8.4	18.9
15.26	24.5	0.37	1.5	-2	6	0.87	1.07	9.4	10.1	1.58	36	30	6	7	17.1
16.24	29.6	0.64	2.16	-1.5	6	0.92	1.04	11.3	11.8	1.91	36	32.9	6	9.5	21.4
17.22	30.4	0.7	2.29	-1.3	6	0.98	1.01	11.6	11.7	1.96	36	32.8	6	10.4	22.1
18.21	47.7	1.27	2.67	-1	6	1.04	0.98	18.3	18	3.11	38	44.9	6	11.9	29.8
19.19	19.7	0.68	3.47	-1	4	1.09	0.96	12.6	12	1.24	1.00E+09	1.00E+09	6	12	24
20.18	90.1	1.52	1.69	-0.8	7	1.15	0.93	28.7	26.8	1.00E+09	40	61.6	1	6.9	33.7
21.16	91.1	2.04	2.24	-0.7	7	1.21	0.91	29.1	26.5	1.00E+09	40	61.3	1	9.3	35.7
22.15	31.1	1.06	3.42	-0.7	5	1.27	0.89	14.9	13.2	1.99	1.00E+09	1.00E+09	6	13.2	26.4
23.13	32.3	1.1	3.4	-0.4	5	1.32	0.87	15.5	13.5	2.07	1.00E+09	1.00E+09	6	13.5	27
24.11	26.4	0.62	2.35	-0.3	6	1.34	0.86	10.1	8.7	1.67	32	30	6	8.7	17.5
25.1	32.7	0.78	2.38	0	6	1.37	0.85	12.5	10.7	2.08	34	30.1	6	10.7	21.4
26.08	36.4	1.12	3.08	0.2	5	1.39	0.85	17.4	14.7	2.32	1.00E+09	1.00E+09	6	14.7	29.5
27.07	29.6	0.61	2.06	0.4	6	1.42	0.84	11.3	9.5	1.87	34	30	6	9.5	19
28.05	18.6	0.28	1.71	0.5	6	1.45	0.83	6.3	5.3	1	30	30	3	5.3	10.5
29.04	39.4	1.1	2.8	0.7	6	1.47	0.82	15.1	12.4	2.51	34	34.4	6	12.4	24.9
30.02	107.5	3.26	3.04	1.2	6	1.5	0.82	41.2	33.6	7.05	40	62.9	10	16.4	50.1
31	55.8	1.7	3.05	1.6	6	1.52	0.81	21.4	17.3	3.6	38	43.9	6	16.5	33.8
31.99	60.5	1.92	3.18	2.2	6	1.55	0.8	23.2	18.6	3.91	38	46	6	17.2	35.9
32.97	59.1	1.86	3.15	3	6	1.57	0.8	22.6	18.1	3.82	38	45.1	6	17.3	35.3
33.96	43.3	1.71	3.96	3	5	1.6	0.79	20.7	16.4	2.76	1.00E+09	1.00E+09	6	16.4	32.8
34.94	28.5	0.76	2.65	3	6	1.63	0.78	10.9	8.6	1.77	32	30	6	8.6	17.1
35.92	44.8	1.15	2.57	2.9	6	1.65	0.78	17.2	13.4	2.85	34	36.5	6	13.4	26.7
36.91	195.1	4.48	2.29	3.1	7	1.68	0.77	62.3	48.1	1.00E+09	42	78.4	1	11.4	59.5
37.89	218.9	5.99	2.74	3.4	7	1.71	0.77	69.9	53.5	1.00E+09	44	81.5	1	14	67.5
38.88	94.7	3.59	3.79	3.5	5	1.73	0.76	45.4	34.5	8.17	1.00E+09	1.00E+09	6	26.8	61.3
39.86	47.9	1.56	3.26	3.5	5	1.76	0.75	22.9	17.3	3.04	1.00E+09	1.00E+09	6	17.3	34.6
40.85	65.8	2.59	3.94	3.6	5	1.78	0.75	31.5	23.6	4.23	1.00E+09	1.00E+09	6	23.6	47.2
41.83	75	2.98	3.98	3.6	5	1.81	0.74	35.9	26.7	4.84	1.00E+09	1.00E+09	6	26.7	53.4
42.81	29	0.88	3.05	3.4	5	1.83	0.74	13.9	10.2	1.77	1.00E+09	1.00E+09	3	10.2	20.5
43.8	24.9	0.52	2.08	3.6	6	1.86	0.73	9.6	7	1.5	30	30	3	7	14
44.78	28.4	0.7	2.47	3.4	6	1.89	0.73	10.9	7.9	1.72	32	30	3	7.9	15.8
45.77	28.7	0.83	2.88	3.6	5	1.91	0.72	13.8	10	1.74	1.00E+09	1.00E+09	3	10	19.9
46.75	37.8	1.19	3.14	3.8	5	1.94	0.72	18.1	13	2.34	1.00E+09	1.00E+09	6	13	26
47.74	42.3	1.24	2.93	4.2	6	1.96	0.71	16.2	11.6	2.64	34	32.3	6	11.6	23.1
48.72	41.4	1.46	3.51	4.5	5	1.99	0.71	19.8	14.1	2.58	1.00E+09	1.00E+09	6	14.1	28.1
49.7	29.5	0.82	2.78	4.8	5	2.01	0.7	14.1	9.9	1.78	1.00E+09	1.00E+09	3	9.9	19.9
50.69	30.7	0.76	2.48	4.8	6	2.04	0.7	11.7	8.2	1.85	32	30	3	8.2	16.4
51.67	31.3	0.76	2.44	4.9	6	2.07	0.7	12	8.3	1.89	32	30	3	8.3	16.7
52.66	41.5	1.35	3.25	5.1	5	2.09	0.69	19.9	13.8	2.57	1.00E+09	1.00E+09	6	13.8	27.5
53.64	31.3	0.81	2.59	5	6	2.12	0.69	12	8.3	1.88	32	30	3	8.3	16.5
54.63	74.8	2.26	3.03	5.3	6	2.14	0.68	28.6	19.6	4.78	36	47.4	6	19.6	39.1
55.61	42.9	1.72	4.01	5.5	5	2.17	0.68	20.6	14	2.65	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
56.59	48.9	1.51	3.09	5.6	6	2.19	0.68	18.7	12.6	3.04	34	34.9	6	12.6	25.3
57.58	56.1	1.57	2.8	5.9	6	2.22	0.67	21.5	14.4	3.52	34	38.7	6	14.4	28.9
58.56	73.7	2.46	3.33	6.6	6	2.24	0.67	28.2	18.8	4.69	36	46.3	6	18.8	37.7
59.55	78.2	2.67	3.41	7.2	6	2.27	0.68	30	19.9	4.99	36	47.9	6	19.9	39.8
60.53	85	3.57	4.2	7.4	5	2.3	0.66	40.7	26.9	5.44	1.00E+09	1.00E+09	6	26.9	53.7
61.52	137.3	4.62	3.36	7.6	6	2.32	0.66	52.6	34.5	8.92	40	63.7	6	22.4	57
62.42	301	7.8	2.59	8.1	7	2.35	0.65	96.1	62.7	1.00E+09	44	86	1	15.5	78.2
63.32	299.2	7.55	2.52	8.4	7	2.37	0.65	95.5	62	1.00E+09	44	85.7	1	15.1	77.2
64.3	244.8	7.64	3.12	8.8	12	2.4	0.65	117.2	75.7	1.00E+09	42	79.8	1	27.9	103.6
65.29	251.9	5.23	2.08	8.7	8	2.43	0.64	60.3	38.7	1.00E+09	42	80.4	1	9.3	48
66.27	233.6	5.69	2.44	8.2	7	2.46	0.64	74.6	47.6	1.00E+09	42	78.1	1	14.6	62.2
67.26	257.1	3.95	1.54	8.2	8	2.48	0.63	61.6	39.1	1.00E+09	42	80.7	1	6.8	45.8
68.24	173.2	5.31	3.07	8.2	7	2.51	0.63	55.3	34.9	1.00E+09	40	69.2	1	18	52.9
69.22	54.1	1.71	3.16	7.8	6	2.54	0.63	20.7	13	3.34	34	35.7	6	13	26

Gregg	In	Situ.	Inc	Page:		1
Interpretat	Output	-	Release	1.00.19c		
Run	No	01-0509-2123-3339				
Job	No:	97-100				
Client.	KLEINFELDER					
Project.	Calpine	Energy.	East	Altamont	Energy	Center
Site:	CALPINE					
Location:	CPT-2					
Engineer:	R	HEINZEN				
CPT	Date:	05/03/01				
CPT	Time:	7:49				
CPT	File:	068B04.COR				
Northing	(m):	0				
Easting	(m):	0				
Elevation	(m):	0				

Su	Nkt	used:	15			
Averaging	Increment	(m):	0.3			
Phi	Method	:	Robertson	and	Campanella	1983
Dr	Method	:	Jamiolkow -		All	Sands
State	Parameter	M:	1.2			
Used	Unit	Weights	Assigned	to	Soil	Zones

Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	27.7	0.39	1.41	-3.6	6	0.03	2	10.6	21.2	1.84	50	81	10	1.00E+09	1.00E+09
1.48	36.9	1.59	4.32	-3.6	4	0.08	2	23.6	47.2	2.46	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
2.46	65.5	2.2	3.36	-3.6	6	0.14	2	25.1	50.1	4.35	48	82.6	10	1.00E+09	1.00E+09
3.44	40.4	1.88	4.64	-3.2	4	0.2	2	25.8	51.6	2.68	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	24.4	1.12	4.58	-3	3	0.25	1.99	23.4	46.5	1.61	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
5.41	16.4	0.42	2.59	-3	5	0.31	1.8	7.9	14.2	1.07	1.00E+09	1.00E+09	6	7.9	22
6.4	22.7	0.63	2.79	-2.8	5	0.36	1.66	10.9	18	1.49	1.00E+09	1.00E+09	10	9.3	27.3
7.3	17.8	0.66	3.69	-2.3	4	0.42	1.55	11.3	17.6	1.16	1.00E+09	1.00E+09	6	16.9	34.5
8.2	17.2	0.49	2.86	-2.2	5	0.47	1.46	8.2	12	1.11	1.00E+09	1.00E+09	6	10.7	22.7
9.19	22.4	0.57	2.55	-2.1	5	0.52	1.38	10.7	14.8	1.46	1.00E+09	1.00E+09	6	10.2	24.9
10.17	32.4	0.86	2.65	-1.3	6	0.58	1.31	12.4	16.3	2.12	40	42.1	8	8.9	25.2
11.15	43.6	1.47	3.38	-1.1	5	0.64	1.25	20.9	26.1	2.86	1.00E+09	1.00E+09	10	14.7	40.8
12.14	38.9	1.04	2.67	-1.1	6	0.69	1.2	14.9	17.9	2.55	40	44.8	6	9.8	27.6
13.21	30.7	0.89	2.88	-0.7	5	0.75	1.15	14.7	16.9	2	1.00E+09	1.00E+09	6	13.6	30.5
14.27	42.2	1.93	4.58	-0.4	4	0.82	1.11	27	29.9	2.76	1.00E+09	1.00E+09	6	29.2	59.1
15.26	34.7	1.39	4.01	-0.3	5	0.87	1.07	16.6	17.8	2.26	1.00E+09	1.00E+09	6	17.8	35.6
16.24	36.8	1.65	4.47	-0.2	4	0.93	1.04	23.5	24.4	2.39	1.00E+09	1.00E+09	6	24.4	48.8
17.22	35.4	1.46	4.12	0.2	4	0.99	1.01	22.6	22.8	2.3	1.00E+09	1.00E+09	6	22.8	45.6
18.21	34.8	1.49	4.29	0.2	4	1.04	0.98	22.2	21.8	2.25	1.00E+09	1.00E+09	6	21.8	43.6
19.19	26.7	0.98	3.67	0.2	5	1.1	0.95	12.8	12.2	1.7	1.00E+09	1.00E+09	6	12.2	24.4
20.18	24.9	0.84	3.35	5.1	5	1.15	0.93	11.9	11.1	1.59	1.00E+09	1.00E+09	6	11.1	22.2
21.16	16.1	0.41	2.57	5.1	5	1.21	0.91	7.7	7	0.99	1.00E+09	1.00E+09	3	7	14
22.15	16.5	0.51	3.09	5.2	5	1.27	0.89	7.9	7	1.01	1.00E+09	1.00E+09	3	7	14
23.13	22.1	0.8	3.6	5.8	4	1.32	0.87	14.1	12.3	1.39	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
24.11	20.8	0.94	4.54	6.1	3	1.34	0.86	19.9	17.2	1.29	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
25.1	12.7	0.37	2.87	6.1	5	1.37	0.85	6.1	5.2	0.75	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
26.08	12.4	0.31	2.53	6.2	5	1.39	0.85	5.9	5	0.73	1.00E+09	1.00E+09	3	5	10.1
27.07	12.8	0.37	2.91	6.3	5	1.42	0.84	6.1	5.1	0.75	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
28.05	10.2	0.21	2.04	6.4	5	1.45	0.83	4.9	4.1	0.58	1.00E+09	1.00E+09	1.5	4.1	8.1
29.04	11.5	0.3	2.62	6.4	5	1.47	0.82	5.5	4.5	0.65	1.00E+09	1.00E+09	1.5	1.00E+09	1.00E+09
30.02	28.4	0.47	1.66	6.7	6	1.5	0.82	10.9	8.9	1.78	32	30	6	8.9	17.8
31	44.9	1.05	2.34	6.8	6	1.52	0.81	17.2	13.9	2.88	36	37.7	6	13.4	27.4
31.99	56.8	2.06	3.63	7	5	1.55	0.8	27.2	21.8	3.66	1.00E+09	1.00E+09	6	21.8	43.7
32.97	56.7	2.26	3.99	8.8	5	1.57	0.8	27.2	21.6	3.66	1.00E+09	1.00E+09	6	21.6	43.3
33.96	47.5	1.98	4.17	9.7	5	1.6	0.79	22.7	18	3.04	1.00E+09	1.00E+09	6	18	35.9
34.94	33.4	1.09	3.26	9.8	5	1.63	0.78	16	12.6	2.1	1.00E+09	1.00E+09	6	12.6	25.1
35.92	33.5	1.04	3.12	9.9	5	1.65	0.78	16	12.5	2.09	1.00E+09	1.00E+09	6	12.5	24.9
36.91	42.2	1.2	2.83	10.3	6	1.68	0.77	16.2	12.5	2.67	34	34.5	6	12.5	25
37.89	48.4	2.09	4.31	10.5	5	1.7	0.77	23.2	17.8	3.06	1.00E+09	1.00E+09	6	17.8	35.5
38.88	38.8	1.69	4.36	10.6	4	1.73	0.76	24.8	18.9	2.44	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
39.86	45.3	1.67	3.69	11.3	5	1.75	0.76	21.7	16.4	2.87	1.00E+09	1.00E+09	6	16.4	32.7
40.85	27.9	0.66	2.36	11.4	6	1.78	0.75	10.7	8	1.71	32	30	3	8	16.1
41.83	28.1	0.73	2.58	11.5	6	1.81	0.74	10.7	8	1.71	32	30	3	8	16
42.81	50.6	2.34	4.62	14.1	4	1.83	0.74	32.3	23.9	3.21	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
43.8	34.1	1.07	3.13	15.4	5	1.86	0.73	16.3	12	2.11	1.00E+09	1.00E+09	6	12	24
44.78	33	0.81	2.46	15.6	6	1.88	0.73	12.7	9.2	2.03	32	30	6	9.2	18.5
45.77	33.2	1.3	3.9	18.4	5	1.91	0.72	15.9	11.5	2.04	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
46.75	32.2	1.34	4.15	24.1	4	1.93	0.72	20.6	14.8	1.97	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
47.74	30.7	0.91	2.95	24.2	5	1.96	0.71	14.7	10.5	1.86	1.00E+09	1.00E+09	3	10.5	21
48.72	38.8	1.29	3.32	24.4	5	1.98	0.71	18.6	13.2	2.4	1.00E+09	1.00E+09	6	13.2	26.4
49.7	40.2	1.33	3.3	26.8	5	2.01	0.71	19.2	13.6	2.49	1.00E+09	1.00E+09	6	13.6	27.1
50.69	33.8	0.78	2.32	26.9	6	2.04	0.7	12.9	9.1	2.06	32	30	6	9.1	18.1
51.67	34.2	0.73	2.13	27	6	2.06	0.7	13.1	9.1	2.08	32	30	6	9.1	18.2
52.66	44.7	1.94	4.34	28	4	2.09	0.69	28.6	19.8	2.78	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
53.64	40	1.22	3.04	28.6	5	2.11	0.69	19.2	13.2	2.46	1.00E+09	1.00E+09	6	13.2	26.4
54.63	40.4	1.19	2.96	28.7	6	2.14	0.68	15.5	10.6	2.48	32	30	6	10.6	21.2
55.61	120.1	2.6	2.16	29.2	7	2.17	0.68	38.3	26.1	1.00E+09	40	60.8	1	12.1	38.2
56.59	48.1	1.52	3.16	29.3	5	2.19	0.68	23	15.6	2.99	1.00E+09	1.00E+09	6	15.6	31.1
57.58	64	2.34	3.65	29.2	5	2.22	0.67	30.6	20.6	4.04	1.00E+09	1.00E+09	6	20.6	41.1
58.56	91.1	3.39	3.73	29.7	5	2.24	0.67	43.6	29.1	5.85	1.00E+09	1.00E+09	6	29.1	58.2
59.55	54.5	1.52	2.79	33	6	2.27	0.66	20.9	13.9	3.4	34	37.5	6	13.9	27.7
60.53	67	1.67	2.5	33.6	6	2.29	0.66	25.7	17	4.24	36	43.3	6	17	33.9
61.52	71.5	2.35	3.29	34.2	6	2.32	0.66	27.4	18	4.53	36	45	6	18	35.9
62.42	63.8	2.68	4.19	36.1	5	2.34	0.65	30.6	20	4.02	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
63.32	108.5	4.16	3.84	38	5	2.37	0.65	51.9	33.8	6.99	1.00E+09	1.00E+09	6	32.1	65.9
64.3	248.1	7.57	3.08	41.5	12	2.39	0.65	117.8	76.2	1.00E+09	42	80	1	27.5	103.7
65.29	339	11.35	3.35	41.5	12	2.42	0.64	162.3	104.3	1.00E+09	44	89	1	1.00E+09	1.00E+09
66.27	290.7	11.88	4.09	38.9	12	2.45	0.64	139.2	88.9	1.00E+09	42	84.4	1	1.00E+09	1.00E+09
67.26	220.7	5.65	2.56	38.1	7	2.48	0.64	70.4	44.7	1.00E+09	42	76.3	1	15.4	60.1
68.24	235	4.13	1.76	37.6	8	2.51	0.63	56.3	35.5	1.00E+09	42	78	1	8	43.5
69.22	204.4	3.39	1.66	35.8	8	2.54	0.63	48.9	30.7	1.00E+09	42	73.8	1	7.7	38.4
70.21	178.1	4.77	2.68	35.3	7	2.56	0.62	56.9	35.5	1.00E+09	40	69.7	1	16.1	51.6
71.19	76.8	2.97	3.86	35.3	5	2.59	0.62	36.8	22.9	4.85	1.00E+09	1.00E+09	6	22.9	45.7
72.18	64.6	1.64	2.54	39.4	6	2.62	0.62	24.8	15.3	4.03	34	40.4	6	15.3	30.6
73.16	64.4	2.38	3.7	44.2	5	2.64	0.62	30.8	19	4.01	1.00E+09	1.00E+09	6	19	37.9
74.15	52.3	0.92	1.75	45.4	7	2.67	0.61	16.7	10.2	1.00E+09	32	34	1	10.2	20.4
75.13	49.5	1.01	2.05	47.2	6	2.7	0.61	19	11.6	3.01	32	32.3	6	11.6	23.1
76.11	51.5	1.04	2.01	51.2	7	2.72	0.61	16.4	10	1.00E+09	32	33.3	1	10	19.9
77.1	50.4	1	1.99	51.8	7	2.75	0.6	16.1	9.7	1.00E+09	32	32.5	1	9.7	19.4
78.08	53.2	1.3	2.44	52.3	6	2.78	0.6	20.4	12.2	3.25	32	33.9	6	12.2	24.5
79.07	57.4	1.24	2.16	56.7	6	2.8	0.6	22	13.1	3.53	32	36	6	13.1	26.3
80.05	54	1.12	2.07	58.2	6	2.83	0.59	20.7	12.3	3.29	32	34.1	6	12.3	24.6
81.04	52.1	0.95	1.83	58.9	7	2.85	0.59	16.6	9.8	1.00E+09	32	32.9	1	9.8	19.7
82.02	49.5	1.11	2.23	63.1	6	2.88	0.59	19	11.2	2.99	32	31.4	6	11.2	22.4
83	49.9	1.19	2.39	68.6	6	2.91	0.59	19.1	11.2	3.01	32	31.4	6	11.2	22.4
83.99	58	1.14	1.97	70.6	7	2.93	0.58	18.5	10.8	1.00E+09	32	35.6	1	10.8	21.6
84.97	86.2	2.01	2.33	77	7	2.96	0.58	27.5	16	1.00E+09	36	48.6	1	16	32
85.96	97.7	2.49	2.55	94	7	2.99	0.58	31.2	18.1	1.00E+09	36	50.3	1	17.1	35.2
86.94	86.6	2.21	2.56	99.1	6	3.01	0.58	33.2	19.1	5.44	36	46.7	6	19.1	38.2
87.93	128.7	6.49	5.04	102.4	11	3.04	0.57	123.2	70.7	1.00E+09	36	57.9	1	1.00E+09	1.00E+09
88.91	225.1	4.28	1.9	201.3	8	3.07	0.57	53.9	30.7	1.00E+09	40	73.8	1	9.7	40.4
89.89	256	10.44	4.08	181	12	3.1	0.57	122.6	69.6	1.00E+09	42	77.4	1	40.3	109.9
90.88	46.8	1.79	3.83	172.2	5	3.13	0.57	22.4	12.7	2.77	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
91.86	41.5	1.04	2.5	207.4	6	3.15	0.56	15.9	9	2.42	30	30	3	9	17.9
92.85	48.7	1.42	2.92	238.8	6	3.18	0.56	18.7	10.5	2.69	32	30	3	10.5	20.9
93.83	54	1.57	2.91	260.4	6	3.21	0.56	20.7	11.6	3.24	32	32.3	6	11.6	23.1
94.82	56.7	1.64	2.89	294.4	6	3.23	0.56	21.7	12.1	3.41	32	33.6	6	12.1	24.1
95.8	54.6	1.49	2.72	332.1	6	3.26	0.55	20.9	11.6	3.27	32	32.4	6	11.6	23.2
96.78	55.4	1.44	2.59	348.9	6	3.28	0.55	21.2	11.7	3.32	32	32.7	6	11.7	23.4
97.77	48.8	1.2	2.46	349.4	6	3.31	0.55	18.7	10.3	2.87	32	30	3	10.3	20.5
98.75	50.9	1.12	2.2	374.8	6	3.33	0.55	19.5	10.7	3.01	32	30.1	3	10.7	21.4

Gregg	In	Situ,	Inc.	Page:		1
Interpretat	Output	-	Release	1.00.19c		
Run	No:	01-0509-2123-3301				
Job	No:	97-100				
Client:	KLEINFELDER					
Project:	Calpine	Energy,	East	Altamont	Energy	Center
Site:	CALPINE					
Location:	CPT-3					
Engineer:	R.	HEINZEN				
CPT	Date:	05/02/01				
CPT	Time:	11:27				
CPT	File:	068B06.COR				
Northing	(m):	0				
Easting	(m):	0				
Elevation	(m):	0				

Su	Nkt	used:	15			
Averaging	Increment	(m):	0.3			
Phi	Method	:	Robertson and		Campanel	1983
Dr	Method	:	Jamiolkow -		All	Sands
State	Parameter	M:	1.2			
Used	Unit	Weights	Assigned	to	Soil	Zones

Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	36.1	0.1	0.26	0.1	7	0.03	2	11.5	23	1.00E+09	50	88.2	1	0	23
1.48	61.5	0.72	1.17	0.4	7	0.09	2	19.6	39.3	1.00E+09	50	87.7	1	0	39.3
2.46	43.8	1.33	3.03	0.5	6	0.14	2	16.8	33.6	2.91	46	70.8	10	1.00E+09	1.00E+09
3.44	45.8	1.53	3.33	0.6	5	0.2	2	21.9	43.9	3.04	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	36.6	1.36	3.73	0.6	5	0.26	1.97	17.5	34.6	2.42	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
5.41	28.5	1.13	3.98	0.6	4	0.31	1.79	18.2	32.5	1.88	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
6.4	22.6	0.88	3.87	0.8	4	0.37	1.64	14.5	23.8	1.49	1.00E+09	1.00E+09	10	16.8	40.6
7.3	30	1.05	3.51	0.9	5	0.42	1.54	14.3	22.1	1.97	1.00E+09	1.00E+09	10	12.4	34.5
8.2	26.2	0.83	3.18	1	5	0.47	1.45	12.5	18.2	1.71	1.00E+09	1.00E+09	6	11.8	30
9.19	19.1	0.41	2.17	1	6	0.53	1.37	7.3	10.1	1.24	38	30	6	7.2	17.2
10.17	49.1	0.92	1.88	1.4	7	0.59	1.31	15.7	20.5	1.00E+09	42	53.9	1	5.5	25.9
11.15	38.1	0.83	2.17	1.6	6	0.64	1.25	14.6	18.2	2.5	40	45.3	6	7.8	26
12.14	26.1	0.69	2.65	1.9	5	0.7	1.2	12.5	15	1.7	1.00E+09	1.00E+09	6	12.2	27.2
13.21	21.1	0.27	1.3	2.7	6	0.76	1.15	8.1	9.3	1.36	36	30	6	5.9	15.2
14.27	12.3	0.18	1.49	3	5	0.82	1.1	5.9	6.5	0.77	1.00E+09	1.00E+09	3	6.5	13
15.26	14.9	0.26	1.77	3.4	5	0.88	1.07	7.2	7.6	0.94	1.00E+09	1.00E+09	6	7.6	15.3
16.24	23.3	0.48	2.08	4.8	6	0.94	1.03	8.9	9.2	1.49	34	30	6	9.2	18.4
17.22	42.9	1.22	2.85	5.6	6	0.99	1	16.4	16.5	2.79	38	42.5	6	12.3	28.8
18.21	15.4	0.53	3.44	5.7	4	1.05	0.98	9.9	9.6	0.96	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
19.19	11.5	0.48	4.2	5.8	3	1.1	0.95	11	10.5	0.69	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
20.18	22.8	0.6	2.62	6.1	5	1.16	0.93	10.9	10.1	1.44	1.00E+09	1.00E+09	6	10.1	20.3
21.16	52	1.3	2.5	6.6	6	1.22	0.91	19.9	18.1	3.38	38	45.1	6	12.2	30.2
22.15	27	0.49	1.81	7.5	6	1.27	0.89	10.3	9.2	1.71	34	30	6	9.2	18.3
23.13	45.9	1.29	2.82	9.4	6	1.32	0.87	17.6	15.3	2.97	36	40.3	6	14.3	29.6
24.11	36.9	1.35	3.65	9.9	5	1.35	0.86	17.7	15.2	2.37	1.00E+09	1.00E+09	6	15.2	30.4
25.1	17.3	0.69	3.99	9.9	3	1.37	0.85	16.6	14.2	1.06	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
26.08	39.7	1.37	3.44	10.5	5	1.4	0.85	19	16.1	2.55	1.00E+09	1.00E+09	6	16.1	32.1
27.07	48.8	1.74	3.57	11	5	1.43	0.84	23.4	19.6	3.15	1.00E+09	1.00E+09	6	19.6	39.2
28.05	44.3	1.57	3.53	11.5	5	1.45	0.83	21.2	17.6	2.85	1.00E+09	1.00E+09	6	17.6	35.2
29.04	41.9	1.33	3.19	11.9	5	1.48	0.82	20.1	16.5	2.68	1.00E+09	1.00E+09	6	16.5	33

Gregg In Situ. Inc. Page: 1
Interpretat Output - Release 1.00.19c
Run No: 01-0509-2123-3317
Job No: 97-100
Client: KLEINFELDER
Project: Calpine Energy. East Altamont Energy Center
Site: CALPINE
Location: CPT-4
Engineer: R. HEINZEN
CPT Date: 05/02/01
CPT Time: 13:06
CPT File: 068B07.COR
Northing (m): 0
Easting (m): 0
Elevation (m): 0

Su Nkt used: 15
Averaging Increment (m): 0.3
Phi Method : Robertson and Campanel 1983
Dr Method : Jamiolko - All Sands
State Paramete M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	27.5	0.13	0.47	4	7	0.03	2	8.8	17.6	1.00E+09	50	80.4	1	0	17.6
1.48	45.8	0.53	1.17	5.3	7	0.09	2	14.6	29.2	1.00E+09	48	79.3	1	0	29.2
2.46	45.8	1.05	2.29	4.7	6	0.14	2	17.5	35.1	3.04	46	72	10	1.00E+09	1.00E+09
3.44	41.8	1.34	3.21	4.3	5	0.2	2	20	40	2.77	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	29.1	0.91	3.12	4.1	5	0.26	1.97	14	27.5	1.93	1.00E+09	1.00E+09	10	9.2	36.7
5.41	19.6	0.72	3.68	3.8	4	0.31	1.79	12.5	22.4	1.29	1.00E+09	1.00E+09	10	14.7	37.2
6.4	24.9	0.88	3.54	5.4	5	0.37	1.64	11.9	19.6	1.64	1.00E+09	1.00E+09	10	11.7	31.3
7.3	27.3	0.72	2.64	6.7	5	0.42	1.54	13.1	20.1	1.79	1.00E+09	1.00E+09	10	9.5	29.6
8.2	50.7	1.3	2.57	8.2	6	0.47	1.45	19.4	28.2	3.35	42	57.9	10	8.1	36.3
9.19	45.5	1.16	2.55	13.6	6	0.53	1.37	17.4	24	3	42	53.2	10	8.4	32.4
10.17	31.5	1.11	3.53	22.4	5	0.59	1.31	15.1	19.7	2.06	1.00E+09	1.00E+09	6	14.4	34.1
11.15	22.9	0.61	2.65	22.2	5	0.64	1.25	11	13.7	1.49	1.00E+09	1.00E+09	6	11.7	25.4
12.14	22.3	0.51	2.3	22.3	6	0.7	1.2	8.6	10.2	1.44	36	30	6	8.8	19
13.21	24.6	0.67	2.71	24.2	5	0.76	1.15	11.8	13.5	1.59	1.00E+09	1.00E+09	6	13.1	26.7
14.27	14.1	0.64	4.55	24.1	3	0.82	1.1	13.5	14.9	0.89	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
15.26	15.9	0.44	2.77	23.4	5	0.88	1.07	7.6	8.1	1	1.00E+09	1.00E+09	6	8.1	16.3
16.24	44.6	0.86	1.93	17.3	6	0.93	1.04	17.1	17.7	2.91	38	44.5	6	8.6	26.2
17.22	28.9	0.7	2.41	14	6	0.99	1.01	11.1	11.1	1.86	36	31.2	6	11	22.1
18.21	33.1	0.93	2.81	16.6	5	1.04	0.98	15.9	15.5	2.14	1.00E+09	1.00E+09	6	15.5	31.1
19.19	46.5	1.52	3.26	16.5	5	1.1	0.95	22.3	21.2	3.03	1.00E+09	1.00E+09	6	18.3	39.6
20.18	31.1	1.03	3.31	20	5	1.16	0.93	14.9	13.8	2	1.00E+09	1.00E+09	6	13.8	27.7
21.16	27.7	0.92	3.33	22.8	5	1.21	0.91	13.3	12.1	1.77	1.00E+09	1.00E+09	6	12.1	24.1
22.15	21.3	0.53	2.48	26.7	5	1.27	0.89	10.2	9.1	1.34	1.00E+09	1.00E+09	6	9.1	18.1
23.13	14.9	0.41	2.75	32.1	5	1.32	0.87	7.1	6.2	0.91	1.00E+09	1.00E+09	3	6.2	12.4
24.11	26.3	0.7	2.67	34.5	5	1.35	0.86	12.6	10.8	1.66	1.00E+09	1.00E+09	6	10.8	21.7
25.1	23.5	0.62	2.65	35.8	5	1.37	0.85	11.2	9.6	1.47	1.00E+09	1.00E+09	6	9.6	19.2
26.08	25.3	0.7	2.75	45	5	1.4	0.85	12.1	10.2	1.59	1.00E+09	1.00E+09	6	10.2	20.5
27.07	38	1.33	3.51	55.8	5	1.43	0.84	18.2	15.2	2.43	1.00E+09	1.00E+09	6	15.2	30.5
28.05	36.7	1.01	2.75	60.5	6	1.45	0.83	14	11.7	2.34	34	32.6	6	11.7	23.3
29.04	56.9	1.7	2.99	95.2	6	1.48	0.82	21.8	17.9	3.68	38	44.9	6	15.9	33.8
30.02	52.8	2.03	3.85	110.1	5	1.5	0.82	25.3	20.6	3.4	1.00E+09	1.00E+09	6	20.6	41.2
31	47.9	2.04	4.27	110.2	5	1.53	0.81	22.9	18.5	3.07	1.00E+09	1.00E+09	6	18.5	37.1
31.99	46	1.95	4.24	111.4	5	1.55	0.8	22	17.7	2.94	1.00E+09	1.00E+09	6	17.7	35.3
32.97	34.3	1.35	3.94	110.6	5	1.58	0.8	16.4	13.1	2.16	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
33.96	29.2	0.85	2.9	106	5	1.6	0.79	14	11	1.81	1.00E+09	1.00E+09	6	11	22.1
34.94	39.6	0.94	2.36	112.4	6	1.63	0.78	15.2	11.9	2.51	34	33.1	6	11.9	23.8
35.92	71.5	2.44	3.42	138.1	6	1.66	0.78	27.4	21.3	4.63	38	49.8	6	19	40.3
36.91	48.3	1.53	3.16	146.3	5	1.68	0.77	23.1	17.8	3.08	1.00E+09	1.00E+09	6	17.8	35.7
37.89	42.3	1.23	2.9	151.4	6	1.71	0.77	16.2	12.4	2.67	34	34.3	6	12.4	24.8
38.88	44	1.79	4.08	160.9	5	1.73	0.76	21.1	16	2.78	1.00E+09	1.00E+09	6	16	32
39.86	28.5	0.86	3.03	146.9	5	1.76	0.75	13.6	10.3	1.75	1.00E+09	1.00E+09	3	10.3	20.6
40.85	74.4	2.73	3.67	149.5	5	1.78	0.75	35.6	26.7	4.8	1.00E+09	1.00E+09	6	26.5	53.2
41.83	65.2	2.19	3.35	148	6	1.81	0.74	25	18.6	4.19	38	45.9	6	18.6	37.1
42.81	58.1	1.26	2.17	186.4	6	1.84	0.74	22.3	16.4	3.71	36	42.4	6	13.8	30.2
43.8	54.3	1.27	2.33	202.7	6	1.86	0.73	20.8	15.3	3.45	36	40.3	6	15	30.3
44.78	123.9	4.33	3.49	225.1	6	1.89	0.73	47.4	34.5	8.09	40	63.7	10	21	55.5
45.77	131.1	7.47	5.69	160.2	11	1.92	0.72	125.6	90.7	1.00E+09	40	65.1	1	1.00E+09	1.00E+09
46.75	61	2.87	4.7	154	4	1.95	0.72	38.9	27.9	3.89	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
47.74	54.5	1.97	3.62	160.8	5	1.97	0.71	26.1	18.6	3.45	1.00E+09	1.00E+09	6	18.6	37.2
48.72	56.1	1.77	3.16	172	6	2	0.71	21.5	15.2	3.55	36	40.2	6	15.2	30.4
49.7	58.8	1.65	2.81	182.3	6	2.02	0.7	22.5	15.8	3.73	36	41.3	6	15.8	31.6
50.69	64.8	2.08	3.22	189.6	6	2.05	0.7	24.8	17.3	4.12	36	43.9	6	17.3	34.7
51.67	119.7	5.04	4.21	212.7	11	2.08	0.69	114.6	79.5	1.00E+09	40	61.3	1	65.5	145
52.66	80.6	2.5	3.1	221.7	6	2.11	0.69	30.9	21.3	5.17	38	49.8	6	20	41.2
53.64	62.4	1.66	2.66	216.6	6	2.13	0.68	23.9	16.4	3.96	36	42.3	6	16.4	32.8
54.63	57.5	1.53	2.66	219.8	6	2.16	0.68	22	15	3.62	34	39.7	6	15	30
55.61	72.2	2.37	3.28	219.9	6	2.18	0.68	27.7	18.7	4.6	36	46.1	6	18.7	37.4
56.59	66.4	2.39	3.6	219.6	5	2.21	0.67	31.8	21.4	4.21	1.00E+09	1.00E+09	6	21.4	42.8
57.58	76.3	2.95	3.87	225.4	5	2.24	0.67	36.5	24.4	4.87	1.00E+09	1.00E+09	6	24.4	48.9
58.56	159.5	5.35	3.35	250	6	2.26	0.66	61.1	40.6	10.41	40	68.3	10	22.3	63
59.55	205.8	9.49	4.61	253.5	11	2.29	0.66	197.1	130.2	1.00E+09	42	75.5	1	1.00E+09	1.00E+09
60.53	202.1	8.55	4.23	254.6	11	2.32	0.66	193.6	127	1.00E+09	42	74.7	1	1.00E+09	1.00E+09
61.52	201.6	7.28	3.61	262.1	12	2.36	0.65	96.5	62.9	1.00E+09	42	74.5	1	31.2	94.1
62.42	220.5	5.3	2.4	262.9	7	2.38	0.65	70.4	45.6	1.00E+09	42	76.9	1	14.2	59.8
63.32	199.3	5.39	2.7	261	7	2.41	0.64	63.6	41	1.00E+09	42	73.8	1	15.9	56.9
64.3	197.7	3.59	1.81	267.3	8	2.43	0.64	47.3	30.3	1.00E+09	42	73.4	1	8.2	38.5
65.29	86	2.76	3.21	240.4	6	2.46	0.64	32.9	21	5.48	36	49.4	6	21	42
66.27	74.8	3.11	4.15	229.5	5	2.49	0.63	35.8	22.7	4.73	1.00E+09	1.00E+09	6	22.7	45.4
67.26	55.9	1.61	2.88	214.5	6	2.51	0.63	21.4	13.5	3.47	34	36.8	6	13.5	27
68.24	51.9	1.2	2.31	198.6	6	2.54	0.63	19.9	12.5	3.2	32	34.5	6	12.5	25
69.22	52.9	1.11	2.1	186.6	6	2.56	0.62	20.3	12.7	3.26	32	34.9	6	12.7	25.3

Gregg In Situ. Inc. Page: 1
Interpretat Output - Release 1.00.19c
Run No: 01-0509-2123-3367
Job No: 97-100
Client: KLEINFELDER
Project: Calpine Energy. East Altamont Energy Center
Site: CALPINE
Location: CPT-5
Engineer: R. HEINZEN
CPT Date: 05/03/2001
CPT Time: 10:59
CPT File: 068B09.COR
Northing (m): 0
Easting (m): 0
Elevation (m): 0

Su Nkt used: 15
Averaging Increment (m): 0.3
Phi Method : Robertson and Campanel 1983
Dr Method : Jamiolko - All Sands
State Paramete M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	27.7	0.11	0.4	11.4	7	0.03	2	8.8	17.7	1.00E+09	50	80.6	1	0	17.7
1.48	39.2	0.51	1.3	13.5	7	0.09	2	12.5	25	1.00E+09	48	74.8	1	0	25
2.46	45.1	1.44	3.2	13.5	5	0.14	2	21.6	43.1	2.99	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
3.44	38.7	1.7	4.38	12.9	4	0.2	2	24.7	49.5	2.57	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	28.6	1.35	4.73	12.7	3	0.26	1.98	27.4	54.1	1.89	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
5.41	30.1	0.92	3.06	12.7	5	0.31	1.79	14.4	25.8	1.99	1.00E+09	1.00E+09	10	9.7	35.5
6.4	27.5	0.86	3.11	13.1	5	0.37	1.65	13.2	21.7	1.81	1.00E+09	1.00E+09	10	10.4	32.2
7.3	16.1	0.42	2.63	13.2	5	0.42	1.54	7.7	11.9	1.04	1.00E+09	1.00E+09	6	9.4	21.3
8.2	16.1	0.46	2.87	13.4	5	0.47	1.46	7.7	11.3	1.04	1.00E+09	1.00E+09	6	10.8	22.1
9.19	15	0.49	3.28	13.5	4	0.53	1.38	9.6	13.2	0.96	1.00E+09	1.00E+09	6	13.2	26.3
10.17	10.3	0.29	2.81	13.7	4	0.58	1.31	6.6	8.6	0.65	1.00E+09	1.00E+09	6	8.6	17.3
11.15	13.2	0.42	3.19	13.9	4	0.64	1.25	8.4	10.5	0.83	1.00E+09	1.00E+09	6	10.5	21
12.14	31	0.8	2.59	14.4	6	0.7	1.2	11.9	14.2	2.02	38	38.3	6	9.5	23.7
13.21	31.6	1.08	3.42	16.1	5	0.76	1.15	15.1	17.4	2.06	1.00E+09	1.00E+09	6	15.9	33.3
14.27	20.6	0.76	3.67	16.3	4	0.82	1.1	13.2	14.5	1.32	1.00E+09	1.00E+09	6	14.5	29.1
15.26	30.7	1.24	4.03	16.5	4	0.88	1.07	19.6	21	1.99	1.00E+09	1.00E+09	6	21	41.9
16.24	40.1	1.8	4.48	17.5	4	0.93	1.04	25.6	26.6	2.61	1.00E+09	1.00E+09	6	26.6	53.1
17.22	48	2.04	4.26	18.3	5	0.99	1.01	23	23.1	3.13	1.00E+09	1.00E+09	6	22.4	45.5
18.21	30.7	1.67	5.43	18.8	3	1.04	0.98	29.4	28.8	1.98	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
19.19	14.2	0.59	4.15	18.8	3	1.1	0.95	13.6	13	0.87	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
20.18	14.6	0.48	3.27	18.9	4	1.15	0.93	9.3	8.7	0.9	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
21.16	13.2	0.37	2.83	18.8	5	1.21	0.91	6.3	5.8	0.8	1.00E+09	1.00E+09	3	5.8	11.5
22.15	10.9	0.39	3.6	16.3	3	1.27	0.89	10.5	9.3	0.64	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
23.13	17.4	0.6	3.44	18.9	4	1.32	0.87	11.1	9.7	1.07	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
24.11	21.1	0.8	3.78	19.5	4	1.34	0.86	13.5	11.6	1.32	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
25.1	34.5	1.15	3.34	20.3	5	1.37	0.85	16.5	14.1	2.2	1.00E+09	1.00E+09	6	14.1	28.2
26.08	41.6	1.36	3.28	22.9	5	1.39	0.85	19.9	16.9	2.67	1.00E+09	1.00E+09	6	16.9	33.7
27.07	38.2	1.45	3.8	24.6	5	1.42	0.84	18.3	15.4	2.45	1.00E+09	1.00E+09	6	15.4	30.7
28.05	35.7	1.55	4.34	25.1	4	1.45	0.83	22.8	19	2.28	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
29.04	30	0.9	3	26.2	5	1.47	0.82	14.3	11.8	1.89	1.00E+09	1.00E+09	6	11.8	23.7
30.02	33.6	1.1	3.28	28	5	1.5	0.82	16.1	13.2	2.13	1.00E+09	1.00E+09	6	13.2	26.3
31	49.9	1.76	3.52	29.6	5	1.52	0.81	23.9	19.4	3.21	1.00E+09	1.00E+09	6	19.4	38.8
31.99	49	1.81	3.7	31.4	5	1.55	0.8	23.4	18.8	3.14	1.00E+09	1.00E+09	6	18.8	37.7
32.97	48.3	1.77	3.67	36	5	1.57	0.8	23.1	18.4	3.09	1.00E+09	1.00E+09	6	18.4	36.9
33.96	43.6	1.58	3.64	37.2	5	1.6	0.79	20.9	16.5	2.77	1.00E+09	1.00E+09	6	16.5	33
34.94	42.1	2.15	5.1	38.1	3	1.62	0.78	40.3	31.6	2.67	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
35.92	47.8	1.85	3.87	40.8	5	1.65	0.78	22.9	17.8	3.05	1.00E+09	1.00E+09	6	17.8	35.6
36.91	52.3	2.15	4.11	43.2	5	1.68	0.77	25.1	19.4	3.35	1.00E+09	1.00E+09	6	19.4	38.7
37.89	34.7	1.57	4.53	43.6	4	1.7	0.77	22.2	17	2.17	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
38.88	29	0.94	3.25	44.4	5	1.73	0.76	13.9	10.6	1.78	1.00E+09	1.00E+09	6	10.6	21.1
39.86	26.8	0.74	2.76	45.9	5	1.75	0.76	12.8	9.7	1.63	1.00E+09	1.00E+09	3	9.7	19.4
40.85	27.7	0.78	2.8	47	5	1.78	0.75	13.3	10	1.69	1.00E+09	1.00E+09	3	10	19.9
41.83	29.2	0.77	2.64	48.2	6	1.8	0.74	11.2	8.3	1.78	32	30	3	8.3	16.6
42.81	27.3	0.9	3.28	50.8	5	1.83	0.74	13.1	9.7	1.66	1.00E+09	1.00E+09	3	9.7	19.3
43.8	34.8	1.07	3.07	52.3	5	1.86	0.73	16.7	12.2	2.15	1.00E+09	1.00E+09	8	12.2	24.5
44.78	25.1	0.69	2.75	53.3	5	1.88	0.73	12	8.8	1.5	1.00E+09	1.00E+09	3	8.8	17.5
45.77	36.6	1.3	3.55	56.8	5	1.91	0.72	17.5	12.7	2.26	1.00E+09	1.00E+09	6	12.7	25.4
46.75	41.9	1.61	3.84	59.7	5	1.93	0.72	20.1	14.4	2.62	1.00E+09	1.00E+09	6	14.4	28.9
47.74	44	1.69	3.84	61.7	5	1.96	0.71	21.1	15.1	2.75	1.00E+09	1.00E+09	6	15.1	30.1
48.72	31.1	0.98	3.15	63.1	5	1.98	0.71	14.9	10.6	1.89	1.00E+09	1.00E+09	3	10.6	21.2
49.7	29.9	0.48	1.61	65.7	6	2.01	0.71	11.5	8.1	1.81	32	30	3	8.1	16.2
50.69	37.8	0.94	2.47	69.5	6	2.03	0.7	14.5	10.2	2.33	32	30	6	10.2	20.3
51.67	36.2	0.9	2.49	71.8	6	2.06	0.7	13.8	9.6	2.21	32	30	6	9.6	19.3
52.66	56.1	1.18	2.1	80.6	7	2.09	0.69	17.9	12.4	1.00E+09	34	39.6	1	12.4	24.8
53.64	93.4	3.64	3.9	85.8	5	2.11	0.69	44.7	30.8	6.02	1.00E+09	1.00E+09	6	30.8	61.5
54.63	148.8	5.44	3.66	89.2	6	2.14	0.68	57	39	9.71	40	67.2	10	23.5	62.5
55.61	61.4	1.97	3.21	120	6	2.16	0.68	23.5	16	3.88	36	41.6	6	16	32
56.59	48	1.39	2.89	149.4	6	2.19	0.68	18.4	12.4	2.98	34	34.4	6	12.4	24.9
57.58	57.7	2.16	3.74	169	5	2.22	0.67	27.6	18.6	3.63	1.00E+09	1.00E+09	6	18.6	37.1
58.56	71.3	3.57	5.01	168.6	11	2.25	0.67	68.3	45.6	1.00E+09	36	45.4	1	1.00E+09	1.00E+09
59.55	52.4	1.98	3.78	154.9	5	2.28	0.66	25.1	16.7	3.27	1.00E+09	1.00E+09	6	16.7	33.3
60.53	75.5	3.08	4.08	175	5	2.3	0.66	36.2	23.8	4.8	1.00E+09	1.00E+09	6	23.8	47.7
61.52	116.7	4.91	4.2	195.5	11	2.33	0.66	111.8	73.2	1.00E+09	38	59	1	69.4	142.7
62.42	119.7	5.49	4.59	176.7	11	2.36	0.65	114.6	74.6	1.00E+09	38	59.5	1	74.6	149.2
63.32	174.8	7.27	4.16	154.6	11	2.39	0.65	167.4	108.3	1.00E+09	40	70.2	1	70.9	179.2
64.3	177.3	9.27	5.23	122.2	11	2.43	0.64	169.6	109.1	1.00E+09	40	70.4	1	1.00E+09	1.00E+09
65.29	216.1	2.96	1.37	83.8	8	2.46	0.64	51.7	33	1.00E+09	42	75.9	1	6.2	39.2
66.27	176.2	4.69	2.66	71.2	7	2.48	0.63	56.2	35.7	1.00E+09	40	69.9	1	15.8	51.4
67.26	52.3	1.36	2.6	84.8	6	2.51	0.63	20	12.6	3.22	34	34.9	6	12.6	25.3
68.24	55.9	1.1	1.97	62.3	7	2.54	0.63	17.8	11.2	1.00E+09	34	36.6	1	11.2	22.4
69.22	74.8	2.83	3.78	61.8	5	2.56	0.62	35.8	22.4	4.72	1.00E+09	1.00E+09	6	22.4	44.7

Gregg In Situ. Inc Page 1
Interpretat Output - Release 1.00.19c
Run No: 01-0509-2123-3356
Job No: 97-100
Client: KLEINFELDER
Project: Calpine Energy, East Altamont Energy Center
Site: CALPINE
Location: CPT-6
Engineer: R HEINZEN
CPT Date: 05/03/01
CPT Time: 9:45
CPT File: 068B11.COR
Northing (m): 0
Easting (m): 0
Elevation (m): 0

Su Nkt used 15
Averaging Increment (m): 0.3
Phi Method : Robertson and Campanell 1983
Dr Method : Jamiolkow - All Sands
State Parameter M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	20	0.21	1.05	6.6	6	0.03	2	7.6	15.3	1.33	50	71.6	10	0	15.3
1.48	37.5	1.34	3.58	10.5	5	0.08	2	18	35.9	2.5	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
2.46	32	2.09	6.53	9.1	3	0.14	2	30.7	61.3	2.13	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
3.44	27.8	1.17	4.21	8.6	4	0.2	2	17.8	35.5	1.84	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	23.7	0.57	2.41	8.5	6	0.25	1.99	9.1	18.1	1.56	42	45.1	10	5.5	23.6
5.41	17.6	0.17	0.94	8.6	6	0.31	1.8	6.7	12.1	1.15	40	33.7	6	2.7	14.8
6.4	27.4	0.37	1.37	10.7	6	0.36	1.66	10.5	17.4	1.8	40	44	10	3.8	21.2
7.3	29.8	0.64	2.16	11.4	6	0.42	1.55	11.4	17.7	1.96	40	44.5	10	6.3	24
8.2	27.3	0.47	1.73	11.7	6	0.47	1.46	10.4	15.3	1.79	40	40.3	6	5.5	20.8
9.19	29.8	0.41	1.37	12	6	0.52	1.38	11.4	15.7	1.95	40	41.1	6	4.8	20.5
10.17	42.4	1.1	2.6	14.9	6	0.58	1.31	16.2	21.3	2.79	40	49.8	10	8.8	30.1
11.15	32.2	0.72	2.23	16	6	0.64	1.25	12.3	15.4	2.1	38	40.6	6	8	23.4
12.14	22.6	0.55	2.43	16.6	6	0.69	1.2	8.7	10.4	1.46	36	30	6	9.1	19.5
13.21	21.4	0.31	1.46	98.7	6	0.75	1.15	8.2	9.4	1.37	36	30	6	6.4	15.9
14.27	31.2	1.11	3.56	107	5	0.82	1.11	14.9	16.5	2.03	1.00E+09	1.00E+09	6	16.5	33.1
15.26	20.9	0.48	2.3	105.6	6	0.87	1.07	8	8.6	1.34	34	30	6	8.6	17.2
16.24	63.1	1.59	2.52	99.5	6	0.93	1.04	24.2	25.1	4.14	40	54.5	10	10.8	35.9
17.22	64.6	2.51	3.89	94	5	0.99	1.01	30.9	31.2	4.24	1.00E+09	1.00E+09	10	20.8	52
18.21	26.5	0.36	1.37	95.3	6	1.04	0.98	10.1	9.9	1.69	34	30	6	7.3	17.3
19.19	30.3	0.72	2.36	96.6	6	1.1	0.95	11.6	11.1	1.96	36	31.1	6	11.1	22.2
20.18	23.3	0.45	1.92	97.5	6	1.15	0.93	8.9	8.3	1.47	32	30	6	8.3	16.6
21.16	19.1	0.34	1.81	97.7	6	1.21	0.91	7.3	6.6	1.19	32	30	3	6.6	13.3
22.15	14.9	0.11	0.7	97.6	6	1.27	0.89	5.7	5.1	0.91	30	30	3	5.1	10.2
23.13	21.7	0.27	1.23	96.3	6	1.32	0.87	8.3	7.3	1.36	32	30	6	7.3	14.5
24.11	16.8	0.29	1.7	96.8	6	1.35	0.86	6.4	5.5	1.03	30	30	3	5.5	11.1
25.1	14.5	0.18	1.25	96.8	6	1.37	0.85	5.5	4.7	0.87	30	30	3	4.7	9.5
26.08	22.1	0.54	2.45	96.5	5	1.4	0.85	10.6	9	1.37	1.00E+09	1.00E+09	3	9	17.9
27.07	11.8	0.16	1.34	96.2	5	1.42	0.84	5.7	4.8	0.69	1.00E+09	1.00E+09	1.5	4.8	9.5
28.05	117.1	1.77	1.51	97.3	6	1.45	0.83	28	23.3	1.00E+09	42	65.9	1	5.2	28.5
29.04	104	1.92	1.84	95.8	7	1.48	0.82	33.2	27.3	1.00E+09	40	62.2	1	8.6	35.9
30.02	39.4	0.7	1.77	95	6	1.5	0.82	15.1	12.3	2.51	34	34.1	6	10.8	23.1
31	40.7	0.82	2.02	93.8	6	1.53	0.81	15.6	12.6	2.6	34	34.8	6	12.1	24.7
31.99	45.4	0.95	2.08	93.5	6	1.56	0.8	17.4	14	2.9	36	37.7	6	12.3	26.3
32.97	40.9	0.89	2.19	92.5	6	1.58	0.8	15.7	12.5	2.6	34	34.4	6	12.5	24.9
33.96	40.2	1	2.48	93.6	6	1.61	0.79	15.4	12.2	2.56	34	33.8	6	12.2	24.3
34.94	30.5	0.9	2.97	94.3	5	1.63	0.78	14.6	11.4	1.9	1.00E+09	1.00E+09	6	11.4	22.8
35.92	34.1	0.64	1.89	94.6	6	1.66	0.78	13.1	10.1	2.14	32	30	6	10.1	20.3
36.91	40.8	0.67	1.64	97.1	7	1.68	0.77	13	10	1.00E+09	34	33.5	1	9.2	19.2
37.89	40.8	1.17	2.87	99	6	1.71	0.76	15.6	12	2.58	34	33.3	6	12	23.9
38.88	40.5	1.06	2.63	101.9	6	1.74	0.76	15.5	11.8	2.55	34	32.9	6	11.8	23.6
39.86	34.3	1.05	3.07	104.5	5	1.76	0.75	16.4	12.4	2.14	1.00E+09	1.00E+09	6	12.4	24.8
40.85	28	0.54	1.92	104.3	6	1.79	0.75	10.7	8	1.71	32	30	3	8	16.1
41.83	29.7	0.79	2.66	104.2	6	1.81	0.74	11.4	8.4	1.82	32	30	6	8.4	16.9
42.81	46.5	1.18	2.53	104.3	6	1.84	0.74	17.8	13.1	2.94	34	36	6	13.1	26.3
43.8	54.9	1.52	2.76	108.7	6	1.86	0.73	21	15.4	3.49	36	40.5	6	15.4	30.8
44.78	57.5	1.86	3.24	109.4	6	1.89	0.73	22	16	3.66	36	41.7	6	16	32
45.77	49.4	1.34	2.71	113.1	6	1.92	0.72	18.9	13.7	3.12	34	37.1	6	13.7	27.3
46.75	57	1.61	2.83	115.9	6	1.94	0.72	21.8	15.7	3.62	36	41	6	15.7	31.3
47.74	44.6	1.06	2.37	117.4	6	1.97	0.71	17.1	12.2	2.79	34	33.8	6	12.2	24.4
48.72	38.4	0.57	1.49	121.4	7	1.99	0.71	12.2	8.7	1.00E+09	32	30	1	8.7	17.3
49.7	44.7	0.77	1.72	129.6	7	2.02	0.7	14.3	10	1.00E+09	34	33.5	1	10	20.1
50.69	139	4.98	3.58	135.4	6	2.05	0.7	53.2	37.2	9.07	40	65.8	10	22.5	59.7
51.67	133.7	8.28	6.2	133.1	11	2.08	0.69	128	88.8	1.00E+09	40	64.5	1	1.00E+09	1.00E+09
52.66	71.1	3.83	5.39	135.8	11	2.11	0.69	66.1	46.9	1.00E+09	36	46.2	1	1.00E+09	1.00E+09
53.64	53.3	1.5	2.81	140.8	6	2.14	0.68	20.4	14	3.35	34	37.7	6	14	27.9
54.63	53.4	1.29	2.42	144.9	6	2.17	0.68	20.4	13.9	3.35	34	37.6	6	13.9	27.8
55.61	52.4	0.93	1.78	151.6	7	2.19	0.68	16.7	11.3	1.00E+09	34	36.9	1	11.3	22.6
56.59	61.9	1.27	2.05	160	7	2.22	0.67	19.7	13.3	1.00E+09	36	41.5	1	12.4	25.7
57.58	73.4	2.12	2.89	168.1	6	2.25	0.67	28.1	18.8	4.67	36	46.2	6	18.8	37.5
58.56	57.5	1.57	2.74	171.8	6	2.27	0.66	22	14.8	3.81	34	39	6	14.6	29.2
59.55	54.5	1.21	2.22	174.4	6	2.3	0.66	20.9	13.8	3.4	34	37.3	6	13.8	27.5
60.53	97	2.6	2.68	180.4	6	2.32	0.66	37.2	24.4	6.24	38	53.7	6	18.3	42.7
81.52	126.1	4.67	3.71	180.8	6	2.35	0.65	48.3	31.5	8.17	38	61.1	6	24.6	56.2
62.42	70.2	3.29	4.69	177	11	2.38	0.65	67.3	43.7	1.00E+09	36	44.1	1	1.00E+09	1.00E+09
63.32	91.2	3.45	3.78	186.4	5	2.4	0.65	43.7	28.2	5.83	1.00E+09	1.00E+09	6	28.2	56.3
64.3	125	5.73	4.58	197.9	11	2.43	0.64	119.7	76.8	1.00E+09	38	60.3	1	76.8	153.6
65.29	186.1	8.46	4.54	206.7	11	2.46	0.64	178.2	113.5	1.00E+09	40	71.5	1	78.8	192.4
66.27	195	8.04	4.12	202.3	12	2.5	0.63	93.4	59.1	1.00E+09	40	72.7	1	36.2	95.3
67.26	155.9	7.7	4.94	183	11	2.53	0.63	149.3	93.9	1.00E+09	40	66.1	1	85.5	179.4
68.24	64.1	3.36	5.24	177.3	11	2.56	0.62	61.4	38.4	1.00E+09	34	40.4	1	1.00E+09	1.00E+09
69.22	54	1.68	3.1	175.6	6	2.59	0.62	20.7	12.8	3.33	34	35.3	6	12.8	25.7
70.21	58.2	1.74	2.98	177.9	6	2.62	0.62	22.3	13.8	3.61	34	37.4	6	13.8	27.6
71.19	55.5	1.37	2.47	178.8	6	2.64	0.62	21.3	13.1	3.42	34	35.9	6	13.1	26.2
72.18	56.6	1.35	2.38	182.5	6	2.67	0.61	21.7	13.3	3.49	34	36.3	6	13.3	26.6
73.16	82	3.15	3.84	189.1	5	2.69	0.61	39.2	23.9	5.18	1.00E+09	1.00E+09	6	23.9	47.8
74.15	58.6	1.66	2.83	194.1	6	2.72	0.61	22.4	13.6	3.62	34	37	6	13.6	27.2
75.13	59.6	1.3	2.18	196.9	6	2.74	0.6	22.8	13.8	3.68	34	37.4	6	13.8	27.6
76.11	78	1.58	2.02	214.6	7	2.77	0.6	24.9	15	1.00E+09	36	44.9	1	13.9	28.8
77.1	70.8	1.83	2.59	221	6	2.8	0.6	27.1	16.2	4.42	34	42	6	16.2	32.4
78.08	60.1	1.91	3.17	225.6	6	2.82	0.6	23	13.7	3.7	34	37.2	6	13.7	27.4
79.07	58.1	1.5	2.59	227.5	6	2.85	0.59	22.2	13.2	3.56	32	36.1	6	13.2	26.4
80.05	70.4	1.84	2.62	233.4	6	2.87	0.59	27	15.9	4.38	34	41.5	6	15.9	31.8
81.04	60.9	1.48	2.43	238.2	6	2.9	0.59	23.3	13.7	3.74	34	37.2	6	13.7	27.4
82.02	51.4	1.45	2.82	241.5	6	2.93	0.58	19.7	11.5	3.11	32	32.2	6	11.5	23
83	202.9	7.87	3.88	249	12	2.95	0.58	97.2	56.6	1.00E+09	40	71.4	1	36.7	93.2
83.99	91.6	5.56	6.07	236.8	11	2.98	0.58	87.7	50.8	1.00E+09	36	48.5	1	1.00E+09	1.00E+09
84.97	56.1	0.87	1.55	251	7	3.01	0.58	17.9	10.3	1.00E+09	32	34.3	1	10.3	20.6
85.96	85.8	1.51	1.76	281	7	3.04	0.57	27.4	15.7	1.00E+09	36	46.3	1	13	28.7
86.94	75.8	2.05	2.7	294	6	3.07	0.57	29.1	16.6	4.72	34	42.7	6	16.6	33.2
87.93	104.3	3.73	3.58	299.2	6	3.09	0.57	40	22.7	6.61	36	51.7	6	22.7	45.5
88.91	146.6	4.24	2.89	283.9	7	3.12	0.57	46.8	26.5	1.00E+09	38	61.3	1	18.9	45.4
89.89	174.8	6.88	3.93	170.7	12	3.15	0.56	63.7	47.2	1.00E+09	40	68.2	1	38	85.2
90.88	127.5	5.42	4.25	216.5	11	3.18	0.56	122.1	68.5	1.00E+09	38	57	1	68.5	137
91.86	192.5	6.79	3.53	277.5	12	3.21	0.56	92.2	51.4	1.00E+09	40	68.7	1	34.7	86.1
92.85	69.7	2.17	3.11	234.5	6	3.24	0.58	26.7	14.8	4.29	34	39.5	6	14.8	29.7
93.83	70.7	2.39	3.38	241.1	6	3.26	0.55	27.1	15	4.35	34	39.8	6	15	30
94.82	76.1	2.07	2.72	263.5	6	3.29	0.55	29.2	16.1	4.7	34	41.8	6	16.1	32.2
95.8	106.1	3.52	3.32	348.9	6	3.31	0.55	40.6	22.3	6.7	36	51.2	6	22.3	44.7
96.78	115.3	2.37	2.05	375	7	3.34	0.55	36.8	20.1	1.00E+09	36	53.5	1	15	35.1
97.77	57.6	0.82	1.42	276.1	7	3.37	0.54	18.4	10	1.00E+09	32	33.4	1	10	20
98.75	56.1	0.92	1.65	346.8	7	3.4	0.54	17.9	9.7	1.00E+09	32	32.5	1	9.7	19.4

Gregg In Situ. Inc Page 1
Interpreta Output - Release 1 00 19c
Run No 01-0509-2123-3290
Job No 97-100
Client KLEINFELDER
Project: Calpine Energy. East Altamont Energy Center
Site: CALPINE
Location: CPT-7
Engineer: R HEINZEN
CPT Date: 05/02/01
CPT Time: 8:51
CPT File: 068B14.COR
Northing (m): 0
Easting (m): 0
Elevation (m) 0

Su Nkt used: 15
Averaging Increment (m): 0.3
Phi Method : Robertso and Campane 1983
Dr Method : Jamiolko - All Sands
State Paramete M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	15.3	0.06	0.4	1.2	6	0.03	2	5.9	11.7	1.02	50	64	10	0	11.7
1.48	34.9	0.12	0.34	2.1	7	0.09	2	11.2	22.3	1.00E+09	48	71.8	1	0	22.3
2.46	56.3	1.57	2.78	1.7	6	0.14	2	21.6	43.2	3.75	48	78.1	10	1.00E+09	1.00E+09
3.44	42.3	1.75	4.13	0.2	5	0.2	2	20.2	40.5	2.81	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	46.9	2.05	4.38	0.2	4	0.26	1.98	30	59.3	3.11	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
5.41	45.4	2.23	4.92	1.2	3	0.31	1.79	43.5	78	3	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
6.4	26	1.15	4.44	1.2	3	0.37	1.65	24.9	41.2	1.71	1.00E+09	1.00E+09	10	29	70.3
7.3	30.4	0.97	3.19	0.4	5	0.42	1.55	14.5	22.5	2	1.00E+09	1.00E+09	10	11.3	33.9
8.2	42.6	1.55	3.64	1.7	5	0.47	1.46	20.4	29.8	2.81	1.00E+09	1.00E+09	10	14	43.8
9.19	43.7	1.77	4.05	3.1	5	0.52	1.38	20.9	28.9	2.88	1.00E+09	1.00E+09	10	16.2	45.2
10.17	30.5	1.78	5.83	10.9	3	0.58	1.31	29.2	38.3	1.99	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
11.15	26.7	1.22	4.57	13.1	3	0.64	1.25	25.5	32	1.74	1.00E+09	1.00E+09	8	32	64.1
12.14	21.4	1.19	5.56	13.6	3	0.69	1.2	20.5	24.7	1.38	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
13.21	19.8	0.86	4.33	16.2	3	0.75	1.18	19	21.9	1.27	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
14.27	21	0.72	3.42	18.3	5	0.81	1.11	10.1	11.2	1.35	1.00E+09	1.00E+09	6	11.2	22.4
15.28	31.9	1.57	4.91	19.8	3	0.87	1.08	30.6	32.9	2.07	1.00E+09	1.00E+09	8	1.00E+09	1.00E+09
16.24	29	1.34	4.61	21.5	3	0.92	1.04	27.8	28.9	1.87	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
17.22	40.9	1.56	3.82	28.6	5	0.98	1.01	19.6	19.8	2.66	1.00E+09	1.00E+09	6	19.8	39.6
18.21	50.9	1.53	3.01	36.1	6	1.03	0.98	19.5	19.2	3.33	38	46.9	6	13.2	32.4
19.19	45.3	1.7	3.75	45.6	5	1.09	0.96	21.7	20.8	2.95	1.00E+09	1.00E+09	6	20.9	41.7
20.18	39.9	1.87	4.69	51.2	4	1.14	0.93	25.5	23.8	2.59	1.00E+09	1.00E+09	6	23.8	47.7
21.16	22.3	0.96	4.32	48.1	3	1.2	0.91	21.4	19.5	1.41	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
22.15	19.9	0.74	3.72	44.7	4	1.26	0.89	12.7	11.3	1.24	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
23.13	30	0.67	2.23	33.8	6	1.31	0.87	11.5	10	1.91	34	30	6	10	20.1
24.11	58.7	1.71	2.91	35	6	1.33	0.87	22.5	19.5	3.82	38	47.2	6	14.6	34
25.1	44.7	1.53	3.42	53.9	5	1.36	0.86	21.4	18.3	2.88	1.00E+09	1.00E+09	6	18.3	36.7
26.08	26.9	1.12	4.15	53.7	4	1.39	0.85	17.2	14.6	1.7	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
27.07	36.7	1.51	4.1	60.7	4	1.41	0.84	23.5	19.8	2.35	1.00E+09	1.00E+09	6	19.8	39.5
28.05	29.7	1.6	5.4	62.5	3	1.44	0.83	28.4	23.7	1.87	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
29.04	27.6	1.06	3.82	65.3	4	1.46	0.83	17.6	14.6	1.73	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
30.02	35.9	1.24	3.45	87.5	5	1.49	0.82	17.2	14.1	2.28	1.00E+09	1.00E+09	6	14.1	28.2
31	50	2.22	4.43	96.6	4	1.51	0.81	32	26	3.22	1.00E+09	1.00E+09	6	26	52
31.99	45.6	2.01	4.41	91.5	4	1.54	0.81	29.1	23.5	2.92	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
32.97	50.8	2.2	4.32	99.7	5	1.56	0.8	24.3	19.5	3.26	1.00E+09	1.00E+09	6	19.5	39
33.96	42.8	1.94	4.53	95.9	4	1.59	0.79	27.3	21.7	2.72	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
34.94	24.8	1.11	4.48	78.1	3	1.61	0.79	23.8	18.7	1.52	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
35.92	23.8	0.95	3.99	83.2	4	1.64	0.78	15.2	11.9	1.45	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
36.91	23.9	0.85	3.53	113.9	5	1.66	0.78	11.5	8.9	1.46	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
37.89	36.8	1.18	3.2	144.4	5	1.69	0.77	17.6	13.6	2.31	1.00E+09	1.00E+09	6	13.6	27.1
38.88	34.9	1.36	3.91	155.9	5	1.72	0.76	16.7	12.8	2.18	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
39.86	66.4	2.07	3.12	141.1	6	1.74	0.76	25.4	19.3	4.28	38	47	6	18.1	37.4
40.85	64	2	3.13	124.5	6	1.77	0.75	24.5	18.4	4.11	38	45.7	6	18.4	36.8
41.83	40.7	1.23	3.03	125.9	5	1.79	0.75	19.5	14.5	2.55	1.00E+09	1.00E+09	6	14.5	29.1
42.81	35.7	1.18	3.3	88.1	5	1.82	0.74	17.1	12.7	2.22	1.00E+09	1.00E+09	6	12.7	25.4
43.8	26.6	0.53	2.01	98.7	6	1.84	0.74	10.2	7.5	1.61	32	30	3	7.5	15
44.78	29.5	0.6	2.03	119.6	6	1.87	0.73	11.3	8.3	1.8	32	30	3	8.3	16.5
45.77	75.1	2.46	3.27	129.7	6	1.9	0.73	28.8	20.9	4.83	38	49.3	6	19.7	40.6
46.75	106	4.46	4.21	87.4	11	1.92	0.72	101.5	73.2	1.00E+09	40	58.9	1	82.8	136
47.74	55.8	1.83	3.28	91.4	5	1.95	0.72	26.7	19.1	3.54	1.00E+09	1.00E+09	6	19.1	38.2
48.72	47.7	1.44	3.01	124.8	6	1.98	0.71	18.3	13	2.99	34	35.6	6	13	26
49.7	46.1	1.42	3.07	126.4	6	2.01	0.71	17.7	12.5	2.89	34	34.5	6	12.5	25
50.69	56.2	1.77	3.16	206	6	2.03	0.7	21.5	15.1	3.55	36	40	6	15.1	30.2
51.67	49.5	1.9	3.84	167.4	5	2.06	0.7	23.7	16.5	3.1	1.00E+09	1.00E+09	6	16.5	33.1
52.66	47.7	1.98	4.17	110.6	5	2.08	0.69	22.8	15.8	2.98	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
53.64	51.2	1.96	3.83	112.7	5	2.11	0.69	24.5	16.9	3.21	1.00E+09	1.00E+09	6	16.9	33.8
54.63	53	1.56	2.95	168.6	6	2.13	0.68	20.3	13.9	3.33	34	37.6	6	13.9	27.6
55.61	70.7	2.05	2.9	335.2	6	2.16	0.68	27.1	18.4	4.5	36	45.7	6	18.4	36.9
56.59	170	2.98	1.75	281.1	8	2.19	0.68	40.7	27.5	1.00E+09	40	70.7	1	7.5	35.1
57.58	175.7	3.79	2.16	60.1	7	2.21	0.67	56.1	37.7	1.00E+09	42	71.4	1	12.3	50
58.56	156.5	5.77	3.69	50.7	12	2.24	0.67	74.9	50	1.00E+09	40	67.9	1	30.4	80.4
59.55	151.4	6.42	4.24	90.3	11	2.27	0.66	145	96.2	1.00E+09	40	66.8	1	69.7	165.9
60.53	168.2	5.76	3.42	123.3	6	2.3	0.66	64.4	42.5	10.98	40	69.6	10	23	65.5
61.52	126.7	4.94	3.9	91.7	12	2.33	0.66	60.7	39.7	1.00E+09	40	61.3	1	32.2	72
62.42	177.2	3.19	1.8	75	8	2.36	0.65	42.4	27.6	1.00E+09	40	70.8	1	8	35.7
63.32	167.5	2.8	1.67	46.1	8	2.38	0.65	40.1	26	1.00E+09	40	69	1	7.6	33.6
64.3	46.6	1.11	2.39	47.7	6	2.41	0.64	17.8	11.5	2.86	32	32.1	6	11.5	23
65.29	53.4	1.38	2.58	58.4	6	2.44	0.64	20.5	13.1	3.31	34	35.9	6	13.1	26.2
66.27	56	1.78	3.18	124.1	6	2.46	0.64	21.4	13.7	3.48	34	37.1	6	13.7	27.3
67.26	65.6	1.91	2.91	220.1	6	2.49	0.63	25.1	15.9	4.11	34	41.5	6	15.9	31.9
68.24	49.3	1.28	2.6	218.8	6	2.51	0.63	18.9	11.9	3.02	32	33.2	6	11.9	23.8
69.22	44.1	1.11	2.53	248.4	6	2.54	0.63	16.9	10.6	2.87	32	30	6	10.6	21.2
70.21	50.5	1.32	2.61	260.3	6	2.56	0.62	19.4	12.1	3.1	32	33.6	6	12.1	24.2
71.19	56.4	1.37	2.43	341.2	6	2.59	0.62	21.6	13.4	3.49	34	36.6	6	13.4	26.8
72.18	58.9	1.18	2.07	315	7	2.62	0.62	18.2	11.2	1.00E+09	34	36.7	1	11.2	22.4
73.16	76.2	1.39	1.83	484.7	7	2.64	0.62	24.3	15	1.00E+09	36	44.9	1	12.4	27.4
74.15	93.8	2.16	2.3	536.1	7	2.67	0.61	29.9	18.3	1.00E+09	36	50.7	1	14.6	32.9
75.13	90.5	3.21	3.55	365.8	6	2.7	0.61	34.7	21.1	5.74	36	49.6	6	21.1	42.2
76.11	63.7	1.75	2.74	61.1	6	2.72	0.61	24.4	14.8	3.95	34	39.4	6	14.8	29.6
77.1	59	1.73	2.93	68.7	6	2.75	0.6	22.6	13.6	3.64	34	37	8	13.6	27.3
78.08	63	1.59	2.52	73.1	6	2.77	0.6	24.1	14.5	3.9	34	38.8	6	14.5	29
79.07	92.4	3.76	4.07	133.1	5	2.8	0.6	44.2	26.4	5.86	1.00E+09	1.00E+09	6	28.4	52.9
80.05	77.5	2.9	3.74	150.2	5	2.83	0.59	37.1	22.1	4.86	1.00E+09	1.00E+09	6	22.1	44.2
81.04	172	3.75	2.18	206.8	7	2.85	0.59	54.9	32.5	1.00E+09	40	67.2	1	14.1	46.6
82.02	267.1	8.23	3.08	33.3	12	2.88	0.59	127.9	75.4	1.00E+09	42	79.7	1	30	105.3

Gregg In Situ, Inc. Page: 1
Interpretat Output - Release 1.00.19c
Run No: 01-0509-2123-3378
Job No: 97-100
Client: KLEINFELDER
Project: Calpine Energy, East Altamont Energy Center
Site: CALPINE
Location: CPT-8
Engineer: R. HEINZEN
CPT Date: 05/03/01
CPT Time: 11:33
CPT File: 068B16.COR
Northing (m): 0
Easting (m): 0
Elevation (m): 0

Su Nkt used: 15
Averaging Increment (m): 0.3
Phi Method : Robertson and Campanel 1983
Dr Method : Jamiolkow - All Sands
State Parameter M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	37.1	0.11	0.29	73	7	0.03	2	11.8	23.7	1.00E+09	50	89	1	0	23.7
1.48	62.2	2.02	3.25	81.1	6	0.09	2	23.8	47.7	4.14	50	88.2	10	1.00E+09	1.00E+09
2.46	47.9	3.23	6.74	45.2	3	0.14	2	45.9	91.7	3.18	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
3.44	38.7	1.95	5.04	30.4	3	0.2	2	37	74.1	2.57	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	23.1	0.63	2.72	28.5	5	0.25	1.99	11.1	22	1.52	1.00E+09	1.00E+09	10	7.7	29.8
5.41	24.6	0.78	3.19	26.9	5	0.31	1.8	11.8	21.2	1.62	1.00E+09	1.00E+09	10	9.8	31
6.4	25.4	0.65	2.57	25.3	6	0.36	1.66	9.7	16.1	1.67	40	41.8	10	6.9	23
7.3	29.9	0.66	2.21	24.3	6	0.42	1.55	11.5	17.8	1.97	40	44.6	10	6.4	24.2
8.2	35.9	0.46	1.29	23.6	7	0.47	1.46	11.5	16.7	1.00E+09	40	48.2	1	3.4	20.2
9.19	24.5	0.35	1.42	22.6	6	0.53	1.38	9.4	13	1.6	38	35.6	6	5	18
10.17	14.5	0.03	0.23	19	6	0.58	1.31	5.5	7.3	0.92	34	30	6	0	7.3
11.15	24.5	0.02	0.08	18.2	7	0.64	1.25	7.8	9.8	1.00E+09	38	32.7	1	0	9.8
12.14	55.8	0.58	1.04	18.2	7	0.7	1.2	17.8	21.3	1.00E+09	42	55.1	1	3.3	24.6
13.21	107.9	1.99	1.85	14.1	7	0.76	1.15	34.4	39.5	1.00E+09	44	72.7	1	5.8	45.3
14.27	42.5	2.23	5.25	12.3	3	0.82	1.1	40.7	45	2.78	1.00E+09	1.00E+09	6	45	89.9
15.26	30.3	0.69	2.29	12.6	6	0.88	1.07	11.6	12.4	1.96	36	34.3	6	9.7	22.1
16.24	43.5	1.24	2.85	15.2	6	0.93	1.03	16.7	17.2	2.84	38	43.8	6	11.9	29.2
17.22	31.4	0.87	2.77	17.4	5	0.99	1.01	15	15.1	2.03	1.00E+09	1.00E+09	6	15.1	30.2
18.21	40.2	1.17	2.9	18.5	6	1.05	0.98	15.4	15	2.61	38	39.9	6	12.9	28
19.19	60.4	2.07	3.43	22.1	5	1.1	0.95	28.9	27.6	3.96	1.00E+09	1.00E+09	6	19.3	46.8
20.18	55.8	2.15	3.85	34.8	5	1.16	0.93	26.7	24.8	3.64	1.00E+09	1.00E+09	6	22	46.8
21.16	50.7	1.73	3.42	36.6	5	1.22	0.91	24.3	22	3.3	1.00E+09	1.00E+09	6	20.2	42.2
22.15	46.4	1.65	3.55	38	5	1.27	0.89	22.2	19.7	3.01	1.00E+09	1.00E+09	6	19.7	39.4
23.13	36.3	1.35	3.73	39	5	1.32	0.87	17.4	15.1	2.33	1.00E+09	1.00E+09	6	15.1	30.2
24.11	35.5	1.23	3.46	39.3	5	1.35	0.86	17	14.6	2.27	1.00E+09	1.00E+09	6	14.6	29.3
25.1	33.7	1.39	4.11	39.6	4	1.38	0.85	21.5	18.3	2.15	1.00E+09	1.00E+09	6	18.3	36.7
26.08	22.7	0.47	2.08	39.8	6	1.4	0.84	8.7	7.4	1.42	32	30	6	7.4	14.7
27.07	16.2	0.24	1.45	39.8	6	1.43	0.84	6.2	5.2	0.98	30	30	3	5.2	10.4
28.05	14.6	0.26	1.8	39.5	5	1.45	0.83	7	5.8	0.87	1.00E+09	1.00E+09	3	5.8	11.6
29.04	36.4	0.98	2.71	40.9	6	1.48	0.82	13.9	11.5	2.31	34	32.1	6	11.5	22.9
30.02	56.1	1.79	3.19	47	6	1.5	0.82	21.5	17.5	3.62	38	44.2	6	17.1	34.6
31	61.6	1.93	3.13	50.4	6	1.53	0.81	23.6	19.1	3.99	38	46.7	6	16.8	35.9
31.99	49.4	2.02	4.08	53.3	5	1.56	0.8	23.7	19	3.17	1.00E+09	1.00E+09	6	19	38
32.97	20.6	0.71	3.44	50.9	5	1.58	0.8	9.9	7.9	1.25	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
33.96	34.4	1.02	2.96	50.9	5	1.61	0.79	16.5	13	2.16	1.00E+09	1.00E+09	6	13	26
34.94	33.3	0.89	2.67	50.6	6	1.63	0.78	12.8	10	2.09	32	30	6	10	20
35.92	26.6	0.91	3.43	49.5	5	1.66	0.78	12.7	9.9	1.64	1.00E+09	1.00E+09	3	9.9	19.8
36.91	21.9	0.53	2.41	48.4	6	1.68	0.77	8.4	6.5	1.32	30	30	3	6.5	12.9
37.89	32.4	0.96	2.96	48.9	5	1.71	0.76	15.5	11.8	2.01	1.00E+09	1.00E+09	6	11.8	23.7
38.88	50.2	1.74	3.46	51.6	5	1.73	0.76	24.1	18.3	3.2	1.00E+09	1.00E+09	6	18.3	36.5
39.86	30.6	0.96	3.14	55.7	5	1.76	0.75	14.6	11	1.89	1.00E+09	1.00E+09	6	11	22.1
40.85	34.1	0.74	2.16	55.4	6	1.79	0.75	13.1	9.8	2.12	32	30	6	9.8	19.5
41.83	28.2	0.65	2.29	59.9	6	1.81	0.74	10.8	8	1.72	32	30	3	8	16.1
42.81	28.5	0.63	2.22	60.2	6	1.84	0.74	10.9	8.1	1.74	32	30	3	8.1	16.1
43.8	34.8	0.73	2.09	62.3	6	1.86	0.73	13.3	9.8	2.15	32	30	6	9.8	19.5
44.78	43.8	0.77	1.75	66.4	7	1.89	0.73	14	10.2	1.00E+09	34	33.9	1	10.2	20.3
45.77	50.5	1.23	2.44	81.9	6	1.92	0.72	19.4	14	3.19	34	37.8	6	14	28
46.75	47	0.95	2.03	101.6	6	1.94	0.72	18	12.9	2.96	34	35.5	6	12.9	25.8
47.74	55.8	1.18	2.11	115.3	6	1.97	0.71	21.4	15.3	3.54	36	40.3	6	14.3	29.5
48.72	166.8	7.08	4.24	126.9	11	2	0.71	159.8	113.1	1.00E+09	42	71.4	1	67	180.1
49.7	105.1	6.71	6.38	117.5	11	2.03	0.7	100.7	70.7	1.00E+09	38	57.9	1	1.00E+09	1.00E+09
50.69	47.8	2.03	4.26	121.2	5	2.06	0.7	22.9	15.9	2.99	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
51.67	42.9	1.06	2.48	131.8	6	2.09	0.89	16.4	11.4	2.66	32	31.9	6	11.4	22.8
52.66	57	1.72	3.02	150.8	6	2.11	0.89	21.8	15	3.6	34	39.8	6	15	30
53.64	66.2	2.18	3.29	170	6	2.14	0.68	25.4	17.4	4.21	36	44	6	17.4	34.7
54.63	64.5	2.33	3.61	179.6	5	2.16	0.68	30.9	21	4.09	1.00E+09	1.00E+09	6	21	42
55.61	65.8	2.24	3.4	204.6	5	2.19	0.68	31.5	21.3	4.17	1.00E+09	1.00E+09	6	21.3	42.6
56.59	63.3	1.85	2.92	228.7	6	2.21	0.67	24.2	16.3	4	36	42.1	6	16.3	32.6
57.58	92.9	3.13	3.37	241.2	6	2.24	0.67	35.6	23.8	5.97	38	53	6	22.1	45.9
58.56	98	2.77	2.83	205.4	6	2.27	0.66	37.5	24.9	6.31	38	54.4	6	18.9	43.8
59.55	62.6	2.86	4.57	188.1	5	2.29	0.66	30	19.8	3.94	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
60.53	117.8	3.62	3.07	183.3	6	2.32	0.66	45.1	29.6	7.62	38	59.3	6	20.5	50.2
61.52	162.1	5.58	3.44	167.4	6	2.34	0.65	62.1	40.6	10.57	40	68.3	10	23.3	63.9
62.42	102	5.67	5.56	158.5	11	2.37	0.65	97.7	63.5	1.00E+09	38	54.9	1	1.00E+09	1.00E+09
63.32	146.7	6.34	4.32	160.3	11	2.4	0.65	140.4	90.7	1.00E+09	40	65.1	1	72.7	163.4
64.3	125.4	4.6	3.67	113.7	6	2.43	0.64	48	30.8	8.11	38	60.4	6	24.8	55.7
65.29	56.7	1.58	2.79	102.6	6	2.45	0.64	21.7	13.9	3.53	34	37.5	6	13.9	27.7
66.27	49.9	1.07	2.15	106.6	6	2.48	0.83	19.1	12.1	3.07	32	33.7	6	12.1	24.3
67.26	52.8	1.33	2.51	109.7	6	2.51	0.63	20.2	12.8	3.26	34	35.2	6	12.8	25.6
68.24	52.8	1.3	2.46	113.4	6	2.53	0.63	20.2	12.7	3.26	34	35.1	6	12.7	25.4
69.22	47.9	1.1	2.29	119.4	8	2.56	0.63	18.4	11.5	2.93	32	32.1	6	11.5	23

Gregg In Situ, Inc. Page: 1
Interpretat Output - Release 1.00.19c
Run No: 01-0509-2123-3328
Job No: 97-100
Client: KLEINFELDER
Project: Calpine Energy, East Altamont Energy Center
Site: CALPINE
Location: CPT-9
Engineer: R. HEINZEN
CPT Date: 05/02/01
CPT Time: 13:57
CPT File: 068B19.COR
Northing (m): 0
Easting (m): 0
Elevation (m): 0

Su Nkt used: 15
Averaging Increment (m): 0.3
Phi Method : Robertson and Campanel 1983
Dr Method : Jamiolkow - All Sands
State Parameter M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	18.3	0.26	1.43	-1.5	6	0.03	2	7	14	1.22	50	69.1	10	0	14
1.48	42.1	1.37	3.26	-1.2	5	0.08	2	20.2	40.3	2.8	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
2.46	42.7	1.25	2.93	-1.4	6	0.14	2	16.4	32.7	2.84	46	70.4	10	1.00E+09	1.00E+09
3.44	37.2	1.47	3.96	-1.8	5	0.2	2	17.8	35.6	2.47	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	35.6	2.17	6.09	-1.9	3	0.25	1.99	34.1	67.9	2.36	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
5.41	23.9	1.66	6.94	-2.4	3	0.31	1.8	22.9	41.3	1.57	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
6.4	29.8	1.31	4.38	-2.5	4	0.36	1.66	19	31.6	1.96	1.00E+09	1.00E+09	10	19.4	51
7.3	10.4	0.37	3.62	-2.9	3	0.41	1.55	9.9	15.4	0.66	1.00E+09	1.00E+09	6	15.4	30.8
8.2	5.3	0.18	3.44	-3	3	0.46	1.47	5.1	7.5	0.33	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
9.19	12.8	0.66	5.15	-3	3	0.52	1.39	12.2	17	0.82	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
10.17	13.9	0.53	3.79	-3	3	0.57	1.32	13.3	17.6	0.89	1.00E+09	1.00E+09	6	17.6	35.1
11.15	15.1	0.55	3.65	-3	4	0.63	1.26	9.6	12.1	0.96	1.00E+09	1.00E+09	6	12.1	24.2
12.14	7.1	0.28	3.96	-3	3	0.69	1.21	6.8	8.2	0.43	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
13.21	16.3	0.46	2.81	-3.3	5	0.75	1.16	7.8	9	1.04	1.00E+09	1.00E+09	6	9	18.1
14.27	25	0.79	3.15	-3.1	5	0.81	1.11	11.9	13.3	1.61	1.00E+09	1.00E+09	6	13.3	26.6
15.26	24.7	0.84	3.42	-2.9	5	0.86	1.08	11.8	12.7	1.59	1.00E+09	1.00E+09	6	12.7	25.4
16.24	15.5	0.35	2.23	-3	5	0.92	1.04	7.4	7.8	0.97	1.00E+09	1.00E+09	6	7.8	15.5
17.22	41.7	1.84	4.41	-2.6	4	0.98	1.01	26.6	27	2.72	1.00E+09	1.00E+09	6	27	53.9
18.21	43.2	2.17	5.03	-2.5	3	1.03	0.98	41.4	40.8	2.81	1.00E+09	1.00E+09	6	40.8	81.6
19.19	32.7	1.47	4.49	-2.7	4	1.09	0.96	20.9	20	2.11	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
20.18	24.7	0.93	3.75	-2.6	4	1.14	0.94	15.8	14.7	1.57	1.00E+09	1.00E+09	6	14.7	29.5
21.16	32.7	0.94	2.89	-2.4	5	1.2	0.91	15.6	14.3	2.1	1.00E+09	1.00E+09	6	14.3	28.5
22.15	38.4	1.34	3.5	-2.4	5	1.26	0.89	18.4	16.4	2.48	1.00E+09	1.00E+09	6	16.4	32.8
23.13	30.8	0.87	2.84	-2.4	5	1.31	0.87	14.7	12.9	1.96	1.00E+09	1.00E+09	6	12.9	25.8
24.11	19.3	0.6	3.11	-2.5	5	1.33	0.87	9.3	8	1.2	1.00E+09	1.00E+09	3	8	16
25.1	16.1	0.36	2.26	-2.5	5	1.36	0.86	7.7	6.6	0.98	1.00E+09	1.00E+09	3	6.6	13.3
26.08	38.4	1.68	4.38	-2.4	4	1.39	0.85	24.5	20.8	2.46	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
27.07	50	2.05	4.11	-2.3	5	1.41	0.84	24	20.2	3.23	1.00E+09	1.00E+09	6	20.2	40.3
28.05	48.9	0.85	1.74	-2.1	7	1.44	0.83	15.6	13	1.00E+09	36	41	1	8.3	21.3
29.04	139.6	1.66	1.19	-1.6	8	1.47	0.83	33.4	27.6	1.00E+09	42	70.7	1	3.9	31.5

Gregg In Situ, Inc. Page: 1
Interpretat Output - Release 1.00.19c
Run No: 01-0509-2123-3334
Job No: 97-100
Client: KLEINFELDER
Project: Calpine Energy, East Altamont Energy Center
Site: CALPINE
Location: CPT-10
Engineer: R. HEINZEN
CPT Date: 05/02/01
CPT Time: 14:30
CPT File: 068B23.COR
Northing (m): 0
Easting (m): 0
Elevation (m): 0

Su Nkt used: 15
Averaging Increment (m): 0.3
Phi Method : Robertson and Campanel 1983
Dr Method : Jamiolkow - All Sands
State Parameter M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	25.8	0.1	0.39	-1.4	7	0.03	2	8.3	16.5	1.00E+09	50	78.6	1	0	16.5
1.48	45.4	0.78	1.72	-1.4	7	0.09	2	14.5	29	1.00E+09	48	79	1	0	29
2.46	34.8	0.26	0.73	-1.3	7	0.14	2	11.1	22.2	1.00E+09	46	64.1	1	0	22.2
3.44	34.2	0.61	1.8	-1.5	6	0.2	2	13.1	26.2	2.27	44	58.8	10	3	29.2
4.43	23.3	0.55	2.36	-1.7	6	0.26	1.97	8.9	17.6	1.54	42	44.3	10	5.4	23
5.41	17	0.4	2.34	-1.8	5	0.31	1.78	8.1	14.5	1.11	1.00E+09	1.00E+09	6	7.3	21.8
6.4	14	0.44	3.14	-2.1	4	0.37	1.64	8.9	14.7	0.91	1.00E+09	1.00E+09	6	13.8	28.5
7.3	21.3	0.72	3.39	-2.2	5	0.42	1.54	10.2	15.7	1.39	1.00E+09	1.00E+09	6	11.8	27.4
8.2	25.3	1.08	4.28	-2.2	3	0.47	1.45	24.3	35.3	1.66	1.00E+09	1.00E+09	6	31.2	66.5
9.19	23	1.23	5.36	-2.2	3	0.53	1.38	22	30.3	1.5	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
10.17	20.6	0.91	4.39	-2.1	3	0.58	1.31	19.7	25.8	1.34	1.00E+09	1.00E+09	6	25.8	51.7
11.15	19.3	0.71	3.69	-2	4	0.64	1.25	12.3	15.4	1.24	1.00E+09	1.00E+09	6	15.4	30.8
12.14	21.6	0.72	3.34	-1.8	5	0.7	1.2	10.3	12.4	1.39	1.00E+09	1.00E+09	6	12.4	24.8
13.21	21.2	0.66	3.11	-1.5	5	0.76	1.15	10.2	11.7	1.37	1.00E+09	1.00E+09	6	11.7	23.4
14.27	17.7	0.56	3.16	-1.4	5	0.82	1.11	8.5	9.4	1.12	1.00E+09	1.00E+09	6	9.4	18.7
15.26	25.6	0.56	2.18	-1.3	6	0.87	1.07	9.8	10.5	1.65	36	30	6	9.4	19.9
16.24	30.8	0.7	2.26	-1.2	6	0.93	1.04	11.8	12.2	1.99	36	33.9	6	9.9	22.1
17.22	39.9	1.47	3.68	-1	5	0.99	1.01	19.1	19.3	2.6	1.00E+09	1.00E+09	6	19.3	38.5
18.21	42	2.2	5.23	-1	3	1.04	0.98	40.2	39.4	2.73	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
19.19	21.9	1.22	5.6	-1	3	1.1	0.95	20.9	20	1.38	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
20.18	16.8	0.55	3.26	-1	4	1.15	0.93	10.7	10	1.04	1.00E+09	1.00E+09	3	10	20
21.16	21	0.74	3.52	-1.1	4	1.21	0.91	13.4	12.2	1.32	1.00E+09	1.00E+09	6	12.2	24.4
22.15	19	0.54	2.82	-1.1	5	1.27	0.89	9.1	8.1	1.18	1.00E+09	1.00E+09	3	8.1	16.2
23.13	17.9	0.72	4.02	-1	3	1.32	0.87	17.2	15	1.11	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
24.11	20.1	0.48	2.4	-1	5	1.34	0.86	9.6	8.3	1.25	1.00E+09	1.00E+09	3	8.3	16.6
25.1	26.7	1.18	4.41	-0.9	3	1.37	0.86	25.6	21.9	1.69	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
26.08	18.4	0.42	2.28	-0.9	5	1.39	0.85	8.8	7.5	1.13	1.00E+09	1.00E+09	3	7.5	15
27.07	30.1	0.68	2.26	-0.8	6	1.42	0.84	11.5	9.7	1.9	34	30	6	9.7	19.4
28.05	37.6	1.11	2.94	-0.7	5	1.44	0.83	18	15	2.4	1.00E+09	1.00E+09	6	15	29.9
29.04	43.5	1.31	3.02	-0.7	6	1.47	0.83	16.7	13.7	2.79	36	37.3	6	13.7	27.5

Gregg In Situ, Inc. Page: 1
Interpretat Output - Release 1.00.19c
Run No: 01-0509-2123-3394
Job No: 97-100
Client: KLEINFELDER
Project: Calpine Energy, East Altamont Energy Center
Site: CALPINE
Location: CPT-11
Engineer: R. HEINZEN
CPT Date: 05/03/01
CPT Time: 12:59
CPT File: 068B27.COR
Northing (m): 0
Easting (m): 0
Elevation (m): 0

Su Nkt used: 15
Averaging Increment (m): 0.3
Phi Method : Robertson and Campanel 1983
Dr Method : Jamiolkow - All Sands
State Parameter M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	16.4	0.17	1.02	24	6	0.03	2	6.3	12.6	1.09	50	66	10	0	12.6
1.48	42.7	1.05	2.47	18	6	0.08	2	16.3	32.7	2.84	48	77.6	10	1.00E+09	1.00E+09
2.46	44.5	2.51	5.64	11.9	3	0.14	2	42.7	85.3	2.96	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
3.44	35.3	2.73	7.75	6.6	3	0.2	2	33.8	67.6	2.34	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	21.5	1.13	5.27	6.3	3	0.25	2	20.6	41.2	1.42	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
5.41	16.8	0.73	4.33	2.5	3	0.3	1.81	16.1	29.2	1.1	1.00E+09	1.00E+09	6	25.4	54.6
6.4	15.8	0.49	3.08	1.1	5	0.36	1.67	7.6	12.6	1.03	1.00E+09	1.00E+09	6	9.9	22.5
7.3	19.4	0.65	3.34	3.4	5	0.41	1.56	9.3	14.5	1.27	1.00E+09	1.00E+09	6	11.5	25.9
8.2	18.5	0.51	2.77	6.7	5	0.46	1.47	8.9	13	1.2	1.00E+09	1.00E+09	6	10.3	23.3
9.19	16.5	0.41	2.49	9.6	5	0.52	1.39	7.9	10.9	1.06	1.00E+09	1.00E+09	6	10.1	21.1
10.17	128.8	1.63	1.26	8.9	8	0.58	1.32	30.8	40.6	1.00E+09	46	81.8	1	1.3	41.8
11.15	107.7	4.51	4.19	15.4	11	0.64	1.25	103.1	128.9	1.00E+09	44	75.2	1	1.00E+09	1.00E+09
12.14	34	1.28	3.77	21.1	5	0.7	1.2	16.3	19.5	2.22	1.00E+09	1.00E+09	6	16.8	36.3
13.21	26.5	0.59	2.24	27.6	6	0.76	1.15	10.2	11.6	1.72	36	32.5	6	8.8	20.5
14.27	32.5	0.68	2.1	36.5	6	0.82	1.1	12.5	13.7	2.11	38	37.3	6	8.6	22.4
15.26	33.1	0.77	2.32	41.4	6	0.88	1.07	12.7	13.5	2.15	38	36.8	6	9.8	23.3
16.24	48.2	1.11	2.3	68.8	6	0.94	1.03	18.5	19.1	3.15	38	46.7	6	9.9	29
17.22	59.2	1.76	2.97	104.5	6	0.99	1	22.7	22.8	3.88	40	51.8	6	12.9	35.7
18.21	42.9	1.58	3.67	118.7	5	1.05	0.98	20.6	20.1	2.79	1.00E+09	1.00E+09	6	20.1	40.1
19.19	28	1.2	4.3	66.4	4	1.1	0.95	17.9	17	1.79	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
20.18	17.6	0.5	2.84	36.3	5	1.16	0.93	8.4	7.8	1.09	1.00E+09	1.00E+09	3	7.8	15.6
21.16	11.1	0.38	3.43	30	4	1.22	0.91	7.1	6.4	0.66	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
22.15	17.9	0.43	2.43	31.6	5	1.27	0.89	8.5	7.6	1.11	1.00E+09	1.00E+09	3	7.6	15.2
23.13	26.5	0.7	2.64	51	5	1.33	0.87	12.7	11	1.68	1.00E+09	1.00E+09	6	11	22
24.11	27.3	0.64	2.35	60.7	6	1.35	0.86	10.5	9	1.73	32	30	6	9	18
25.1	31	0.86	2.78	72.5	5	1.38	0.85	14.8	12.6	1.97	1.00E+09	1.00E+09	6	12.6	25.3
26.08	23.8	0.66	2.76	72.9	5	1.4	0.84	11.4	9.6	1.49	1.00E+09	1.00E+09	6	9.6	19.3
27.07	23	0.5	2.16	87.7	6	1.43	0.84	8.8	7.4	1.43	32	30	6	7.4	14.8
28.05	34.6	0.86	2.49	117.7	6	1.45	0.83	13.2	11	2.2	34	30.8	6	11	22
29.04	28.9	0.84	2.89	107.7	5	1.48	0.82	13.8	11.4	1.82	1.00E+09	1.00E+09	6	11.4	22.8

Gregg In Situ, Inc. Page: 1
Interpretat Output - Release 1.00.19c
Run No: 01-0509-2123-3339
Job No: 97-100
Client: KLEINFELDER
Project: Calpine Energy, East Altamont Energy Center
Site: CALPINE
Location: CPT-12
Engineer: R. HEINZEN
CPT Date: 05/02/01
CPT Time: 14:58
CPT File: 068B28.COR
Northing (m): 0
Easting (m): 0
Elevation (m): 0

Su Nkt used: 15
Averaging Increment (m): 0.3
Phi Method : Robertson and Campanel 1983
Dr Method : Jamiolkow - All Sands
State Parameter M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	37.8	0.29	0.76	0	7	0.03	2	12.1	24.2	1.00E+09	50	89.6	1	0	24.2
1.48	69	1.95	2.82	0.2	6	0.09	2	26.4	52.8	4.59	50	91.1	10	1.00E+09	1.00E+09
2.46	41.3	2.22	5.38	0.1	3	0.14	2	39.6	79.1	2.74	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
3.44	36.2	1.35	3.72	0.1	5	0.2	2	17.3	34.7	2.4	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	36.6	1.76	4.81	0	3	0.25	1.99	35.1	69.8	2.43	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
5.41	27	1.58	5.84	-0.1	3	0.31	1.8	25.9	46.7	1.78	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
6.4	26.3	1.04	3.94	-0.3	4	0.36	1.66	16.8	27.9	1.73	1.00E+09	1.00E+09	10	17.2	45.1
7.3	24.1	0.78	3.25	-0.3	5	0.42	1.55	11.5	17.9	1.58	1.00E+09	1.00E+09	6	11.3	29.2
8.2	30.7	1.18	3.84	-0.3	5	0.47	1.46	14.7	21.5	2.02	1.00E+09	1.00E+09	10	14.1	35.7
9.19	27.9	1.14	4.1	-0.3	4	0.52	1.38	17.8	24.6	1.82	1.00E+09	1.00E+09	6	21	45.6
10.17	30.4	1	3.27	-0.2	5	0.58	1.31	14.6	19.1	1.99	1.00E+09	1.00E+09	6	13.4	32.5
11.15	33.3	1.4	4.2	-0.2	4	0.64	1.25	21.3	26.7	2.18	1.00E+09	1.00E+09	6	23.7	50.4
12.14	21.2	0.78	3.67	-0.2	4	0.69	1.2	13.5	16.2	1.36	1.00E+09	1.00E+09	6	16.2	32.5
13.21	22.6	0.61	2.69	-0.1	5	0.75	1.15	10.8	12.5	1.46	1.00E+09	1.00E+09	6	12.5	24.9
14.27	47.5	1.54	3.24	0.1	5	0.81	1.11	22.7	25.2	3.11	1.00E+09	1.00E+09	6	15.8	41
15.26	63.2	0.5	0.8	0.1	8	0.87	1.07	15.1	16.2	1.00E+09	40	55.5	1	2.2	18.4
16.24	45.2	0.39	0.86	0.2	7	0.93	1.04	14.4	14.9	1.00E+09	38	44.9	1	3.7	18.7
17.22	50.3	1.07	2.12	0.3	6	0.99	1.01	19.3	19.4	3.29	38	47.1	6	9.5	28.9
18.21	50.8	1.83	3.6	0.3	5	1.04	0.98	24.3	23.8	3.32	1.00E+09	1.00E+09	6	19.6	43.4
19.19	54.3	2	3.68	0.4	5	1.1	0.95	26	24.8	3.56	1.00E+09	1.00E+09	6	20.5	45.3
20.18	49.1	2.18	4.43	0.4	4	1.16	0.93	31.4	29.2	3.2	1.00E+09	1.00E+09	6	29.2	58.3
21.16	27.2	1.5	5.5	0.3	3	1.21	0.91	26.1	23.7	1.74	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
22.15	22.5	0.8	3.56	0.2	5	1.27	0.89	10.8	9.6	1.42	1.00E+09	1.00E+09	6	9.6	19.2
23.13	34.1	0.9	2.63	0.2	6	1.32	0.87	13.1	11.4	2.19	34	31.9	6	11.4	22.8
24.11	38.6	0.74	1.92	0.2	6	1.35	0.86	14.8	12.7	2.48	36	35.1	6	10.6	23.4
25.1	28.7	0.98	3.41	0.1	5	1.37	0.85	13.7	11.7	1.82	1.00E+09	1.00E+09	6	11.7	23.5
26.08	20.8	0.73	3.49	0.1	4	1.4	0.85	13.2	11.2	1.28	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
27.07	25	0.87	3.49	0.1	5	1.42	0.84	12	10	1.56	1.00E+09	1.00E+09	6	10	20
28.05	18.9	0.46	2.45	0.2	5	1.45	0.83	9	7.5	1.15	1.00E+09	1.00E+09	3	7.5	15
29.04	43.3	1.16	2.69	0.3	6	1.47	0.82	16.6	13.6	2.77	36	37.1	6	13.6	27.3

Gregg	In	Situ,	Inc.	Page:	1			
Interpretat	Output	-	Release	1.00.19c				
Run	No:	01-0509-2123-3405						
Job	No:	97-100						
Client:	KLEINFELDER							
Project:	Calpine	Energy,	East	Altamont	Energy	Center		
Site:	CALPINE							
Location:	CPT-13							
Engineer:	R.	HEINZEN						
CPT	Date:	05/03/01						
CPT	Time:	13:44						
CPT	File:	068C29.COR						
Northing	(m):	0						
Easting	(m):	0						
Elevation	(m):	0						
Su	Nkt	used:	15					
Averaging	Increment	(m):	0.3					
Phi	Method	:	Robertson and		Campanel	1983		
Dr	Method	:	Jamiolkow -		All	Sands		
State	Parameter	M:	1.2					
Used	Unit	Weights	Assigned	to	Soil	Zones		

Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	17.2	0.09	0.49	2.3	6	0.03	2	6.6	13.2	1.15	50	67.4	10	0	13.2
1.48	69.9	1.24	1.77	3.5	7	0.09	2	22.3	44.6	1.00E+09	50	91.7	1	1.00E+09	1.00E+09
2.46	54.6	3.74	6.85	3.3	11	0.15	2	52.3	104.5	1.00E+09	48	76.8	1	1.00E+09	1.00E+09
3.44	33.9	2.25	6.64	1	3	0.21	2	32.5	64.9	2.25	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	24.4	1.21	4.94	-0.7	3	0.26	1.96	23.4	45.8	1.61	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
5.41	36.3	1.26	3.47	5.3	5	0.32	1.78	17.4	30.9	2.4	1.00E+09	1.00E+09	10	11.4	42.3
6.4	41.6	1.59	3.82	12.8	5	0.37	1.64	19.9	32.7	2.75	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
7.3	41.8	1.75	4.18	3	5	0.42	1.54	20	30.7	2.76	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
8.2	40.5	1.45	3.58	7.1	5	0.48	1.45	19.4	28.1	2.67	1.00E+09	1.00E+09	10	13.8	41.9
9.19	56.2	1.78	3.18	7.4	6	0.53	1.37	21.5	29.5	3.71	42	59.2	10	10.6	40.1
10.17	79	2.36	2.99	3.6	6	0.59	1.3	30.3	39.4	5.23	44	67.5	10	10.9	50.3
11.15	81	3.11	3.84	3.5	5	0.65	1.24	38.8	48.3	5.36	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
12.14	59.7	1.84	3.08	3.6	6	0.7	1.19	22.9	27.3	3.93	42	56.9	10	11.5	38.8
13.21	65.1	2.01	3.08	6.3	6	0.76	1.15	24.9	28.6	4.29	42	58.2	10	12.1	40.6
14.27	71.3	1.92	2.69	7.8	6	0.82	1.1	27.3	30.1	4.7	42	59.7	10	11	41.1
15.26	33.8	1.3	3.86	9	5	0.88	1.07	16.2	17.3	2.19	1.00E+09	1.00E+09	6	17.3	34.5
16.24	25	0.99	3.96	10.5	4	0.94	1.03	15.9	16.5	1.6	1.00E+09	1.00E+09	6	16.5	32.9
17.22	25.3	0.76	3.01	11	5	0.99	1	12.1	12.1	1.62	1.00E+09	1.00E+09	6	12.1	24.3
18.21	18.5	0.52	2.82	11	5	1.05	0.98	8.8	8.6	1.16	1.00E+09	1.00E+09	6	8.6	17.3
19.19	15.8	0.49	3.11	10.7	5	1.11	0.95	7.5	7.2	0.98	1.00E+09	1.00E+09	3	7.2	14.4
20.18	22	0.7	3.18	11.3	5	1.16	0.93	10.5	9.8	1.39	1.00E+09	1.00E+09	6	9.8	19.6
21.16	25.6	0.74	2.9	12.6	5	1.22	0.91	12.3	11.1	1.63	1.00E+09	1.00E+09	6	11.1	22.2
22.15	36.7	1.61	4.38	14.1	4	1.27	0.89	23.4	20.8	2.36	1.00E+09	1.00E+09	6	20.8	41.5
23.13	47.8	1.8	3.76	25	5	1.33	0.87	22.9	19.9	3.1	1.00E+09	1.00E+09	6	19.9	39.8
24.11	150.9	4.63	3.07	28.9	6	1.35	0.86	57.8	49.7	9.97	42	74.1	10	16.5	66.2
25.1	91.8	4.02	4.38	25	11	1.38	0.85	88	74.8	1.00E+09	40	59.6	1	55.5	130.3
26.08	19.4	0.47	2.44	22.8	5	1.41	0.84	9.3	7.8	1.2	1.00E+09	1.00E+09	3	7.8	15.7
27.07	33.4	1.1	3.3	37.6	5	1.44	0.83	16	13.4	2.12	1.00E+09	1.00E+09	6	13.4	26.7
28.05	33.3	1.23	3.69	48.1	5	1.46	0.83	15.9	13.2	2.11	1.00E+09	1.00E+09	6	13.2	26.4
29.04	33.6	1.08	3.21	61.8	5	1.49	0.82	16.1	13.2	2.13	1.00E+09	1.00E+09	6	13.2	26.4
30.02	33.4	0.97	2.9	63.5	5	1.51	0.81	16	13	2.11	1.00E+09	1.00E+09	6	13	26
31	57.4	2.13	3.71	86.6	5	1.54	0.81	27.5	22.1	3.71	1.00E+09	1.00E+09	6	22.1	44.3
31.99	56.5	1.99	3.52	210.3	5	1.57	0.8	27.1	21.6	3.65	1.00E+09	1.00E+09	6	21.6	43.3
32.97	44.7	1.59	3.55	190	5	1.59	0.79	21.4	17	2.86	1.00E+09	1.00E+09	6	17	34
33.96	35.9	1.24	3.45	165.3	5	1.62	0.79	17.2	13.5	2.26	1.00E+09	1.00E+09	6	13.5	27.1
34.94	23.6	0.59	2.49	121.4	6	1.64	0.78	9	7.1	1.44	32	30	3	7.1	14.1
35.92	29.4	0.71	2.42	114.1	6	1.67	0.77	11.2	8.7	1.82	32	30	6	8.7	17.4
36.91	103.2	2.01	1.95	211.1	7	1.7	0.77	32.9	25.3	1.00E+09	40	60	1	9.7	35
37.89	111.7	3.95	3.53	94.1	6	1.72	0.76	42.8	32.6	7.3	40	62	10	20.2	52.8
38.88	39.8	1.03	2.58	212.5	6	1.75	0.76	15.3	11.5	2.5	34	32.3	6	11.5	23.1

Gregg	In	Situ,	Inc.	Page:	1
Interpretat	Output	-	Release	1.00.19c	
Run	No:	01-0509-2123-3400			
Job	No:	97-100			
Client:	KLEINFELDER				
Project:	Calpine	Energy,	East	Altamont	Energy Center
Site:	CALPINE				
Location:	CPT-14				
Engineer:	R.	HEINZEN			
CPT	Date:	05/03/01			
CPT	Time:	13:20			
CPT	File:	068B32.COR			
Northing	(m):	0			
Easting	(m):	0			
Elevation	(m):	0			

Su	Nkt	used:	15				
Averaging	Increment	(m):	0.3				
Phi	Method	:	Robertson and		Campanel	1983	
Dr	Method	:	Jamiolkow -		All	Sands	
State	Parameter	M:	1.2				
Used	Unit	Weights	Assigned	to	Soil	Zones	

Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	37.6	0.32	0.84	1.3	7	0.03	2	12	24	1.00E+09	50	89.4	1	0	24
1.48	71.9	2.1	2.92	1.4	6	0.09	2	27.5	55.1	4.79	50	92.3	10	1.00E+09	1.00E+09
2.46	62.1	3.52	5.66	0.8	11	0.15	2	59.5	119	1.00E+09	48	80.6	1	1.00E+09	1.00E+09
3.44	45.1	1.91	4.24	1.7	5	0.21	2	21.6	43.2	2.99	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	41.3	1.92	4.65	1	4	0.26	1.95	26.3	51.3	2.73	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
5.41	41.7	1.5	3.59	1.2	5	0.32	1.77	20	35.3	2.76	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
6.4	39.8	1.57	3.95	2.8	5	0.38	1.63	19.1	31.1	2.63	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
7.3	25.1	0.79	3.14	2.3	5	0.43	1.53	12	18.3	1.64	1.00E+09	1.00E+09	6	11.1	29.4
8.2	27.3	0.9	3.29	2.8	5	0.48	1.44	13.1	18.9	1.79	1.00E+09	1.00E+09	6	12.3	31.2
9.19	40.9	1.36	3.32	5.5	5	0.54	1.37	19.6	26.8	2.69	1.00E+09	1.00E+09	10	13.4	40.1
10.17	37.5	1.78	4.73	4.4	3	0.59	1.3	36	46.8	2.46	1.00E+09	1.00E+09	10	39	85.7
11.15	42.3	1.68	3.97	3.2	5	0.65	1.24	20.2	25.2	2.78	1.00E+09	1.00E+09	10	17.2	42.3
12.14	62.7	1.73	2.76	5	6	0.7	1.19	24	28.6	4.13	42	58.3	10	10.4	39.1
13.21	83.9	3.78	4.51	9.9	11	0.77	1.14	80.3	91.6	1.00E+09	42	65.4	1	1.00E+09	1.00E+09
14.27	73	1.96	2.69	12.6	6	0.83	1.09	28	30.6	4.81	42	60.2	10	11.1	41.7
15.26	58.4	1.2	2.06	11.7	7	0.89	1.06	18.6	19.7	1.00E+09	40	52.9	1	7.4	27.1
16.24	25.9	0.45	1.75	19.2	6	0.95	1.03	9.9	10.2	1.66	34	30	6	8.4	18.5
17.22	37.5	1.18	3.15	24	5	1.01	1	18	17.9	2.43	1.00E+09	1.00E+09	6	17.1	35
18.21	35.4	1.64	4.62	23.2	3	1.06	0.97	33.9	32.9	2.29	1.00E+09	1.00E+09	6	32.9	65.8
19.19	29.8	1.12	3.75	24	5	1.12	0.95	14.3	13.5	1.91	1.00E+09	1.00E+09	6	13.5	27
20.18	16.5	0.47	2.84	20.7	5	1.17	0.92	7.9	7.3	1.02	1.00E+09	1.00E+09	3	7.3	14.6
21.16	14.7	0.25	1.67	18.8	6	1.23	0.9	5.6	5.1	0.9	30	30	3	5.1	10.2
22.15	25.2	0.88	3.5	20.2	5	1.29	0.88	12.1	10.6	1.59	1.00E+09	1.00E+09	6	10.6	21.3
23.13	19.5	0.76	3.88	19.5	4	1.34	0.86	12.5	10.8	1.21	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
24.11	11.6	0.39	3.35	16.9	4	1.36	0.86	7.4	6.3	0.68	1.00E+09	1.00E+09	1.5	1.00E+09	1.00E+09
25.1	13.1	0.5	3.82	17	3	1.39	0.85	12.6	10.7	0.78	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
26.08	16.6	0.5	3	17.3	5	1.41	0.84	8	6.7	1.01	1.00E+09	1.00E+09	3	6.7	13.4
27.07	38.9	1.34	3.44	25.6	5	1.44	0.83	18.6	15.5	2.49	1.00E+09	1.00E+09	6	15.5	31.1
28.05	34.8	1.34	3.85	36	5	1.46	0.83	16.6	13.8	2.21	1.00E+09	1.00E+09	6	13.8	27.5
29.04	35.9	0.81	2.26	55.3	6	1.49	0.82	13.7	11.3	2.28	34	31.5	6	11.3	22.5
30.02	42.4	1.78	4.19	60.8	5	1.52	0.81	20.3	16.5	2.71	1.00E+09	1.00E+09	6	16.5	33
31	25.1	1.08	4.3	45.2	3	1.54	0.81	24	19.3	1.55	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
31.99	13.6	0.47	3.49	28.4	4	1.57	0.8	8.7	6.9	0.78	1.00E+09	1.00E+09	1.5	1.00E+09	1.00E+09
32.97	34.9	1.46	4.19	24.4	4	1.59	0.79	22.3	17.7	2.2	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
33.96	24.3	0.71	2.93	26.7	5	1.62	0.79	11.6	9.2	1.49	1.00E+09	1.00E+09	3	9.2	18.3
34.94	40.6	1.42	3.49	60.3	5	1.64	0.78	19.5	15.2	2.57	1.00E+09	1.00E+09	6	15.2	30.4
35.92	28.6	1.12	3.9	56.3	4	1.67	0.77	18.3	14.2	1.77	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
36.91	23.5	0.73	3.09	47.2	5	1.69	0.77	11.3	8.7	1.43	1.00E+09	1.00E+09	3	8.7	17.3
37.89	26.3	0.77	2.94	51.4	5	1.72	0.76	12.6	9.6	1.61	1.00E+09	1.00E+09	3	9.6	19.2
38.88	26.8	0.73	2.71	58.2	5	1.75	0.76	12.8	9.7	1.64	1.00E+09	1.00E+09	3	9.7	19.4

Gregg	In	Situ,	Inc.	Page:	1
Interpretat	Output	-	Release	1.00.19c	
Run	No:	01-0509-2123-3389			
Job	No:	97-100			
Client:	KLEINFELDER				
Project:	Calpine	Energy,	East	Altamont	Energy
Site:	CALPINE				
Location:	CPT-15				
Engineer:	R.	HEINZEN			
CPT	Date:	05/03/01			
CPT	Time:	12:15			
CPT	File:	068B34.COR			
Northing	(m):	0			
Easting	(m):	0			
Elevation	(m):	0			

Su	Nkt	used:	15		
Averaging	Increment	(m):	0.3		
Phi	Method	:	Robertson and		Campanella,
Dr	Method	:	Jamiolkow -		All
State	Parameter	M:	1.2		
Used	Unit	Weights	Assigned to		Soil

Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	47.7	0.02	0.04	13.6	8	0.03	2	11.4	22.8	1.00E+09	50	95	1	0	22.8
1.48	89.1	0.68	0.76	8.4	8	0.09	2	21.3	42.7	1.00E+09	50	95	1	0	42.7
2.46	75.9	1.28	1.69	3	7	0.15	2	24.2	48.4	1.00E+09	48	86.1	1	0	48.4
3.44	63.7	1.42	2.23	2.3	6	0.21	2	24.4	48.8	4.23	46	76.4	10	3.7	52.5
4.43	44.3	1.04	2.35	0.6	6	0.26	1.96	17	33.1	2.93	44	62.5	10	5.5	38.7
5.41	44.6	1.2	2.68	-3.5	6	0.32	1.77	17.1	30.3	2.95	44	59.9	10	7.1	37.4
6.4	50.2	1.44	2.87	-0.3	6	0.37	1.63	19.2	31.5	3.32	44	61	10	8.3	39.7
7.3	45	1.33	2.96	-1	6	0.43	1.53	17.2	26.4	2.97	42	56	10	8.9	35.3
8.2	43.2	1.45	3.36	-0.8	5	0.48	1.45	20.7	29.9	2.85	1.00E+09	1.00E+09	10	13.1	43
9.19	48.3	1.46	3.02	9.3	6	0.53	1.37	18.5	25.3	3.19	42	54.8	10	10	35.3
10.17	39.7	1.25	3.15	22	5	0.59	1.3	19	24.7	2.61	1.00E+09	1.00E+09	10	13.2	37.9
11.15	37.3	1.16	3.11	24.7	5	0.65	1.24	17.9	22.2	2.44	1.00E+09	1.00E+09	6	13.5	35.7
12.14	48.2	1.73	3.59	66.7	5	0.7	1.19	23.1	27.5	3.17	1.00E+09	1.00E+09	10	16.3	43.9
13.21	21.9	0.72	3.28	31.4	5	0.76	1.14	10.5	12	1.41	1.00E+09	1.00E+09	6	12	24
14.27	36.7	1.1	3	38	5	0.83	1.1	17.6	19.3	2.39	1.00E+09	1.00E+09	6	14.7	34
15.26	44.9	1.98	4.4	53.3	4	0.88	1.07	28.7	30.5	2.93	1.00E+09	1.00E+09	6	29.2	59.7
16.24	27.4	1.36	4.98	22.8	3	0.94	1.03	26.2	27.1	1.76	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
17.22	31.8	1.16	3.66	32.6	5	0.99	1	15.2	15.3	2.06	1.00E+09	1.00E+09	6	15.3	30.6
18.21	28	1.14	4.06	44	4	1.05	0.98	17.9	17.5	1.8	1.00E+09	1.00E+09	6	17.5	35
19.19	27.4	1.01	3.67	42.1	5	1.11	0.95	13.1	12.5	1.75	1.00E+09	1.00E+09	6	12.5	25
20.18	27.7	1.16	4.19	44.8	4	1.16	0.93	17.7	16.4	1.77	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
21.16	17.1	0.49	2.88	31.8	5	1.22	0.91	8.2	7.4	1.06	1.00E+09	1.00E+09	3	7.4	14.8
22.15	14.5	0.39	2.72	29.6	5	1.27	0.89	7	6.2	0.88	1.00E+09	1.00E+09	3	6.2	12.3
23.13	12	0.25	2.11	28.1	5	1.33	0.87	5.8	5	0.71	1.00E+09	1.00E+09	3	5	10
24.11	17.5	0.33	1.86	45.3	6	1.35	0.86	6.7	5.8	1.07	30	30	3	5.8	11.5
25.1	27.3	0.68	2.49	91.8	6	1.38	0.85	10.4	8.9	1.72	32	30	6	8.9	17.8
26.08	47.5	1.37	2.89	192.4	6	1.4	0.84	18.2	15.4	3.07	36	40.4	6	15.1	30.5
27.07	29.8	1.18	3.95	69.9	4	1.43	0.84	19.1	15.9	1.89	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
28.05	25.1	0.78	3.11	56.7	5	1.46	0.83	12	9.9	1.56	1.00E+09	1.00E+09	6	9.9	19.9
29.04	32	0.79	2.47	69.1	6	1.48	0.82	12.3	10.1	2.02	34	30	6	10.1	20.1

Gregg In Situ, Inc. Page: 1
Interpretat Output - Release 1.00.19c
Run No: 01-0509-2123-3394
Job No: 97-100
Client: KLEINFELDER
Project: Calpine Energy, East Altamont Energy Center
Site: CALPINE
Location: CPT-16
Engineer: R. HEINZEN
CPT Date: 05/03/01
CPT Time: 12:36
CPT File: 068B35.COR
Northing (m): 0
Easting (m): 0
Elevation (m): 0

Su Nkt used: 15
Averaging Increment (m): 0.3
Phi Method : Robertson and Campanel 1983
Dr Method : Jamiolkow - All Sands
State Parameter M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	42.7	0.78	1.82	5.8	7	0.03	2	13.6	27.2	1.00E+09	50	93	1	1.00E+09	1.00E+09
1.48	50.3	2.21	4.4	1.6	5	0.09	2	24.1	48.2	3.35	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
2.46	58.8	3.31	5.63	0.4	11	0.15	2	56.3	112.7	1.00E+09	48	79	1	1.00E+09	1.00E+09
3.44	34.9	1.78	5.09	-0.5	3	0.21	2	33.4	66.9	2.31	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	36	1.69	4.69	0.6	3	0.26	1.96	34.4	67.4	2.38	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
5.41	29	1.3	4.47	1.3	3	0.32	1.78	27.8	49.5	1.92	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
6.4	25.1	0.82	3.28	2	5	0.37	1.64	12	19.7	1.65	1.00E+09	1.00E+09	10	10.9	30.6
7.3	25	0.72	2.88	2.8	5	0.42	1.54	12	18.4	1.64	1.00E+09	1.00E+09	6	10.2	28.6
8.2	37.2	1.31	3.53	4.7	5	0.47	1.45	17.8	25.8	2.45	1.00E+09	1.00E+09	10	13.4	39.2
9.19	27.8	1.25	4.51	5.9	3	0.53	1.37	26.6	36.5	1.82	1.00E+09	1.00E+09	6	34.9	71.4
10.17	22	0.89	4.04	6.2	4	0.59	1.31	14.1	18.4	1.43	1.00E+09	1.00E+09	6	18.4	36.7
11.15	17	0.75	4.4	5.4	3	0.64	1.25	16.3	20.4	1.09	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
12.14	12.9	0.43	3.33	5	4	0.7	1.2	8.2	9.8	0.81	1.00E+09	1.00E+09	6	9.8	19.7
13.21	13.7	0.39	2.87	6.1	5	0.76	1.15	6.6	7.5	0.86	1.00E+09	1.00E+09	6	7.5	15.1
14.27	24.3	0.65	2.69	9.6	5	0.82	1.1	11.6	12.9	1.57	1.00E+09	1.00E+09	6	12.9	25.7
15.26	30.9	1	3.24	12.5	5	0.88	1.07	14.8	15.8	2	1.00E+09	1.00E+09	6	15.8	31.6
16.24	35.1	1.19	3.4	16.2	5	0.93	1.04	16.8	17.4	2.28	1.00E+09	1.00E+09	6	17.4	34.8
17.22	32.3	1.02	3.14	18.5	5	0.99	1.01	15.5	15.6	2.09	1.00E+09	1.00E+09	6	15.6	31.2
18.21	34	1.03	3.03	19.2	5	1.04	0.98	16.3	15.9	2.19	1.00E+09	1.00E+09	6	15.9	31.8
19.19	44.2	1.81	4.09	22.7	5	1.1	0.95	21.2	20.2	2.88	1.00E+09	1.00E+09	6	20.2	40.4
20.18	35.9	1.6	4.47	23.1	4	1.16	0.93	22.9	21.3	2.32	1.00E+09	1.00E+09	6	21.3	42.6
21.16	39.6	1.73	4.37	17.3	4	1.21	0.91	25.3	22.9	2.56	1.00E+09	1.00E+09	6	22.9	45.9
22.15	34.5	1.39	4.03	18	4	1.27	0.89	22	19.5	2.22	1.00E+09	1.00E+09	6	19.5	39.1
23.13	28.7	0.9	3.14	33.1	5	1.32	0.87	13.7	12	1.82	1.00E+09	1.00E+09	6	12	23.9
24.11	19.7	0.64	3.26	33.9	5	1.35	0.86	9.4	8.1	1.22	1.00E+09	1.00E+09	3	8.1	16.2
25.1	31.1	1.24	3.97	41.1	4	1.37	0.85	19.9	17	1.98	1.00E+09	1.00E+09	6	17	33.9
26.08	37.3	1.68	4.5	35.3	4	1.4	0.85	23.8	20.1	2.38	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
27.07	76.9	2.08	2.7	33	6	1.43	0.84	29.5	24.7	5.02	40	54.1	6	14.2	38.8
28.05	64.9	2.37	3.66	30.2	5	1.45	0.83	31.1	25.8	4.22	1.00E+09	1.00E+09	6	23.5	49.3
29.04	160.3	4.98	3.1	44.9	6	1.48	0.82	61.4	50.5	10.57	42	74.6	10	17.4	68

Gregg	In	Situ,	Inc.	Page:	1				
Interpretat	Output	-	Release	1.00.19c					
Run	No:	01-0509-2123-3421							
Job	No:	97-100							
Client:	KLEINFELDER								
Project:	Calpine	Energy,	East	Altamont	Energy	Center			
Site:	CALPINE								
Location:	CPT-17								
Engineer:	R.	HEINZEN							
CPT	Date:	05/03/01							
CPT	Time:	14:58							
CPT	File:	068B38.COR							
Northing	(m):	0							
Easting	(m):	0							
Elevation	(m):	0							
Su	Nkt	used:	15						
Averaging	Increment	(m):	0.3						
Phi	Method	:	Robertson and	Campanel	1983				
Dr	Method	:	Jamiolkow -	All	Sands				
State	Parameter	M:	1.2						
Used	Unit	Weights	Assigned	to	Soil	Zones			

Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	12.4	0.44	3.55	-0.1	4	0.03	2	7.9	15.8	0.83	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
1.48	42	1.85	4.41	1.5	4	0.08	2	26.8	53.6	2.79	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
2.46	46.9	3.51	7.48	1.4	3	0.14	2	44.9	89.9	3.12	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
3.44	27.2	2.7	9.9	-2.4	3	0.2	2	26.1	52.2	1.8	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	13	1.13	8.69	-5.9	3	0.25	2	12.5	24.9	0.85	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
5.41	22.9	1.18	5.15	-6.9	3	0.3	1.81	21.9	39.7	1.5	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
6.4	33.3	1.72	5.15	-1.9	3	0.36	1.67	31.9	53.3	2.2	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
7.3	33.2	1.89	5.69	2.1	3	0.41	1.56	31.8	49.7	2.19	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
8.2	28.5	1.58	5.56	1.8	3	0.46	1.47	27.3	40.2	1.87	1.00E+09	1.00E+09	10	40.2	80.4
9.19	24.9	0.92	3.68	7.9	4	0.52	1.39	15.9	22.1	1.62	1.00E+09	1.00E+09	6	18.7	40.8
10.17	65	2.39	3.67	1.9	5	0.57	1.32	31.1	41.1	4.29	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
11.15	40.3	1.83	4.54	3.6	4	0.63	1.26	25.7	32.5	2.65	1.00E+09	1.00E+09	10	25.7	58.2
12.14	28.5	0.85	2.99	8.2	5	0.68	1.21	13.6	16.5	1.85	1.00E+09	1.00E+09	6	13.4	29.9
13.21	33.8	1.01	2.99	17.1	5	0.75	1.16	16.2	18.7	2.2	1.00E+09	1.00E+09	6	13.9	32.7
14.27	28.5	1.14	3.99	18.8	4	0.81	1.11	18.2	20.3	1.85	1.00E+09	1.00E+09	6	20.3	40.5
15.26	16.2	0.49	3.01	17.3	5	0.86	1.08	7.8	8.3	1.02	1.00E+09	1.00E+09	6	8.3	16.7
16.24	11	0.26	2.33	15.3	5	0.92	1.04	5.2	5.5	0.67	1.00E+09	1.00E+09	3	5.5	10.9
17.22	19.1	0.52	2.73	14.8	5	0.98	1.01	9.1	9.2	1.21	1.00E+09	1.00E+09	6	9.2	18.5
18.21	18.3	0.51	2.82	15.3	5	1.03	0.98	8.8	8.6	1.15	1.00E+09	1.00E+09	6	8.6	17.2
19.19	24.9	0.87	3.5	16.1	5	1.09	0.96	11.9	11.4	1.59	1.00E+09	1.00E+09	6	11.4	22.9
20.18	29	1.11	3.83	18.7	4	1.15	0.93	18.5	17.3	1.86	1.00E+09	1.00E+09	6	17.3	34.7
21.16	44	1.59	3.63	18.5	5	1.2	0.91	21.1	19.2	2.85	1.00E+09	1.00E+09	6	19.2	38.4
22.15	41.5	1.97	4.74	21.1	4	1.26	0.89	26.5	23.6	2.68	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
23.13	65.1	2.72	4.18	22.7	5	1.31	0.87	31.2	27.2	4.25	1.00E+09	1.00E+09	6	25.4	52.6
24.11	182.9	2.23	1.22	26.3	8	1.34	0.86	43.8	37.9	1.00E+09	44	79.8	1	3.2	41.1
25.1	90.9	1.71	1.89	23.4	7	1.37	0.86	29	24.8	1.00E+09	40	59.4	1	8.4	33.2
26.08	34.4	1.26	3.66	23.5	5	1.39	0.85	16.5	14	2.19	1.00E+09	1.00E+09	6	14	27.9
27.07	19.9	0.6	3.04	23.9	5	1.42	0.84	9.5	8	1.22	1.00E+09	1.00E+09	3	8	16
28.05	19	0.47	2.48	23.1	5	1.44	0.83	9.1	7.6	1.16	1.00E+09	1.00E+09	3	7.6	15.2
29.04	27.9	0.93	3.32	25	5	1.47	0.83	13.4	11	1.75	1.00E+09	1.00E+09	6	11	22.1
30.02	59.6	1.69	2.84	34.6	6	1.49	0.82	22.8	18.7	3.86	38	46.1	6	15.2	33.9
31	32.4	0.99	3.05	30.4	5	1.52	0.81	15.5	12.6	2.04	1.00E+09	1.00E+09	6	12.6	25.2
31.99	99.3	2.32	2.33	34.5	7	1.55	0.8	31.7	25.5	1.00E+09	40	60.2	1	10.9	36.4
32.97	196.7	3.17	1.61	33.5	8	1.57	0.8	47.1	37.5	1.00E+09	42	79.5	1	5.5	43
33.96	189.4	2.29	1.21	29.4	8	1.6	0.79	45.3	35.8	1.00E+09	42	78.2	1	3.8	39.7
34.94	298.6	4.14	1.39	26.9	8	1.63	0.78	71.5	56	1.00E+09	44	91	1	3.6	59.6
35.92	154.4	3.55	2.3	8.6	7	1.66	0.78	49.3	38.2	1.00E+09	42	71.8	1	11.3	49.5
36.91	37	1.06	2.86	5.4	6	1.69	0.77	14.2	10.9	2.33	34	30.7	6	10.9	21.8
37.89	36.1	0.97	2.68	7.3	6	1.71	0.76	13.8	10.6	2.26	34	30	6	10.6	21.2
38.88	113.9	3.24	2.85	20.5	6	1.74	0.76	43.6	33.1	7.45	40	62.5	10	16.6	49.7

Gregg In Situ, Inc. Page: 1
Interpretat Output - Release 1.00.19c
Run No: 01-0509-2123-3416
Job No: 97-100
Client: KLEINFELDER
Project: Calpine Energy, East Altamont Energy Center
Site: CALPINE
Location: CPT-18
Engineer: R. HEINZEN
CPT Date: 05/03/01
CPT Time: 14:37
CPT File: 068B40.COR
Northing (m): 0
Easting (m): 0
Elevation (m): 0

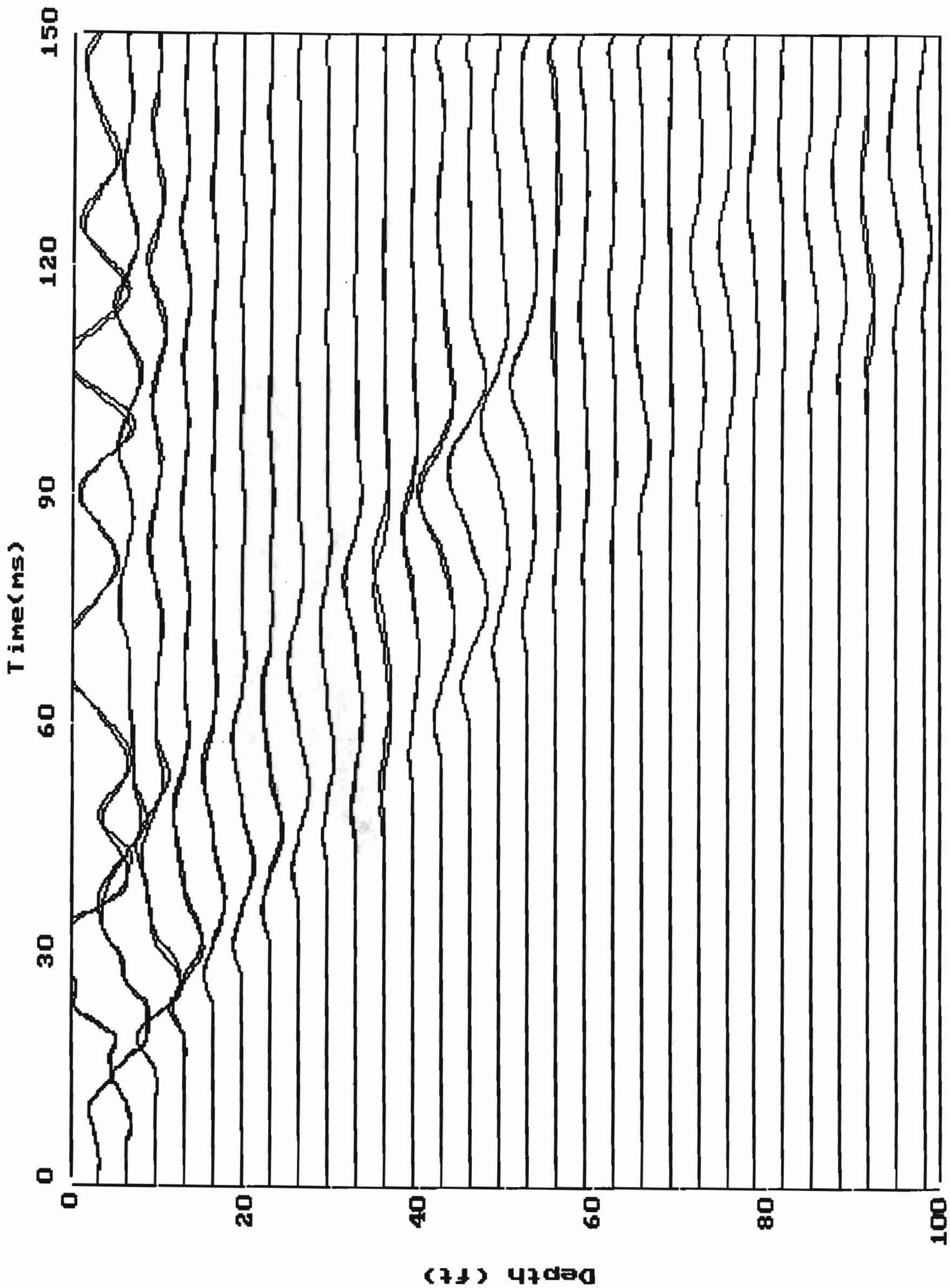
Su * Nkt used: 15
Averaging Increment (m): 0.3
Phi Method : Robertson and Campanel 1983
Dr Method : Jamiolkow - All Sands
State Parameter M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	31.5	0.37	1.16	0.7	7	0.03	2	10.1	20.1	1.00E+09	50	84.3	1	0	20.1
1.48	64.6	0.92	1.42	1.9	7	0.09	2	20.6	41.3	1.00E+09	50	89.2	1	0	41.3
2.46	71.9	1.17	1.63	2.4	7	0.14	2	23	45.9	1.00E+09	48	84.9	1	0	45.9
3.44	79.7	1.29	1.61	4.1	7	0.2	2	25.4	50.9	1.00E+09	48	83	1	0.6	51.5
4.43	46.8	0.94	2	2.8	6	0.26	1.96	17.9	35.2	3.11	44	64.2	10	4.4	39.6
5.41	46.3	1.76	3.81	2.2	5	0.32	1.78	22.2	39.4	3.06	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
6.4	37.6	1.99	5.29	2.7	3	0.37	1.64	36	59	2.48	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
7.3	40	2.02	5.04	3.2	3	0.42	1.54	38.3	58.9	2.64	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
8.2	29.1	1.47	5.04	3.2	3	0.47	1.45	27.9	40.6	1.91	1.00E+09	1.00E+09	10	37.1	77.6
9.19	47	2.05	4.37	4.3	4	0.53	1.38	30	41.3	3.1	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
10.17	54.9	2.3	4.19	10.5	5	0.58	1.31	26.3	34.4	3.62	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
11.15	51.5	2.11	4.1	14.7	5	0.64	1.25	24.6	30.8	3.39	1.00E+09	1.00E+09	10	18.1	48.8
12.14	34.6	1.28	3.69	17.1	5	0.7	1.2	16.5	19.8	2.26	1.00E+09	1.00E+09	6	16.4	36.2
13.21	17.8	0.52	2.92	18.7	5	0.76	1.15	8.5	9.8	1.14	1.00E+09	1.00E+09	6	9.8	19.6
14.27	43.2	1.36	3.16	20.2	5	0.82	1.1	20.7	22.8	2.82	1.00E+09	1.00E+09	6	15.4	38.2
15.26	77.2	2.96	3.84	20.8	5	0.88	1.07	37	39.5	5.09	1.00E+09	1.00E+09	10	20.1	59.6
16.24	63.2	2.15	3.39	22.2	5	0.93	1.04	30.3	31.3	4.15	1.00E+09	1.00E+09	10	17.8	49.2
17.22	53.2	1.79	3.37	30.4	5	0.99	1.01	25.5	25.6	3.48	1.00E+09	1.00E+09	6	18	43.6
18.21	32.3	0.99	3.08	42.3	5	1.04	0.98	15.5	15.1	2.08	1.00E+09	1.00E+09	6	15.1	30.2
19.19	32.3	1.38	4.27	50.6	4	1.1	0.95	20.6	19.7	2.08	1.00E+09	1.00E+09	6	19.7	39.4
20.18	26.2	1.13	4.32	49.9	3	1.16	0.93	25.1	23.3	1.67	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
21.16	25.2	0.75	2.97	59.8	5	1.21	0.91	12.1	11	1.6	1.00E+09	1.00E+09	6	11	22
22.15	45.3	1.17	2.58	163.5	6	1.27	0.89	17.4	15.4	2.94	36	40.6	6	12.9	28.3
23.13	39.9	1.16	2.92	237.5	6	1.32	0.87	15.3	13.3	2.57	36	36.3	6	13.3	26.6
24.11	35.3	0.98	2.78	210.7	6	1.35	0.86	13.5	11.7	2.26	34	32.5	6	11.7	23.3
25.1	49.3	2.03	4.11	221.2	5	1.37	0.85	23.6	20.2	3.19	1.00E+09	1.00E+09	6	20.2	40.3
26.08	38.2	1.2	3.15	205.2	5	1.4	0.85	18.3	15.5	2.45	1.00E+09	1.00E+09	6	15.5	30.9
27.07	30.9	0.8	2.58	233.6	6	1.42	0.84	11.8	9.9	1.96	34	30	6	9.9	19.9
28.05	42.7	1.29	3.01	299.6	6	1.45	0.83	16.4	13.6	2.74	36	37	6	13.6	27.2
29.04	57.6	2.46	4.27	207.1	5	1.48	0.82	27.6	22.7	3.73	1.00E+09	1.00E+09	6	22.7	45.4
30.02	44.1	1.8	4.07	136.8	5	1.5	0.82	21.1	17.2	2.83	1.00E+09	1.00E+09	6	17.2	34.5
31	45.5	1.77	3.89	141.6	5	1.53	0.81	21.8	17.6	2.92	1.00E+09	1.00E+09	6	17.6	35.3
31.99	29	1.24	4.27	97.7	4	1.55	0.8	18.5	14.8	1.81	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
32.97	23.4	0.68	2.91	106.5	5	1.58	0.8	11.2	8.9	1.43	1.00E+09	1.00E+09	3	8.9	17.8
33.96	22.7	0.92	4.05	126.1	4	1.6	0.79	14.5	11.4	1.38	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
34.94	29.6	1.26	4.27	116.3	4	1.63	0.78	18.9	14.8	1.84	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
35.92	22.1	0.98	4.42	82.2	3	1.65	0.78	21.2	16.5	1.34	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
36.91	22	0.71	3.2	112	5	1.68	0.77	10.5	8.1	1.33	1.00E+09	1.00E+09	3	1.00E+09	1.00E+09
37.89	26	0.87	3.36	123.4	5	1.7	0.77	12.4	9.5	1.59	1.00E+09	1.00E+09	3	9.5	19.1
38.88	25.1	0.79	3.16	143.3	5	1.73	0.76	12	9.1	1.53	1.00E+09	1.00E+09	3	9.1	18.3

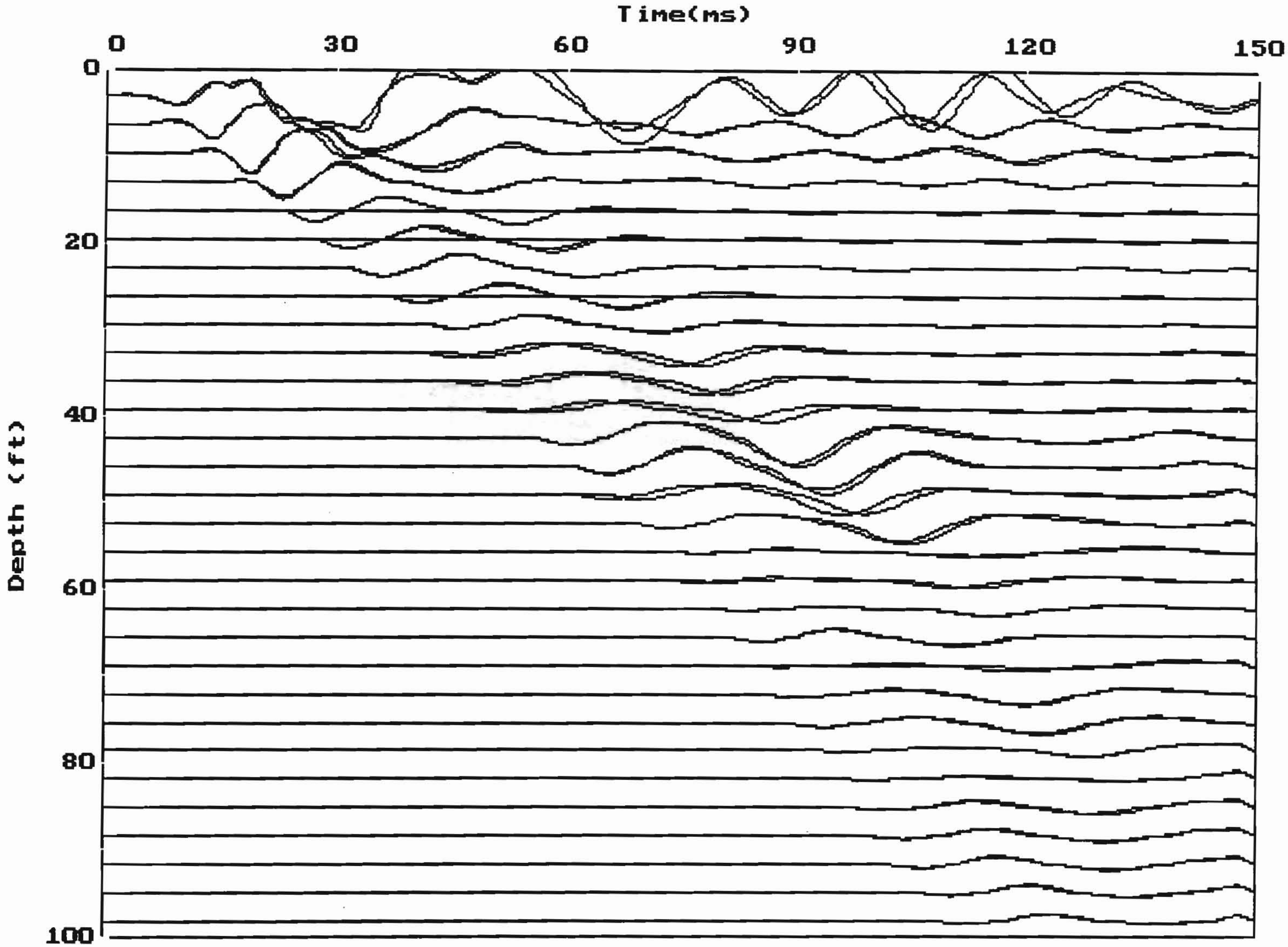
Gregg In Situ, Inc. Page: 1
Interpretat Output - Release 1.00.19c
Run No: 01-0509-2123-3410
Job No: 97-100
Client: KLEINFELDER
Project: Calpine Energy, East Altamont Energy Center
Site: CALPINE
Location: CPT-19
Engineer: R. HEINZEN
CPT Date: 05/03/01
CPT Time: 14:15
CPT File: 068B42.COR
Northing (m): 0
Easting (m): 0
Elevation (m): 0

Su Nkt used: 15
Averaging Increment (m): 0.3
Phi Method : Robertson and Campanel 1983
Dr Method : Jamiolkow - All Sands
State Parameter M: 1.2
Used Unit Weights Assigned to Soil Zones
Values of 1.00E+09 or Undef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT pcf	EStress (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	Phi (Deg)	Dr (%)	OCR	Del(n1)60 (blows/ft)	(N1)60cs (blows/ft)
0.49	5	0.1	2.03	-0.4	4	0.03	2	3.2	6.4	0.33	1.00E+09	1.00E+09	10	0.8	7.2
1.48	58	2.47	4.25	1.3	5	0.08	2	27.8	55.6	3.86	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
2.46	58.1	4.44	7.64	0.6	11	0.14	2	55.7	111.4	1.00E+09	48	78.8	1	1.00E+09	1.00E+09
3.44	41.3	3.19	7.71	-0.6	3	0.2	2	39.6	79.2	2.74	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
4.43	28.3	1.44	5.08	-0.6	3	0.26	1.96	27.1	53.2	1.87	1.00E+09	1.00E+09	10	1.00E+09	1.00E+09
5.41	22	0.72	3.28	-0.6	5	0.31	1.78	10.5	18.7	1.44	1.00E+09	1.00E+09	10	10.1	28.8
6.4	21.8	0.67	3.08	-0.2	5	0.37	1.64	10.4	17.1	1.43	1.00E+09	1.00E+09	6	10.2	27.3
7.3	21.4	0.63	2.95	-0.5	5	0.42	1.54	10.2	15.7	1.4	1.00E+09	1.00E+09	6	10.4	26.1
8.2	39.2	1.05	2.69	0.5	6	0.47	1.45	15	21.8	2.58	42	50.5	10	8.3	30.1
9.19	34.7	1.48	4.27	2.2	4	0.53	1.37	22.1	30.4	2.28	1.00E+09	1.00E+09	10	22.3	52.7
10.17	33.3	0.96	2.89	4.7	5	0.59	1.3	15.9	20.8	2.18	1.00E+09	1.00E+09	6	12.1	32.9
11.15	29.2	0.85	2.9	4.9	5	0.64	1.25	14	17.4	1.9	1.00E+09	1.00E+09	6	12.6	30
12.14	27	0.72	2.65	4.6	5	0.7	1.2	12.9	15.5	1.75	1.00E+09	1.00E+09	6	12.2	27.7
13.21	39.7	1.28	3.23	5.7	5	0.76	1.15	19	21.8	2.59	1.00E+09	1.00E+09	6	15.1	36.9
14.27	30.3	1.12	3.68	6.3	5	0.82	1.1	14.5	16	1.97	1.00E+09	1.00E+09	6	16	32.1
15.26	21.3	0.66	3.11	5.6	5	0.88	1.07	10.2	10.9	1.36	1.00E+09	1.00E+09	6	10.9	21.7
16.24	21	0.55	2.6	5.4	5	0.94	1.03	10.1	10.4	1.34	1.00E+09	1.00E+09	6	10.4	20.8
17.22	22.4	0.79	3.51	5.7	5	0.99	1	10.7	10.8	1.42	1.00E+09	1.00E+09	6	10.8	21.5
18.21	27.5	0.77	2.8	5.9	5	1.05	0.98	13.2	12.9	1.77	1.00E+09	1.00E+09	6	12.9	25.8
19.19	34	0.79	2.33	7.3	6	1.1	0.95	13	12.4	2.19	36	34.3	6	11.2	23.6
20.18	37	0.72	1.95	10.3	6	1.16	0.93	14.2	13.2	2.39	36	36	6	9.8	23
21.16	22.8	0.94	4.13	12	4	1.22	0.91	14.6	13.2	1.44	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
22.15	15.9	0.43	2.68	11.4	5	1.27	0.89	7.6	6.8	0.98	1.00E+09	1.00E+09	3	6.8	13.5
23.13	29.1	1.05	3.61	13.9	5	1.33	0.87	14	12.1	1.85	1.00E+09	1.00E+09	6	12.1	24.2
24.11	26.1	0.93	3.57	15.5	5	1.35	0.86	12.5	10.8	1.65	1.00E+09	1.00E+09	6	10.8	21.5
25.1	19.3	0.54	2.82	15.6	5	1.38	0.85	9.3	7.9	1.19	1.00E+09	1.00E+09	3	7.9	15.8
26.08	15	0.42	2.78	15.1	5	1.4	0.84	7.2	6.1	0.9	1.00E+09	1.00E+09	3	6.1	12.1
27.07	37	1.48	4.01	16.5	5	1.43	0.84	17.7	14.8	2.36	1.00E+09	1.00E+09	6	14.8	29.7
28.05	26.9	1.1	4.11	18.4	4	1.45	0.83	17.2	14.2	1.69	1.00E+09	1.00E+09	6	1.00E+09	1.00E+09
29.04	27.3	0.67	2.48	21.4	6	1.48	0.82	10.4	8.6	1.71	32	30	6	8.6	17.2
30.02	29.4	0.82	2.8	30.3	5	1.51	0.82	14.1	11.5	1.85	1.00E+09	1.00E+09	6	11.5	23
31	35	0.79	2.26	36.6	6	1.53	0.81	13.4	10.8	2.22	34	30.5	6	10.8	21.7
31.99	52.8	1.99	3.77	54.7	5	1.56	0.8	25.3	20.3	3.4	1.00E+09	1.00E+09	6	20.3	40.5
32.97	43.6	1.83	4.2	57.6	5	1.58	0.8	20.9	16.6	2.78	1.00E+09	1.00E+09	6	16.6	33.2
33.96	27.7	0.98	3.54	45.2	5	1.61	0.79	13.3	10.5	1.72	1.00E+09	1.00E+09	6	10.5	20.9
34.94	27.9	0.58	2.08	44.5	6	1.63	0.78	10.7	8.4	1.72	32	30	6	8.4	16.7
35.92	39.6	1.28	3.24	64.5	5	1.66	0.78	19	14.7	2.5	1.00E+09	1.00E+09	6	14.7	29.5
36.91	38.2	1.12	2.93	90.1	5	1.68	0.77	18.3	14.1	2.41	1.00E+09	1.00E+09	6	14.1	28.2
37.89	41.4	1.28	3.09	156.9	5	1.71	0.76	19.8	15.2	2.61	1.00E+09	1.00E+09	6	15.2	30.3
38.88	31.8	1.01	3.18	175.7	5	1.74	0.76	15.3	11.6	1.97	1.00E+09	1.00E+09	6	11.6	23.2



CPT-2 a

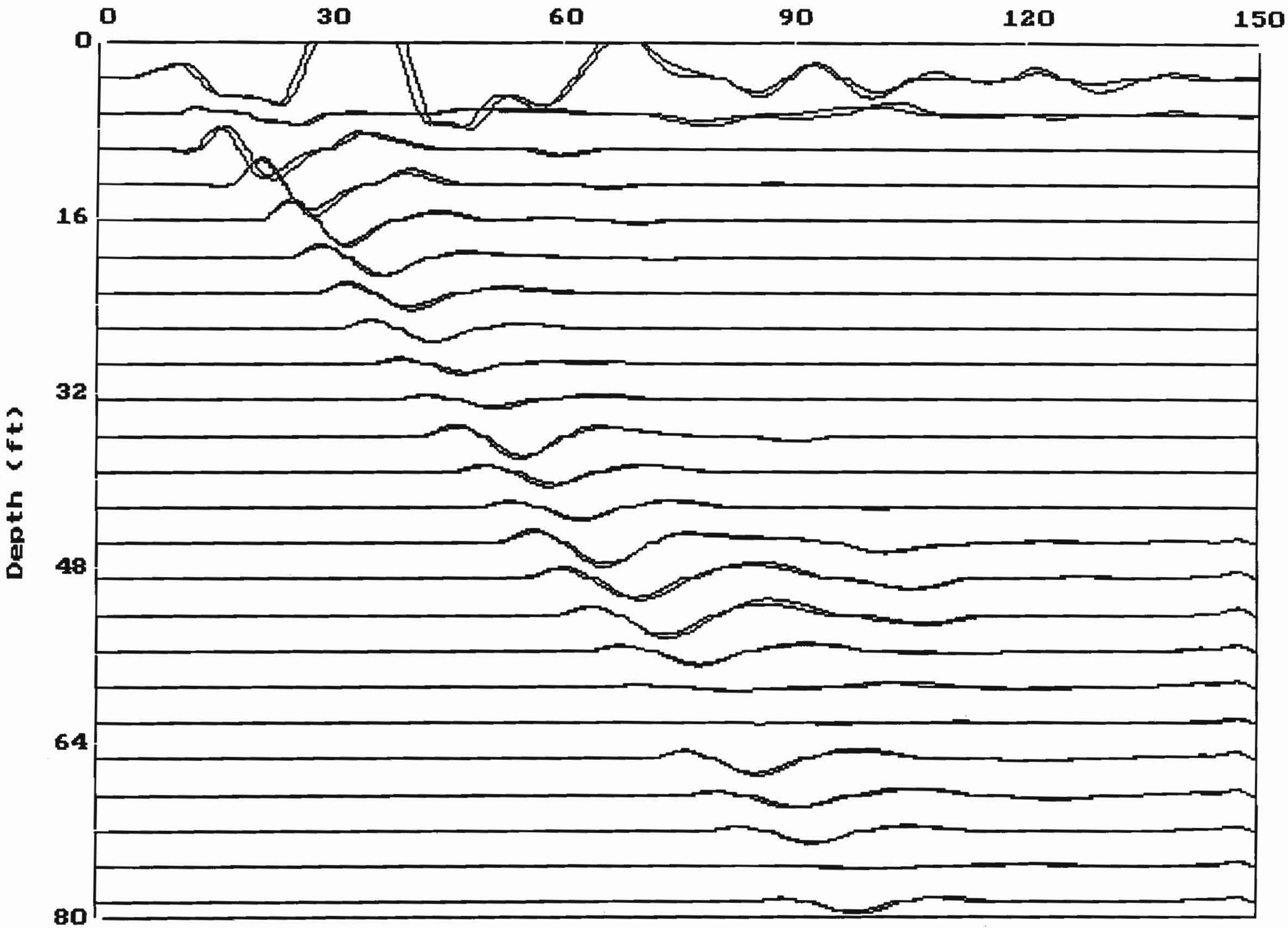


CPT-2 a

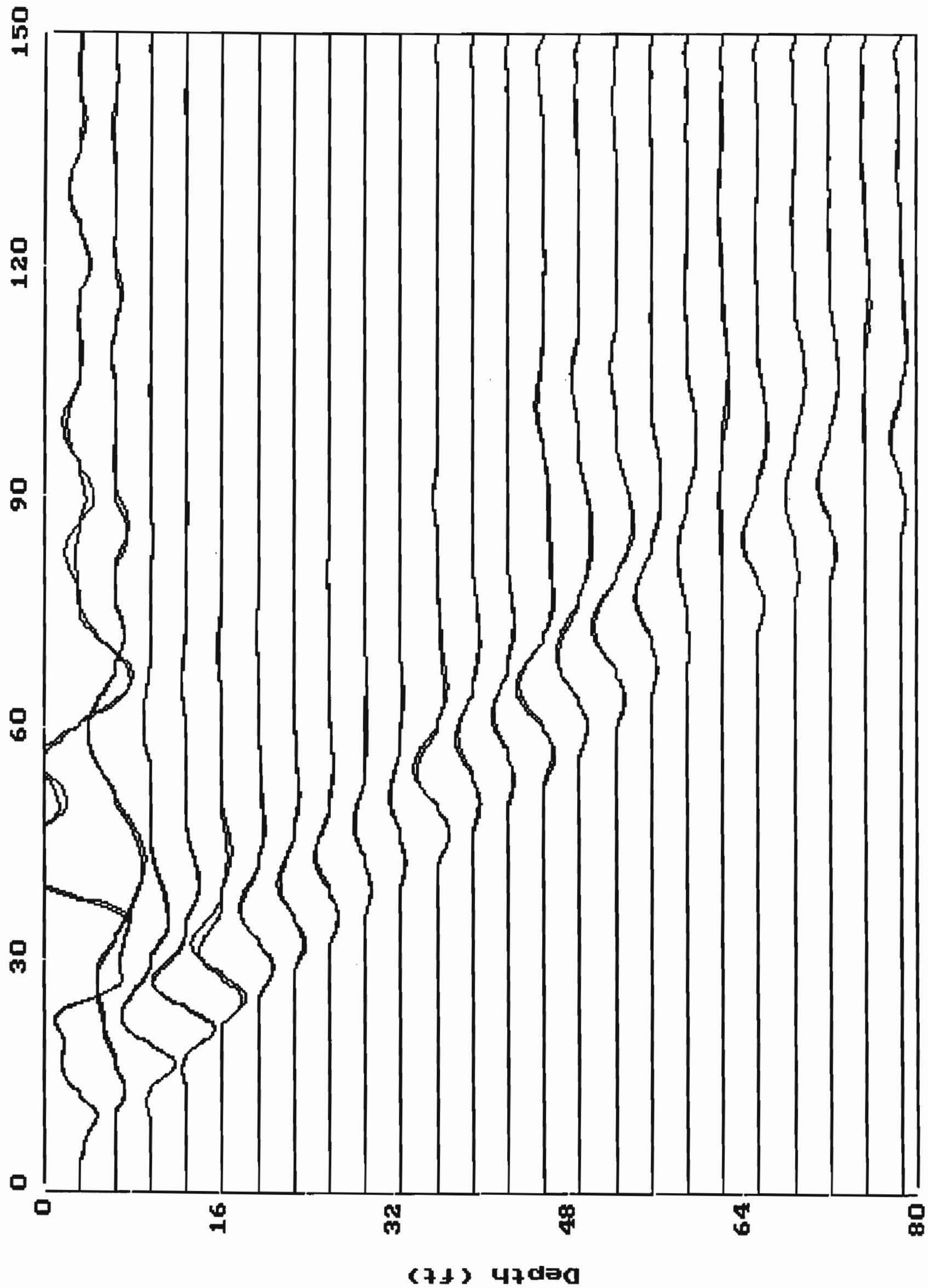
Gregg Shear Wave Velocity Data Reduction Sheet

Hole:	CPT-2 a
Location:	CALPINE
Date:	3/5/01
Source	Hammer and Beam
Source Depth (m):	0
Souce Offset (m):	0.56

Depth (m)	Depth (ft)	Travel Path (m)	Interval Time (ms)	Vs (m/s)	Vs (ft/s)	Interval Depth (m)	Interval Depth (ft)
0.80	2.62	0.98					
1.80	5.90	1.89	4.90	185.42	607.95	1.30	4.26
2.80	9.18	2.86	5.28	183.78	602.55	2.30	7.54
3.80	12.46	3.84	4.43	222.48	729.45	3.30	10.82
4.80	15.74	4.83	4.15	238.92	783.34	4.30	14.10
5.80	19.02	5.83	4.28	232.34	761.77	5.30	17.38
6.80	22.30	6.82	4.28	232.72	763.02	6.30	20.66
7.80	25.57	7.82	5.18	192.48	631.09	7.30	23.93
8.80	28.85	8.82	4.64	215.03	705.01	8.30	27.21
9.80	32.13	9.82	4.02	248.31	814.12	9.30	30.49
10.80	35.41	10.81	3.44	290.27	951.70	10.30	33.77
11.80	38.69	11.81	3.90	256.10	839.66	11.30	37.05
12.80	41.97	12.81	3.96	252.26	827.09	12.30	40.33
13.80	45.25	13.81	3.96	252.30	827.22	13.30	43.61
14.80	48.52	14.81	6.32	158.11	518.38	14.30	46.89
15.80	51.80	15.81	4.22	236.81	776.42	15.30	50.16
16.80	55.08	16.81	4.97	201.09	659.31	16.30	53.44
17.80	58.36	17.81	4.13	242.00	793.46	17.30	56.72
18.80	61.64	18.81	3.02	330.97	1085.15	18.30	60.00
19.80	64.92	19.81	2.71	368.85	1209.34	19.30	63.28
20.80	68.20	20.81	2.90	344.70	1130.15	20.30	66.56
21.80	71.48	21.81	2.90	344.71	1130.19	21.30	69.84
22.80	74.75	22.81	2.80	357.03	1170.59	22.30	73.11
23.80	78.03	23.81	4.14	241.48	791.73	23.30	76.39
24.80	81.31	24.81	3.88	257.66	844.80	24.30	79.67
25.80	84.59	25.81	2.86	349.56	1146.11	25.30	82.95
26.80	87.87	26.81	2.71	368.92	1209.57	26.30	86.23
27.80	91.15	27.81	2.10	476.09	1560.95	27.30	89.51
28.80	94.43	28.81	3.83	261.05	855.89	28.30	92.79
29.80	97.70	29.81	3.06	326.74	1071.27	29.30	96.07



CPT-7 a



CPT-7a

Gregg Shear Wave Velocity Data Reduction Sheet

Hole:	CPT-7 a
Location:	CALPINE
Date:	2/5/01
Source	Hammer and Beam
Source Depth (m):	0
Souce Offset (m):	0.56

Depth (m)	Depth (ft)	Travel Path (m)	Interval Time (ms)	Vs (m/s)	Vs (ft/s)	Interval Depth (m)	Interval Depth (ft)
0.80	2.62	0.98					
1.80	5.90	1.89	4.39	206.96	678.57	1.30	4.26
2.80	9.18	2.86	2.80	346.55	1136.24	2.30	7.54
3.80	12.46	3.84	5.06	194.78	638.63	3.30	10.82
4.80	15.74	4.83	4.01	247.26	810.69	4.30	14.10
5.80	19.02	5.83	3.87	256.95	842.48	5.30	17.38
6.80	22.30	6.82	3.48	286.22	938.43	6.30	20.66
7.80	25.57	7.82	3.14	317.53	1041.10	7.30	23.93
8.80	28.85	8.82	3.34	298.72	979.41	8.30	27.21
9.80	32.13	9.82	3.83	260.62	854.50	9.30	30.49
10.80	35.41	10.81	3.69	270.60	887.22	10.30	33.77
11.80	38.69	11.81	3.64	274.39	899.63	11.30	37.05
12.80	41.97	12.81	3.51	284.60	933.13	12.30	40.33
13.80	45.25	13.81	3.30	302.76	992.66	13.30	43.61
14.80	48.52	14.81	4.20	237.91	780.04	14.30	46.89
15.80	51.80	15.81	3.59	278.36	912.67	15.30	50.16
16.80	55.08	16.81	3.86	258.91	848.90	16.30	53.44
17.80	58.36	17.81	3.67	272.34	892.91	17.30	56.72
18.80	61.64	18.81	3.80	263.03	862.41	18.30	60.00
19.80	64.92	19.81	3.55	281.57	923.19	19.30	63.28
20.80	68.20	20.81	4.26	234.65	769.35	20.30	66.56
21.80	71.48	21.81	3.36	297.52	975.46	21.30	69.84
22.80	74.75	22.81	3.65	273.89	897.99	22.30	73.11
23.80	78.03	23.81	3.65	273.89	898.01	23.30	76.39
24.80	81.31	24.81	2.14	467.17	1531.69	24.30	79.67

Appendix C

APPENDIX C
LABORATORY TESTING

General

Laboratory tests were performed on selected samples to aid in soil classification and to evaluate physical properties of the soils that may affect the geotechnical aspects of project design and construction. A description of the laboratory testing program is presented below; a summary of all laboratory tests performed is presented on the Summary of Laboratory Tests, Plate C-1.

Moisture Content and Dry Unit Weight

Moisture content and dry unit weight tests were performed to evaluate moisture-conditioning requirements during site preparation and earthwork grading; soil overburden, and active and passive earth pressures; and relative soil strength and compressibility. Moisture content was evaluated in general accordance with ASTM Test Method D 2216; dry unit weight was evaluated using procedures similar to ASTM Test Method D 2937. Results of these tests are presented on the boring logs and are summarized on the Summary of Laboratory Tests.

Sieve Analysis

Sieve analyses were performed to evaluate the gradational characteristics of the material and to aid in soil classification. Tests were performed in general accordance with ASTM Test Method C 136. Results of these tests are presented on the boring logs and are summarized on the Summary of Laboratory Tests.

Atterberg Limits

Atterberg Limits tests were performed to aid in soil classification and to evaluate the plasticity characteristics of the material. Additionally, test results were correlated to published data to evaluate the shrink/swell potential of near-surface site soils. Tests were performed in general accordance with ASTM Test Method D 4318. Results of these tests are presented on the boring logs and are summarized on the Summary of Laboratory Tests.

Unconfined Compression

An unconfined compression test was performed on a selected, undisturbed sample to evaluate the undrained shear strength of the fine-grained site soils. Test procedures were in general accordance with ASTM Test Method D 2166. Results of this test are presented on the boring logs, Summary of Laboratory Tests, and attached plates.

Direct Shear

A direct shear test was performed on a relatively undisturbed sample to evaluate the drained shear strength of the site soils. The sample was tested in a near-saturated condition in general accordance with ASTM Test Method D 3080 (consolidated, drained). Results of these tests are presented on the attached plate.

Triaxial Compression

Unconsolidated-undrained (UU) and consolidated-undrained (CU) triaxial compression tests were performed on relatively undisturbed samples to evaluate the undrained shear strength of the site soils. Tests were performed in general accordance with the Department of the Army Engineering Manual EM-1110-2-1906, Appendix X. Results of these tests are presented on attached plates.

Swell Load

A swell load test was performed on two selected, undisturbed samples to evaluate the minimum foundation pressure required to restrain potentially expansive foundation soils. The samples were initially confined vertically with a seating pressure of about 100 pounds per square foot then inundated with water. Once swelling under the initial load was complete, additional vertical loads were applied until swelling was suppressed. Results of the tests are presented on the attached plates.

Consolidation

Consolidation tests were performed on undisturbed soil samples to evaluate potential foundation settlements under the expected loads. Test procedures were in general accordance with ASTM Test Method D 2435. After the seating load of 100 psf, the soil samples were inundated with water. Results of these tests are presented on the attached plates. In reviewing the data obtained, we noted that two of test results appear unreasonable for the soil conditions at the site and suggest the soil samples used for the tests may have been disturbed.

Specific Gravity

Specific gravity tests were performed on soil samples for use in calculating the phase relationships of soil (that is, the relative volumes of solids to water and air in a given volume of soil). Test procedures were in general accordance with ASTM Test Method D 854. Results of these tests are shown on the Summary of Laboratory Tests.

Lime Stabilization Tests

Tests were initially performed in accordance with Caltrans methods to evaluate the percentage of lime when mixed with soil that would raise the pH of the mixture to 12.4 or greater. Once the percentage of lime was established, a resistance value (R-value) test was performed on a sample of the mixture to evaluate pavement support characteristics of the near-surface site soils. The R-value test procedure was in general accordance with California Test 301. Unconfined compressive strength tests were also performed on three remolded samples of lime/soil mixture to evaluate compressive strength in accordance with California Test 373. Results of these tests are presented on the attached plate.

The following plates are attached and complete this appendix.

Plate C1	Summary of Laboratory Tests
Plate C2 – C19	Unconfined Compressive Strength Tests
Plate C20 – C24	Consolidation Tests
Plate C25	Direct Shear Test
Plate C26	UU Triaxial Compression Test
Plate C27	CU Triaxial Compression Test
Plate C28&C29	Sulfate and Chloride Test Results
Plate C30&C31	Minimum Resistivity Test Results
Plate C32	R-value/strength Test Results for Lime/Soil Mixture

BORING NO.	SAMPLE DEPTH (ft)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (% of dry weight)	PARTICLE SIZE SIEVE SIZE (percent passing)						ATTERBERG LIMITS		OTHER TESTS
				3"	3/4"	#4	#10	#40	#200	L.L.	P.I.	
B- 1	3.0	108	14									UC = 5.3 ksf
B- 1	5.0	110	15						60			
B- 1	10.0	110	20									
B- 1	15.0	110	18									
B- 1	20.0											UU = 0.89 ksf
B- 1	35.0	112	17									
B- 1	45.0	93	30									
B- 1	60.0	100	23									
B- 2	1.0	116	9									Swell pressure = 360 psf
B- 2	3.0	112	16									
B- 2	5.0	112	15									
B- 2	10.0	103	22									
B- 2	15.0	111	17									
B- 2	25.0	104	22									UC = 2.9 ksf
B- 2	35.0	118	15									
B- 2	45.0	90	30									
B- 3	1.0											Specific Gravity = 2.72
B- 3	3.0	106	18							32	15	
B- 3	5.0									36	28	
B- 3	10.0	102	24									UC = 1.2 ksf
B- 3	15.0	108	19									
B- 3	30.0	107	20						63			
B- 3	45.0	96	26									UC = 1.1 ksf
B- 3	70.0	104	22									
B- 4	1.0									48	33	
B- 4	5.0	104	12						29			
B- 4	10.0	104	21									
B- 4	15.0	110	20									Specific Gravity = 2.72
B- 4	25.0	109	18									
B- 4	30.0	107	21									
B- 4	45.0	81	39									
B- 4	60.0	103	22									
B- 5	3.0	113	16									Consolidation
B- 5	5.0	104	19							35	20	
B- 5	10.0	104	13									
B- 5	15.0	98	23									
B- 5	20.0	106	24									UU = 0.89 ksf
B- 5	30.0	108	19									
B- 5	50.0	104	21						69			UC = 3.2 ksf
B- 5	60.0	98	26									
B- 5	95.0	108	19									

KA-LABSUM 2011G045.GPJ 8/28/01

KLEINFELDER

SUMMARY OF LABORATORY TESTS

EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE 1 of 3

C-1

Drafted By: G. Gomez
Date: 8/28/2001
Project No.: 20-4561-01
File Number: 2011G045

BORING NO.	SAMPLE DEPTH (ft)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (% of dry weight)	PARTICLE SIZE SIEVE SIZE (percent passing)						ATTERBERG LIMITS		OTHER TESTS
				3"	3/4"	#4	#10	#40	#200	L.L.	P.I.	
B- 6	3.0									29	16	Specific Gravity = 2.74
B- 6	5.0	111	16									UC = 5.3 ksf
B- 6	10.0											Consolidation
B- 6	20.0											Consolidation
B- 6	30.0	111	18									
B- 7	3.0	105	17			35			22			UC = 6.8 ksf
B- 7	5.0	110	16									Specific Gravity = 2.72
B- 7	10.0	103	19									
B- 7	15.0	95	22							27	12	
B- 7	25.0	113	14									UC =3.6 ksf
B- 7	40.0	116	15									
B- 7	50.0	100	23									
B- 8	3.0	110	20									Swell pressure = 760 psf
B- 8	5.0	105	19									UC = 4.6 ksf
B- 8	10.0	105	20									
B- 8	15.0	99	20							26	8	
B- 8	30.0	113	20									
B- 9	3.0	112	14									UC = 11.8 ksf
B- 9	5.0	106	16							32	21	
B- 9	15.0	105	21									
B- 9	30.0	112	18									
B- 9	45.0	104	21									
B- 9	55.0	100	23									UC = 10. 7 ksf
B- 9	60.0											Specific Gravity = 2.77
B- 9	70.0	116	19									
B-10	1.0	118	14									
B-10	5.0											Consolidation
B-11	1.0									42	27	
B-11	5.0	114	17									
B-11	10.0	115	15									
B-11	15.0	113	16									UC = 7.9 ksf
B-12	10.0	114	16									Direct Shear
B-12	20.0	102	25									Consolidation
B-13	1.0									48	28	
B-13	3.0											
B-14	5.0	110	15									
B-15	5.0	100	22									
B-15	10.0	100	22									
B-16	1.0									35	15	
B-16	3.0	97	11							30	14	
B-16	5.0								84			

KLEINFELDER

Drafted By: G. Gomez
Date: 8/28/2001
Project No.: 20-4561-01
File Number: 2011G045

SUMMARY OF LABORATORY TESTS

EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
2 of 3
C-1

KA-LABSUM 2011G045.GPJ 8/28/01

BORING NO.	SAMPLE DEPTH (ft)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (% of dry weight)	PARTICLE SIZE SIEVE SIZE (percent passing)						ATTERBERG LIMITS		OTHER TESTS
				3"	3/4"	#4	#10	#40	#200	L.L.	P.I.	
B-16	10.0	109	17									UC = 5.9 ksf
B-16	30.0	102	22									
B-16	35.0	117	15									
B-17	3.0	104	16									UC = 8.2 ksf
B-17	10.0	101	17							30	15	
B-17	15.0								47			
B-17	25.0	105	20									
B-19	10.0					100			45			
B-20	3.0	104	16							32	17	
B-20	10.0								58			
B-20	15.0	118	14									
B-21	5.0	109	17									UC = 11.9 ksf
B-21	20.0	105	19									
B-22	5.0											Direct Shear
B-22	10.0	114	7									
B-22	15.0											Specific Gravity = 2.71
B-22	20.0	115	17									
B-23	7.0	111	16									UC = 1.6 ksf
B-24	10.0	103	18									
B-25	5.0	104	18									
TP- 1	2.0	107	17									UC = 3.2 ksf
TP- 5	4.0	103	20									UC = 1.9 ksf
TP- 9	3.0	107	17									UC = 3.8 ksf

KA-LABSUM 2011G045.GPJ 8/28/01

KLEINFELDER

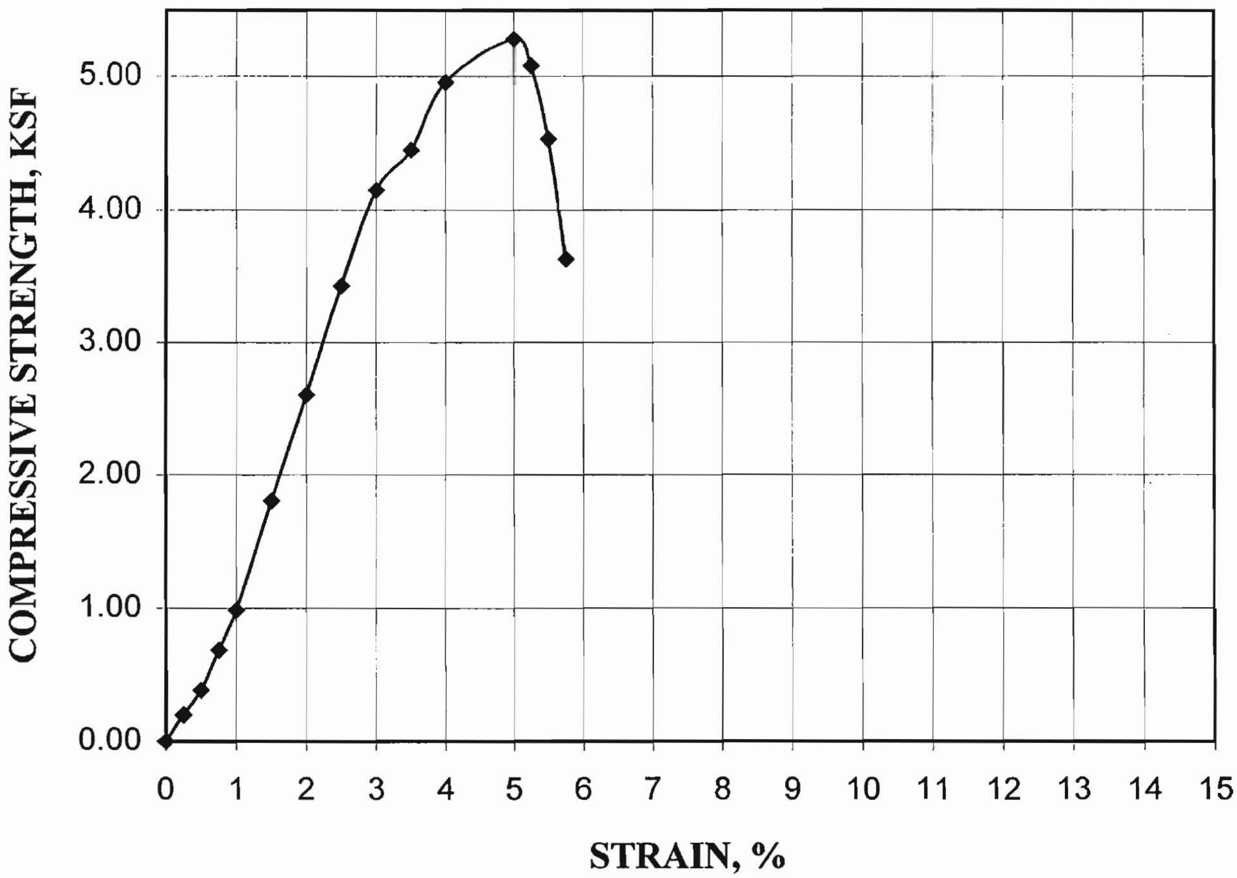
Drafted By: G. Gomez
Date: 8/28/2001
Project No.: 20-4561-01
File Number: 2011G045

SUMMARY OF LABORATORY TESTS

EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE
3 of 3
C-1

UNCONFINED COMPRESSIVE STRENGTH



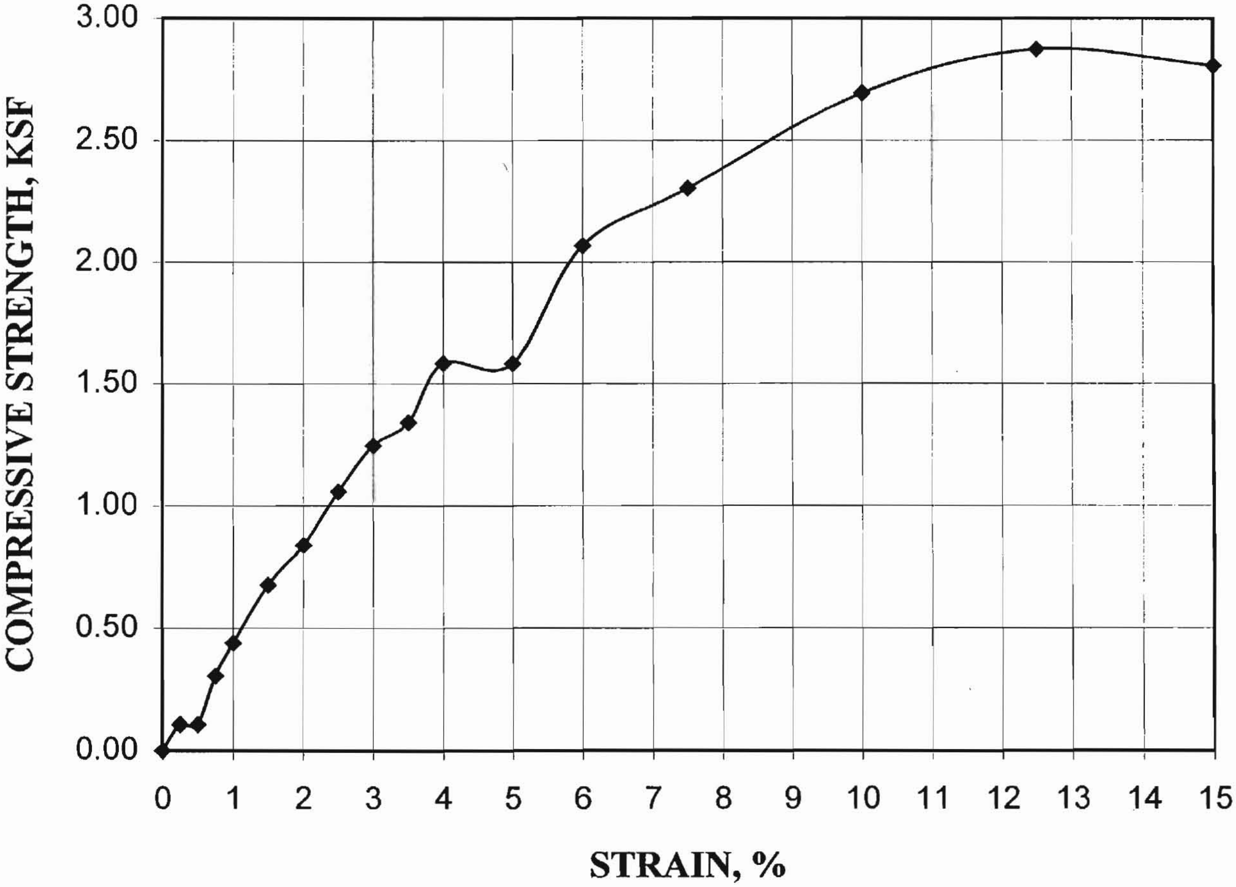
Sample I. D. B1-3-1

Sample Data

Sample Description: Light Brown silty sandy clay
Maximum Strength: 5.3 ksf
Moisture Content: 13.5 %
Density: 107.7 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-2
Drafted By: EAC / File No.: 20-4561-01.G01		

UNCONFINED COMPRESSIVE STRENGTH



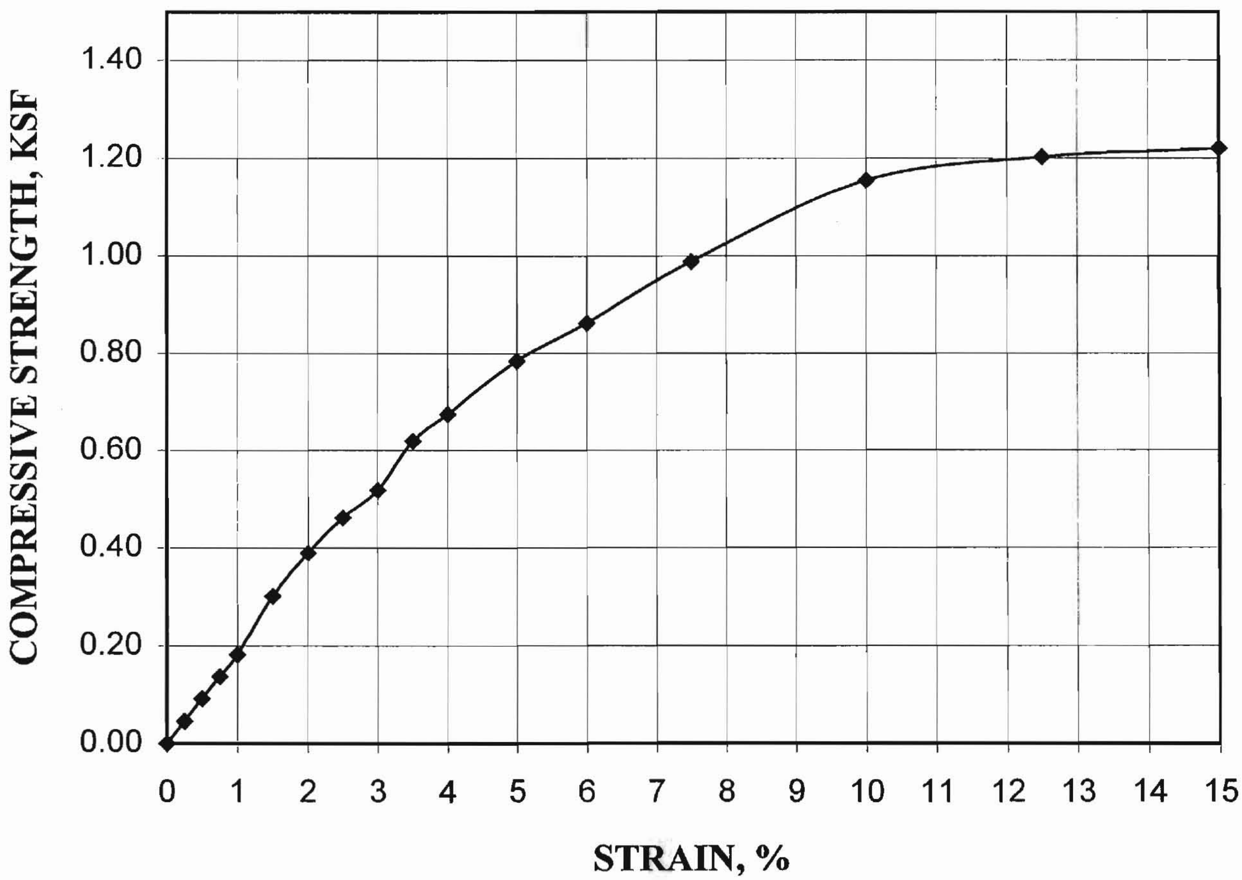
Sample I. D. B2-25-1

Sample Data

Sample Description:	Light Brown silty clay
Maximum Strength:	2.9 ksf
Moisture Content:	22.4 %
Density:	103.6 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-3
Drafted By:EAC	File No.:20-4561.01.G01	

UNCONFINED COMPRESSIVE STRENGTH



Sample I. D. B3-10-1

Sample Data

Sample Description: Fine Brown sandy clay

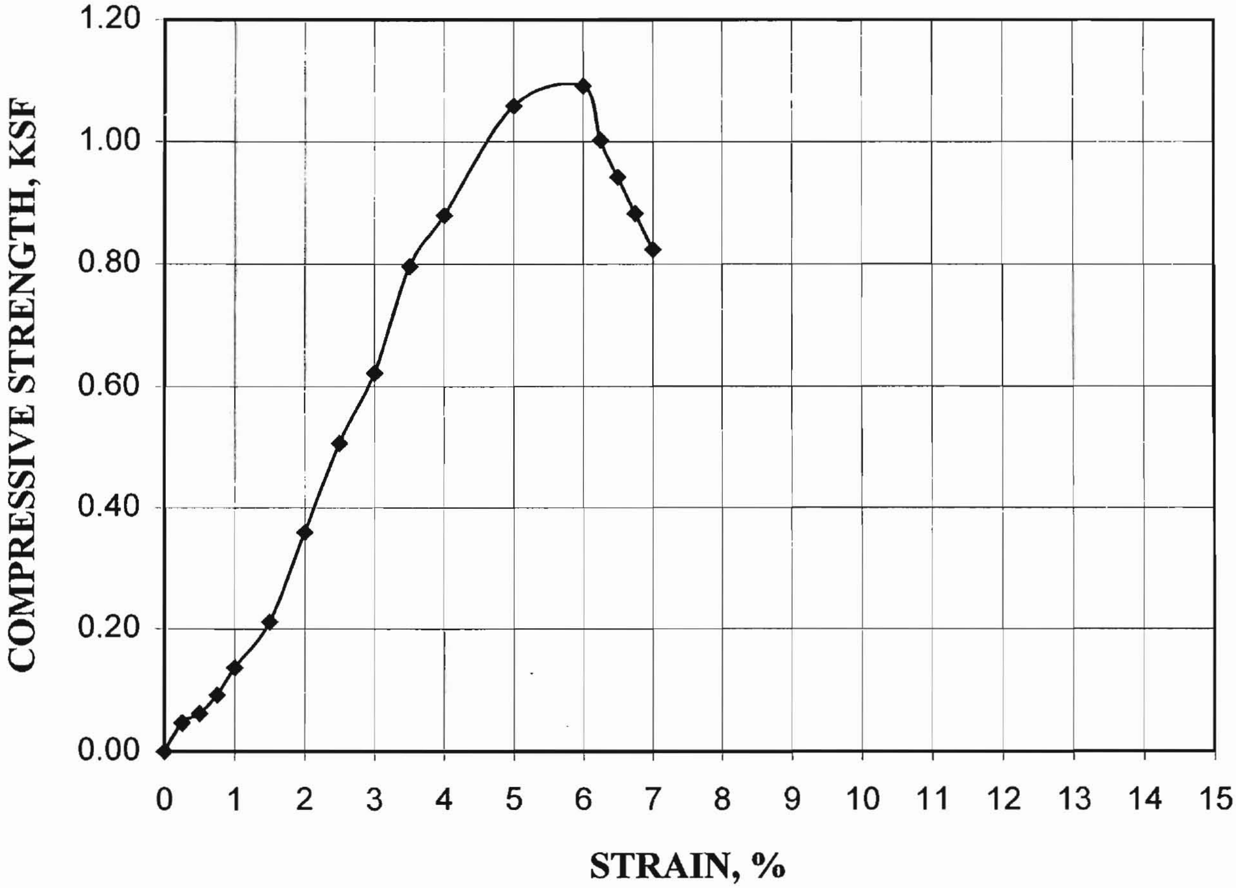
Maximum Strength: 1.2 ksf

Moisture Content: 23.7 %

Density: 101.7 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-4
Drafted By:EAC / File No.:20-4561-01.G01		

UNCONFINED COMPRESSIVE STRENGTH



Sample I. D. B3-45-1

Sample Data

Sample Description: Light Brown silty clay w/ sand

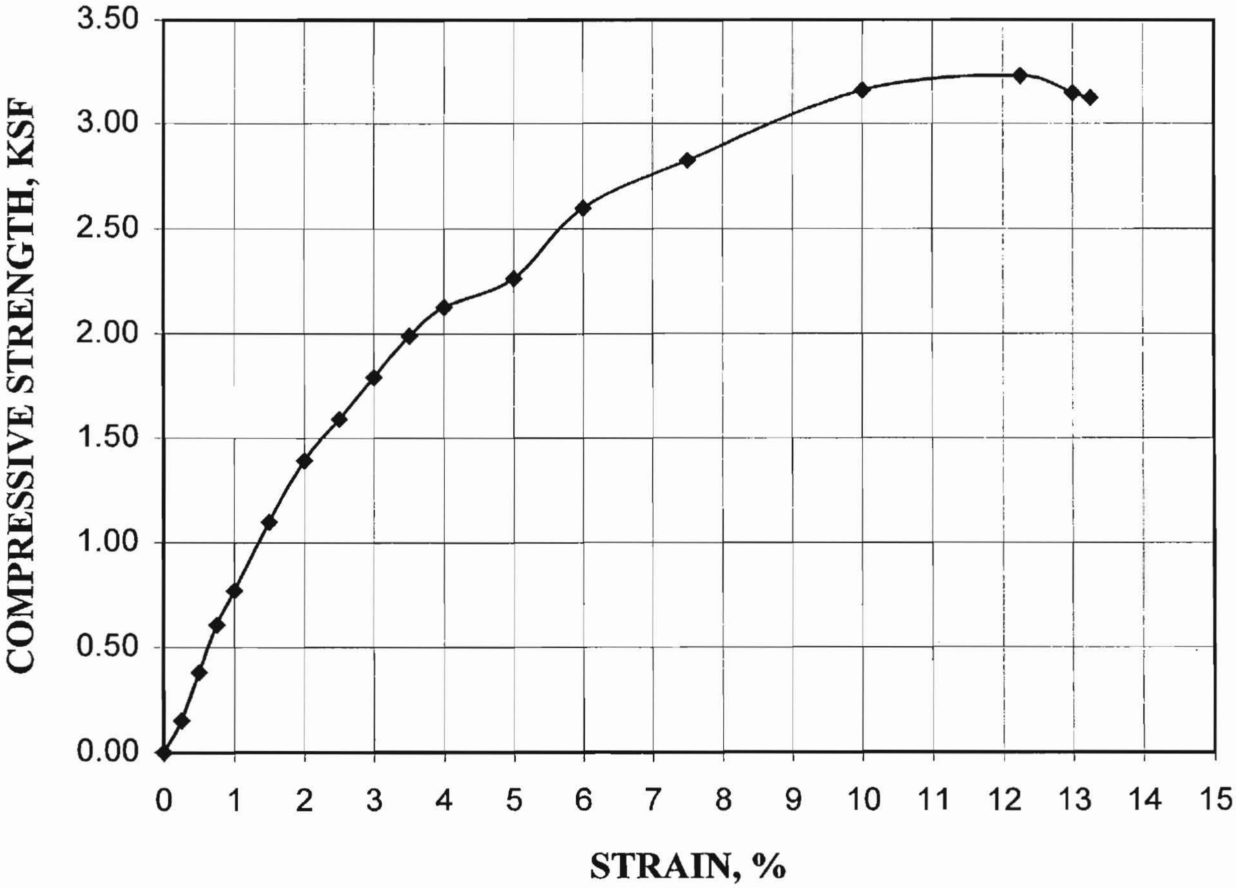
Maximum Strength: 1.1 ksf

Moisture Content: 26.2 %

Density: 95.6 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-5
Drafted By:EAC File No.:20-4561-01		

UNCONFINED COMPRESSIVE STRENGTH



Sample I. D. B5-50-1

Sample Data

Sample Description: Light Brown clay silt

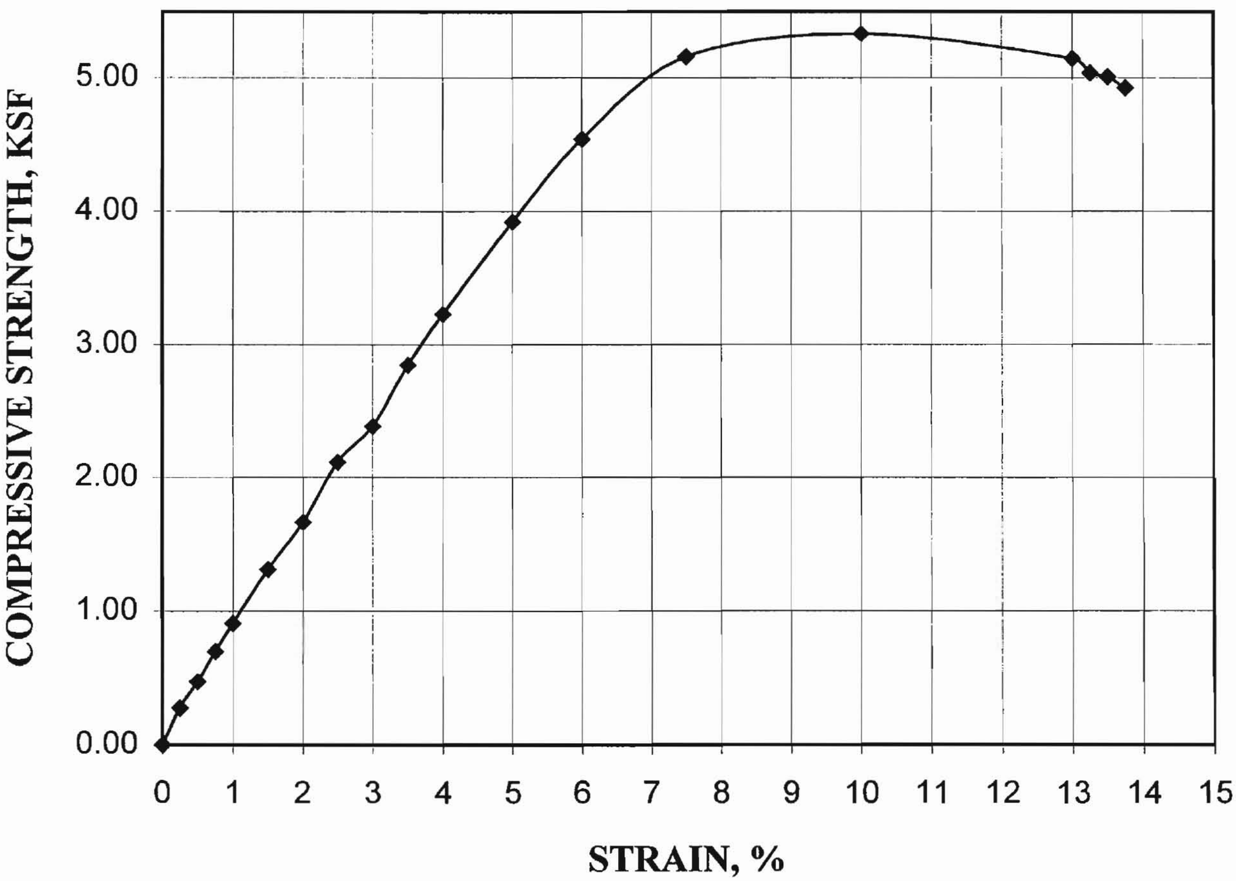
Maximum Strength: 3.2 ksf

Moisture Content: 21.4 %

Density: 104.1 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-6
Drafted By:EAC / File No.:20-4561-01.G01		

UNCONFINED COMPRESSIVE STRENGTH



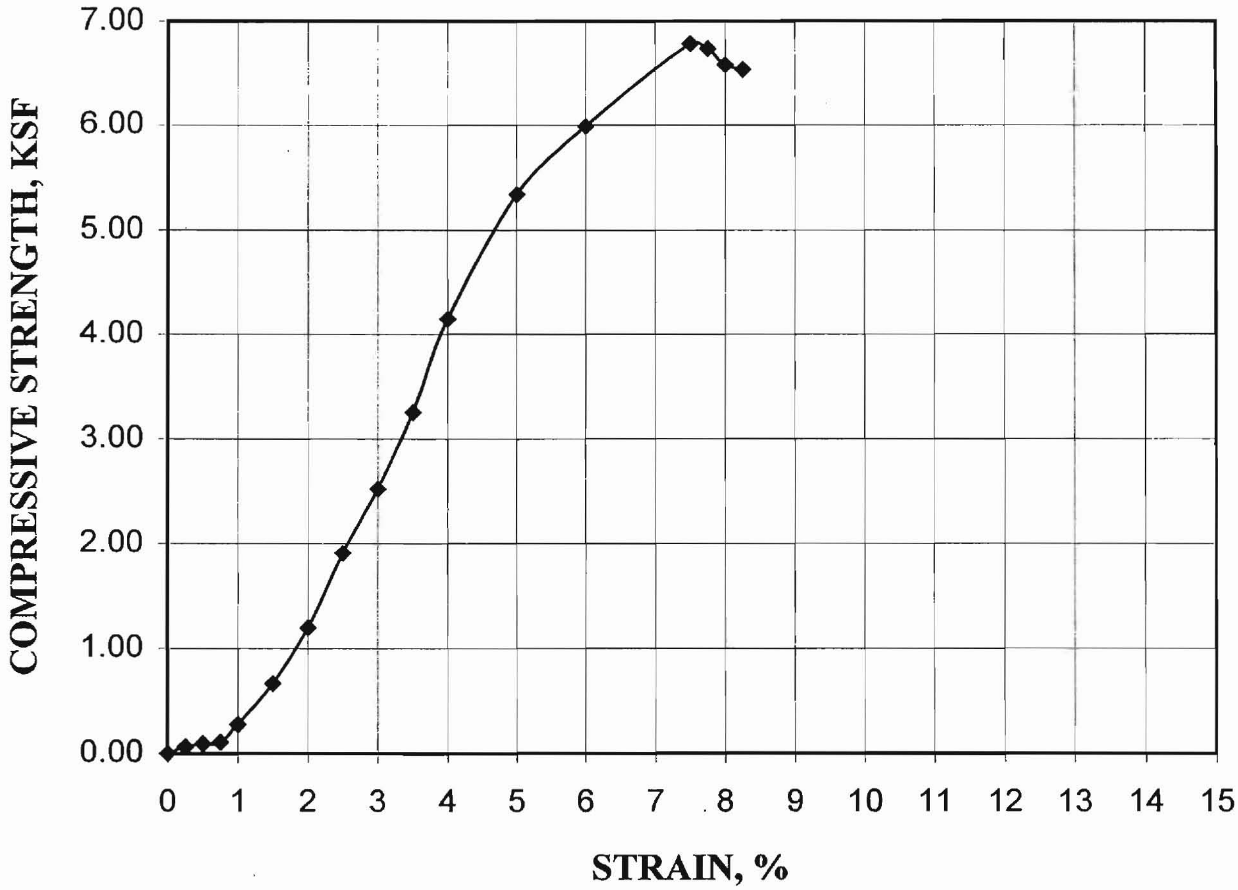
Sample I. D. B6-5-1

Sample Data

Sample Description: EAST ALTAMONT ENERGY
Maximum Strength: 5.3 ksf
Moisture Content: 16.3 %
Density: 111.3 pcf

Kleinfelder, Inc.		EAST ALTAMONT ENERGY CENTER	PLATE C-7
Drafted By:EAC	File No.:20-4561-01.G01		

UNCONFINED COMPRESSIVE STRENGTH



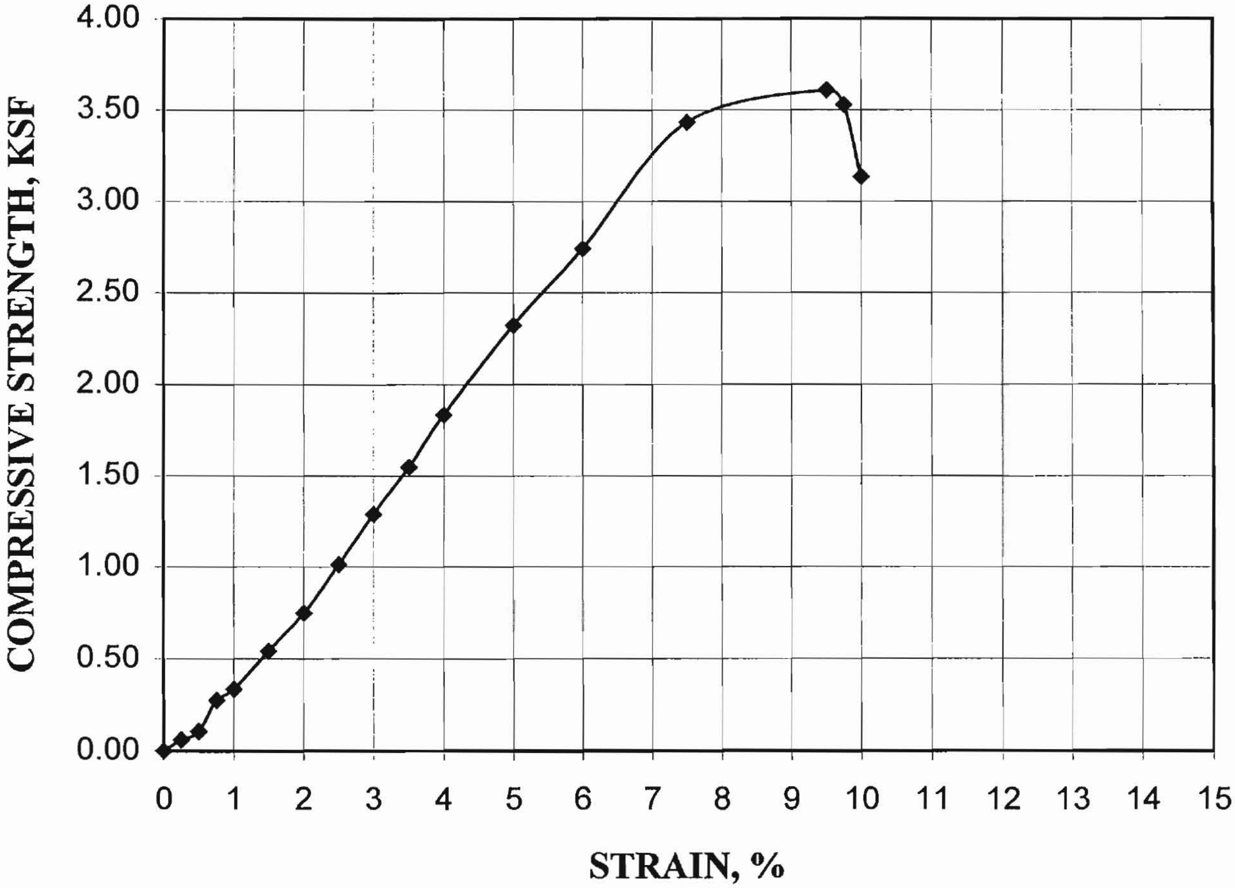
Sample I. D. B7-3-1

Sample Data

Sample Description: Brown silty sandy clay
Maximum Strength: 6.8 ksf
Moisture Content: 17.1 %
Density: 105.0 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-8
Drafted By:EAC File No.:20-4561-01		

UNCONFINED COMPRESSIVE STRENGTH



Sample I. D. B7-25-1

Sample Data

Sample Description: EAST ALTAMONT ENERGY

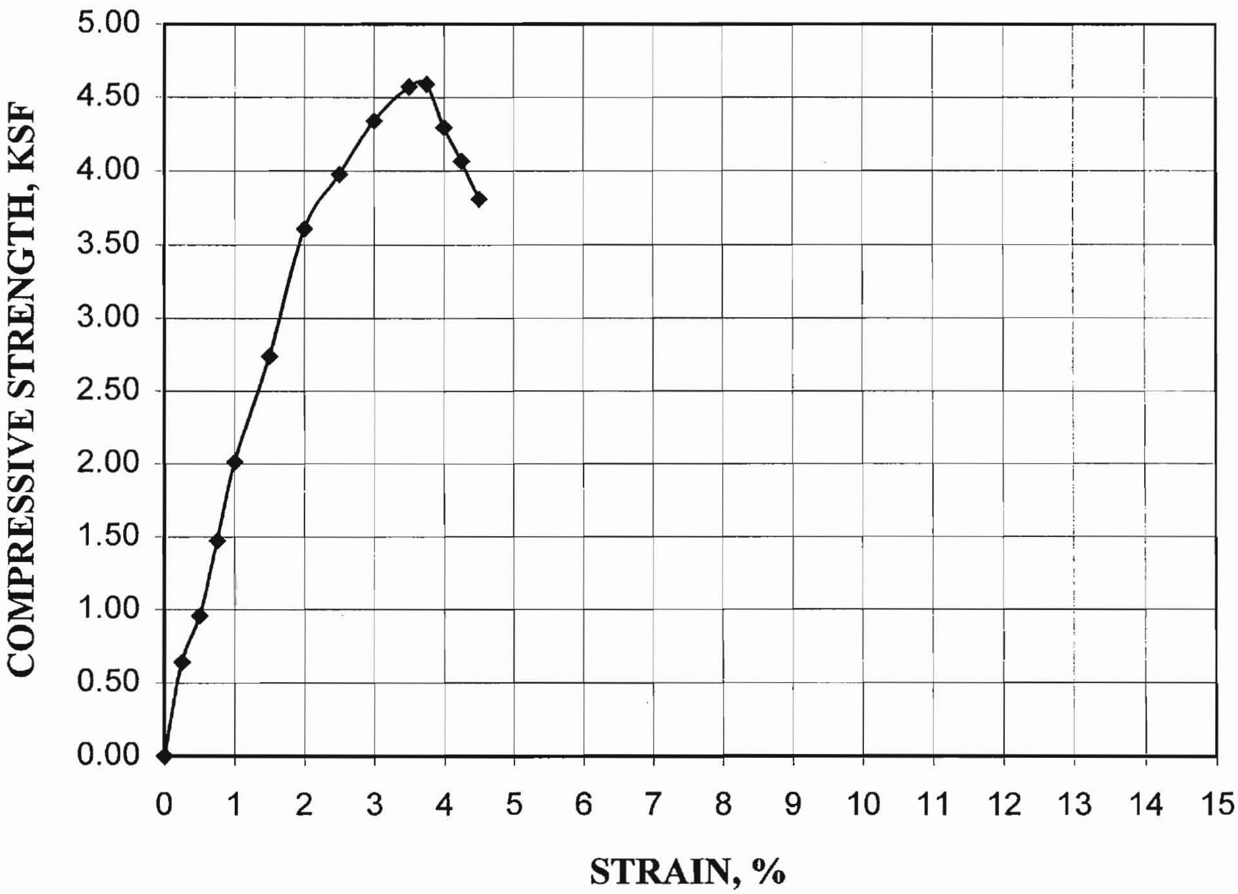
Maximum Strength: 3.6 ksf

Moisture Content: 13.8 %

Density: 112.8 pcf

Kleinfelder, Inc.		EAST ALTAMONT ENERGY CENTER	PLATE C-9
Drafted By:EAC	File No.:20-4561-01.G01		

UNCONFINED COMPRESSIVE STRENGTH



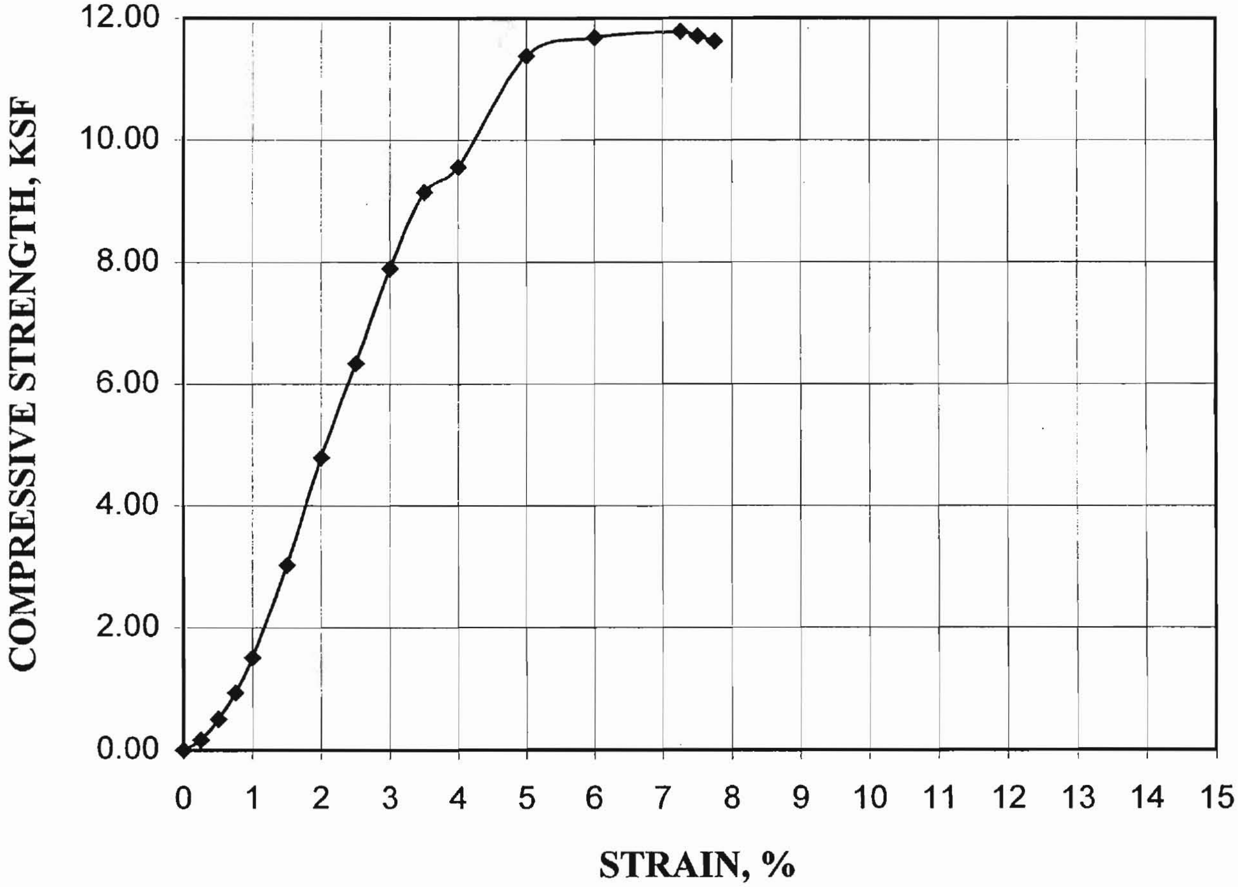
Sample I. D. B8-5-1

Sample Data

Sample Description: Brown clayey silt
Maximum Strength: 4.6 ksf
Moisture Content: 18.9 %
Density: 105.3 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-10
Drafted By:EAC	File No.:20-4561-01.G01	

UNCONFINED COMPRESSIVE STRENGTH



Sample I. D. B9-3-1

Sample Data

Sample Description: Light Brown silty clay

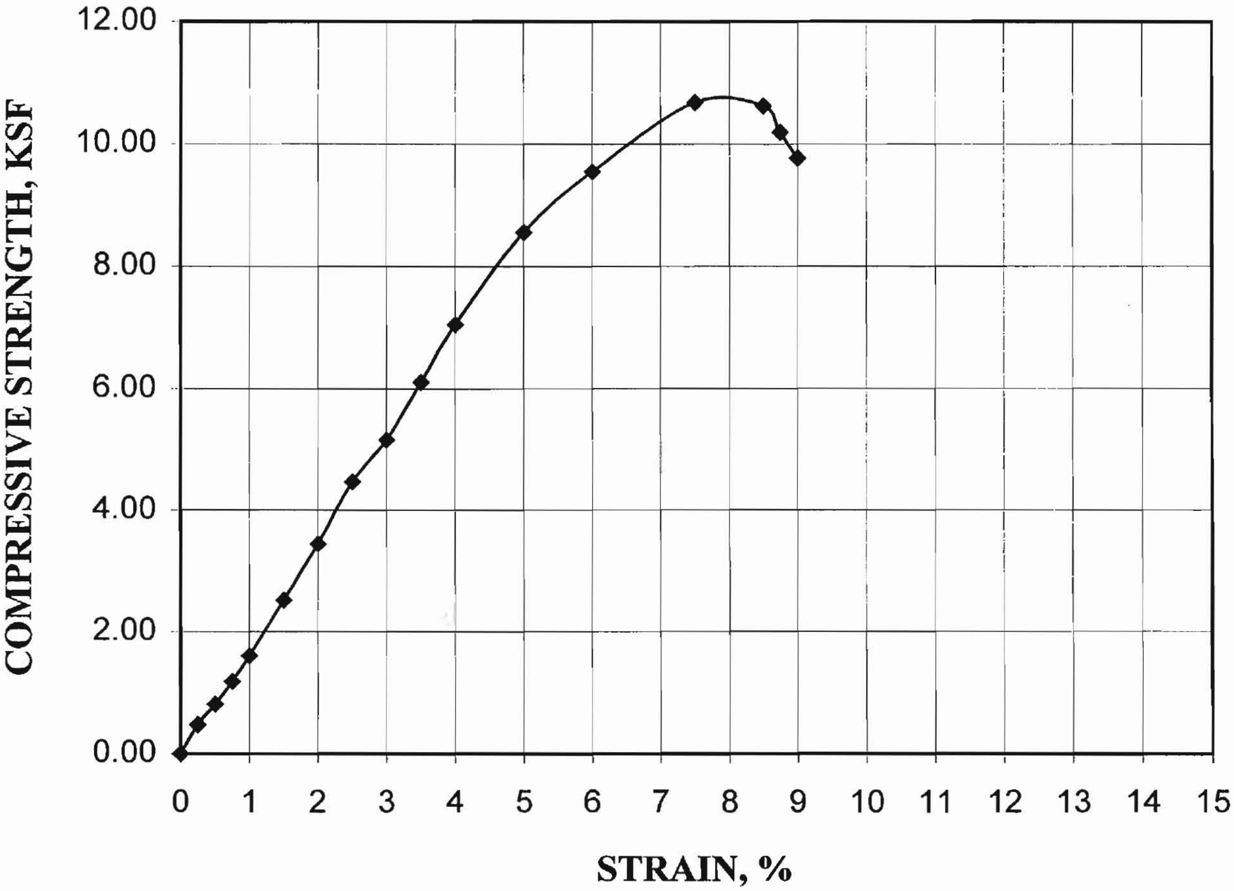
Maximum Strength: 11.8 ksf

Moisture Content: 13.9 %

Density: 111.5 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-11
Drafted By:EAC / File No.:20-4561-01		

UNCONFINED COMPRESSIVE STRENGTH



Sample I. D. B9-55-1

Sample Data

Sample Description: Light Brown silty clay

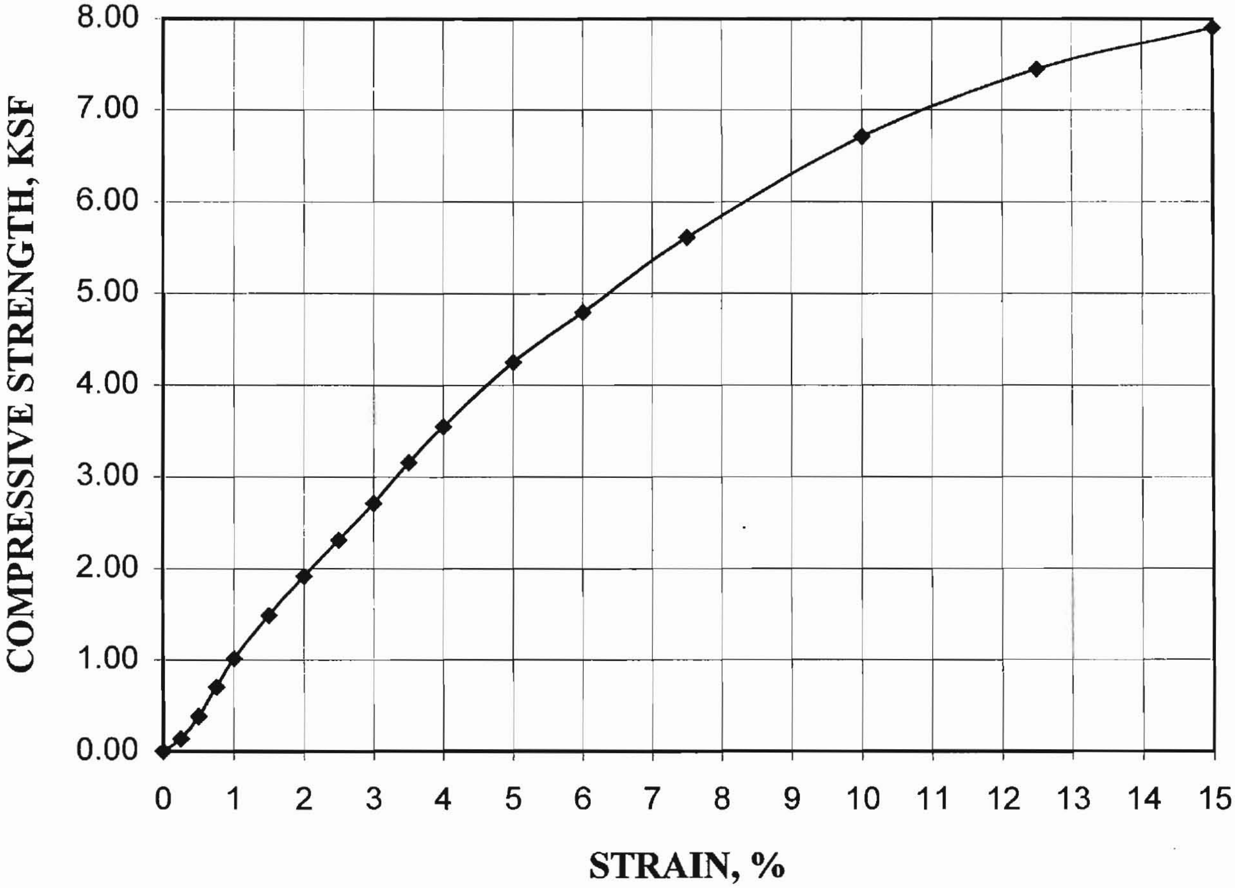
Maximum Strength: 10.7 ksf

Moisture Content: 23.2 %

Density: 99.9 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-12
Drafted By:EAC File No.:20-4561-01		

UNCONFINED COMPRESSIVE STRENGTH



Sample I. D. B11-15-1

Sample Data

Sample Description: Fine Brown clay silt w/ sand

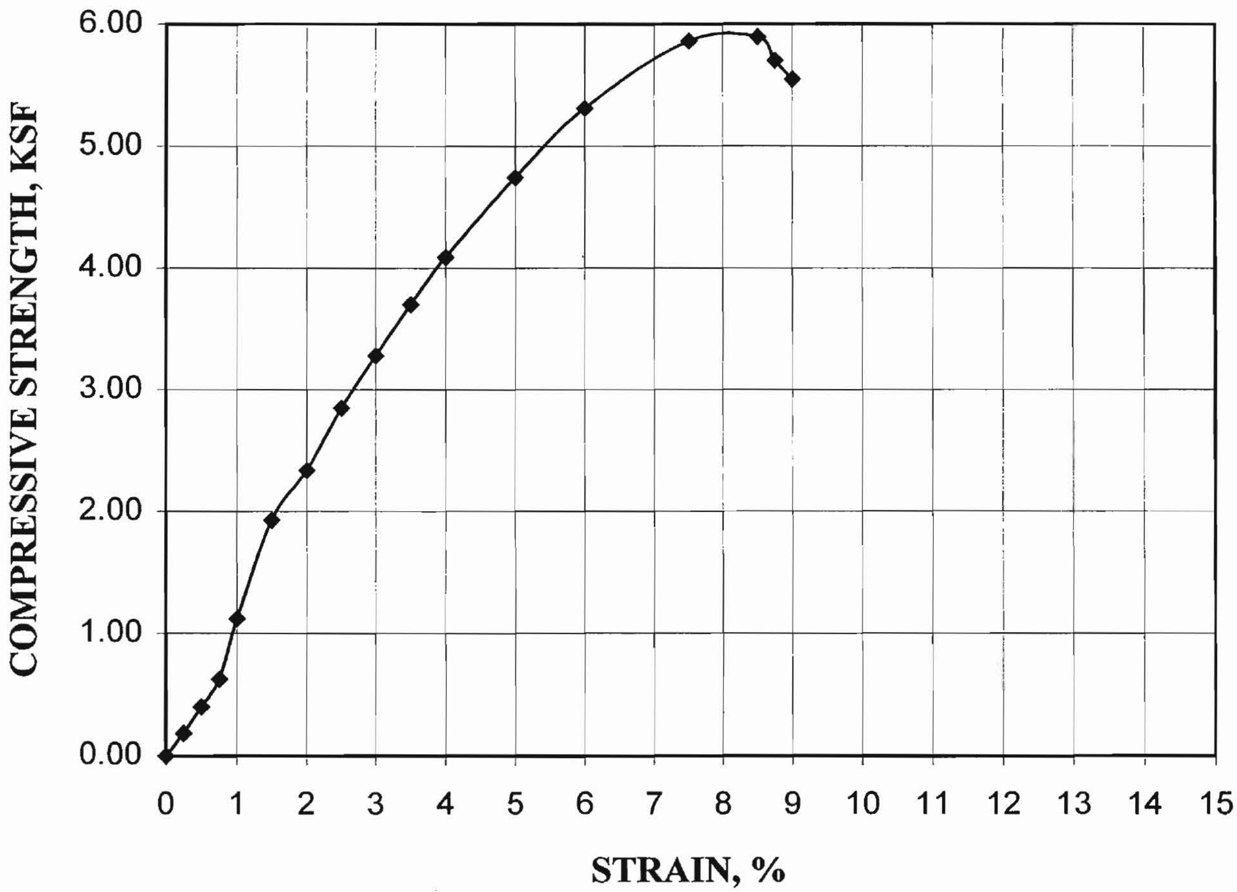
Maximum Strength: 7.9 ksf

Moisture Content: 16.4 %

Density: 113.3 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-13
Drafted By:EAC / File No.:20-4561-01.G01		

UNCONFINED COMPRESSIVE STRENGTH



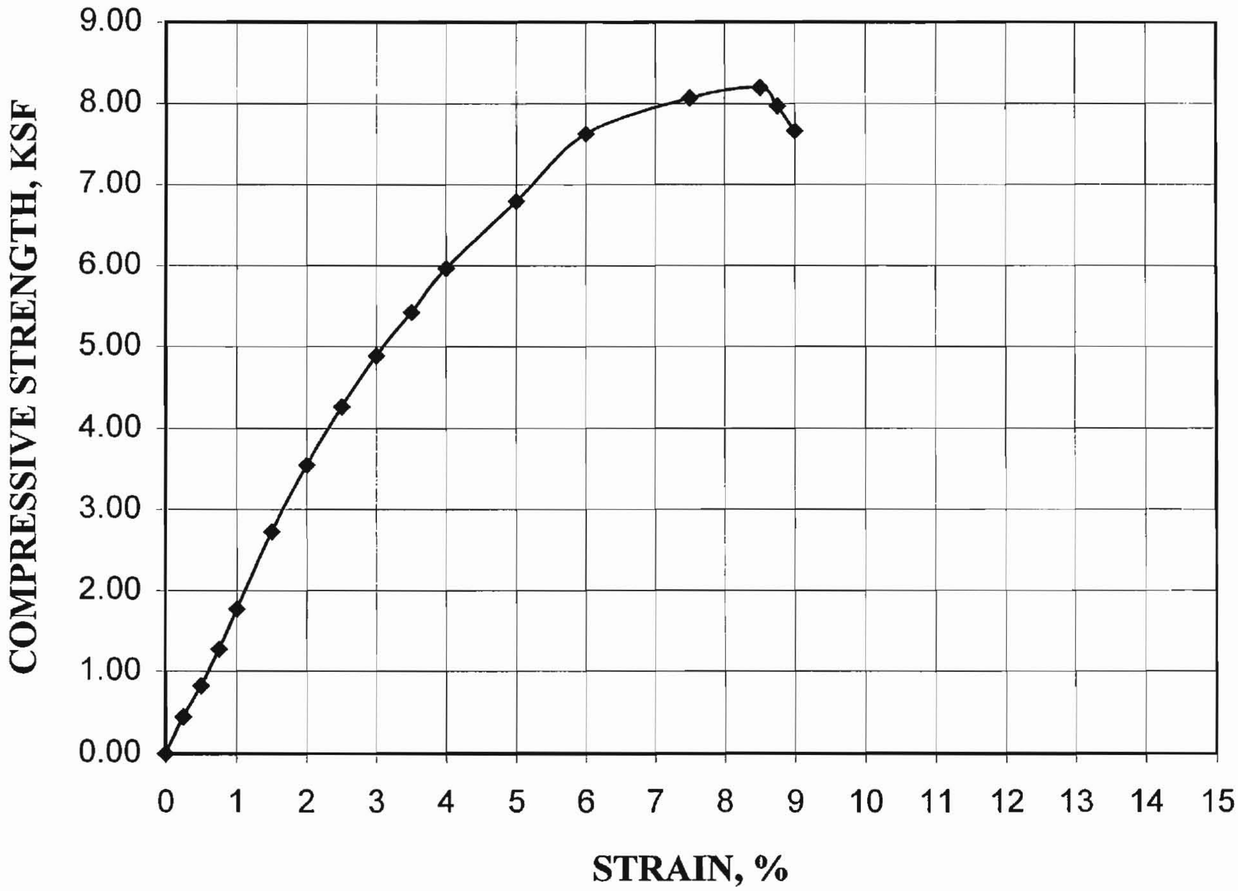
Sample I. D. B16-10-1

Sample Data

Sample Description: Brown clayey sand
Maximum Strength: 5.9 ksf
Moisture Content: 16.5 %
Density: 108.7 pcf

Kleinfelder, Inc.		EAST ALTAMONT ENERGY CENTER	PLATE C-14
Drafted By:EAC	File No.:20-4561-01		

UNCONFINED COMPRESSIVE STRENGTH



Sample I. D. B17-3-1

Sample Data

Sample Description: Brown silty clay w/ fine sand

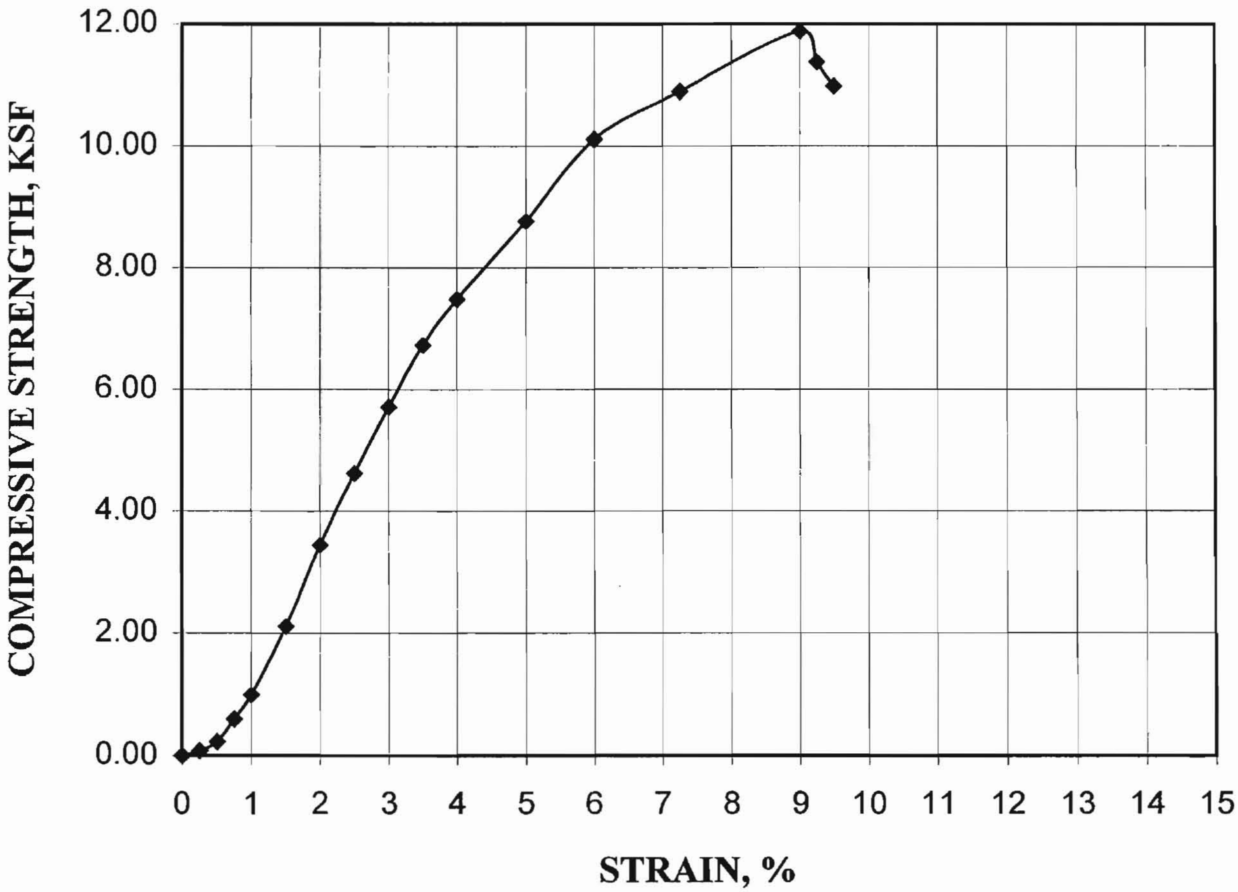
Maximum Strength: 8.2 ksf

Moisture Content: 16.4 %

Density: 104.4 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-15
Drafted By:EAC	File No.:20-4561-01	

UNCONFINED COMPRESSIVE STRENGTH



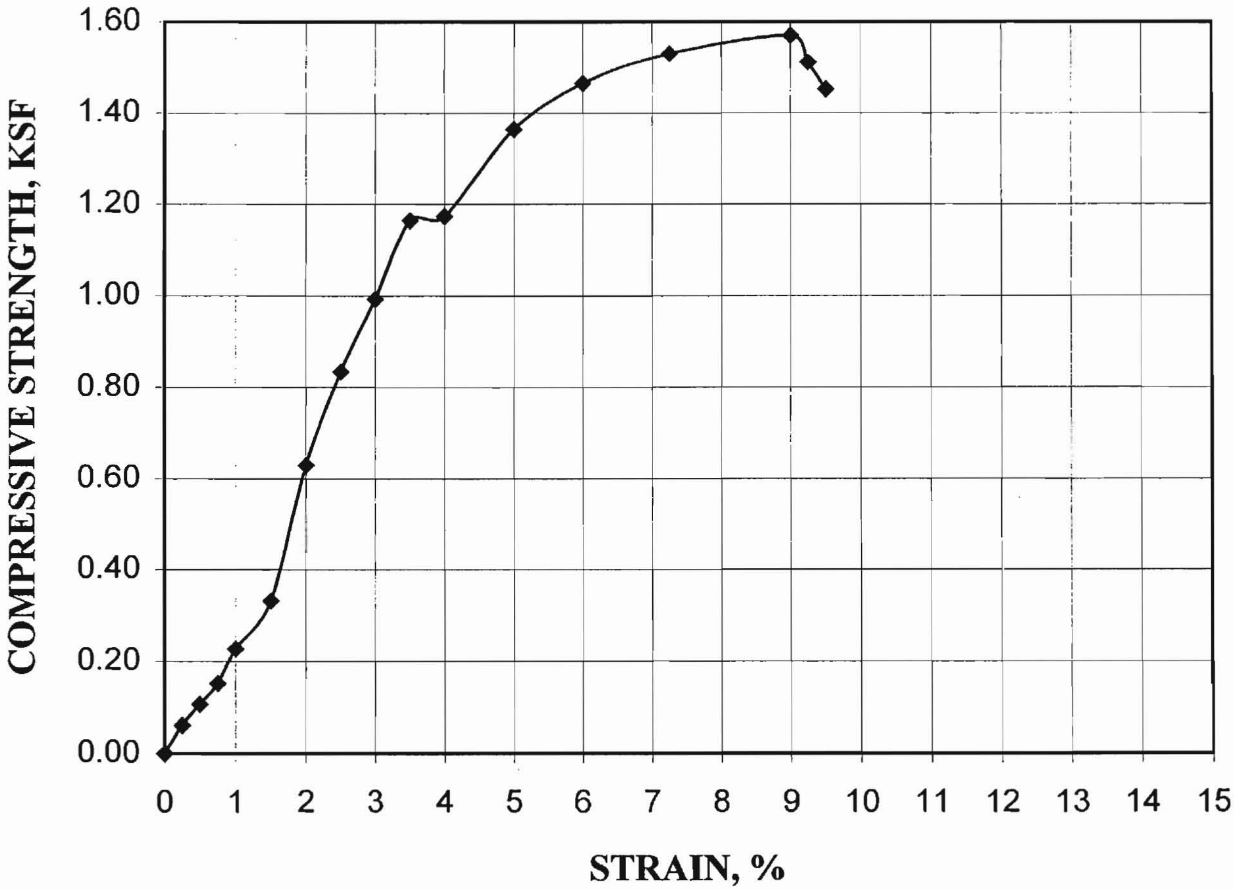
Sample I. D. B21-5-1

Sample Data

Sample Description: Brown silty clay w/ sand
Maximum Strength: 11.9 ksf
Moisture Content: 16.7 %
Density: 109.1 pcf

Kleinfelder, Inc.		EAST ALTAMONT ENERGY CENTER	PLATE C-16
Drafted By:EAC	File No.:20-4561-01		

UNCONFINED COMPRESSIVE STRENGTH



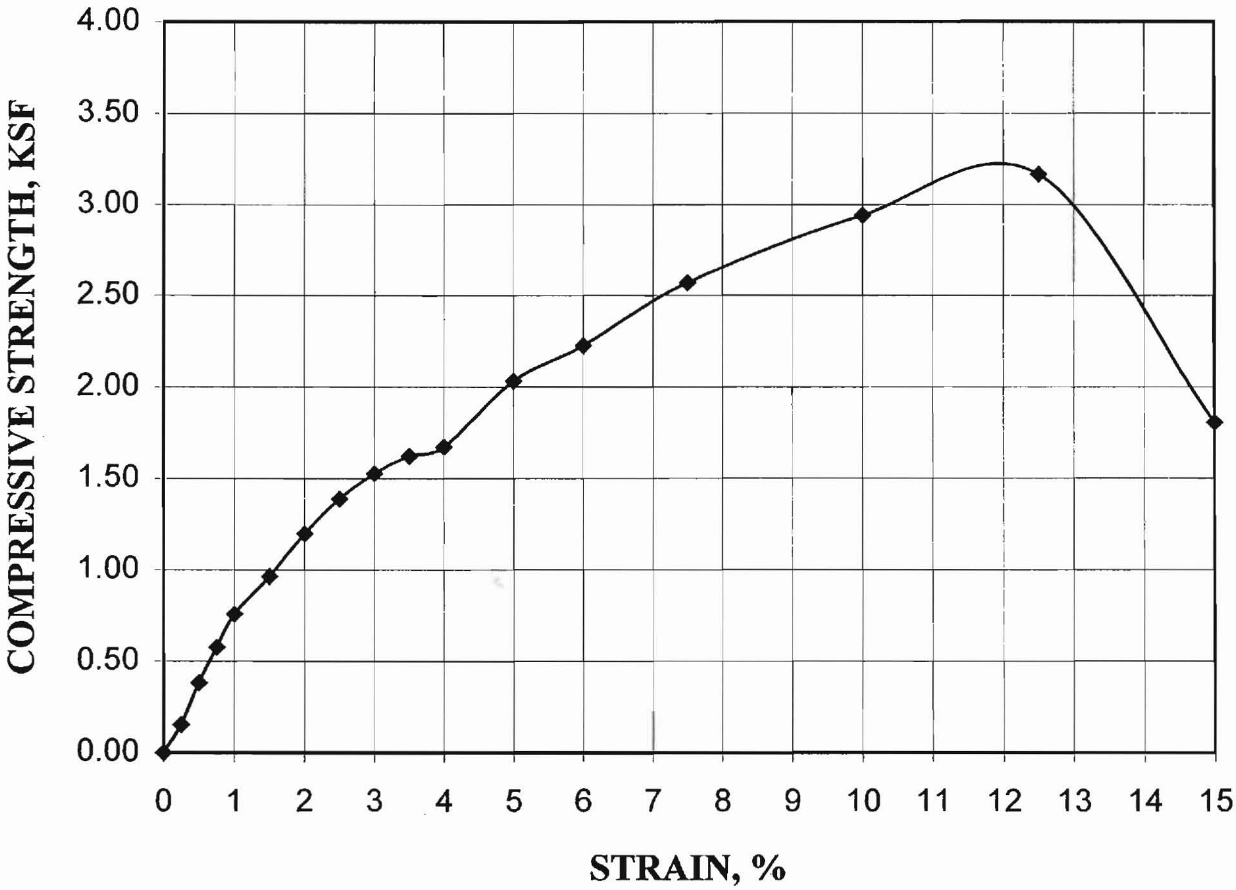
Sample I. D. B23-7-1

Sample Data

Sample Description: Brown silty clay
Maximum Strength: 1.6 ksf
Moisture Content: 15.9 %
Density: 110.9 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-17
Drafted By:EAC	File No.:20-4561-01	

UNCONFINED COMPRESSIVE STRENGTH



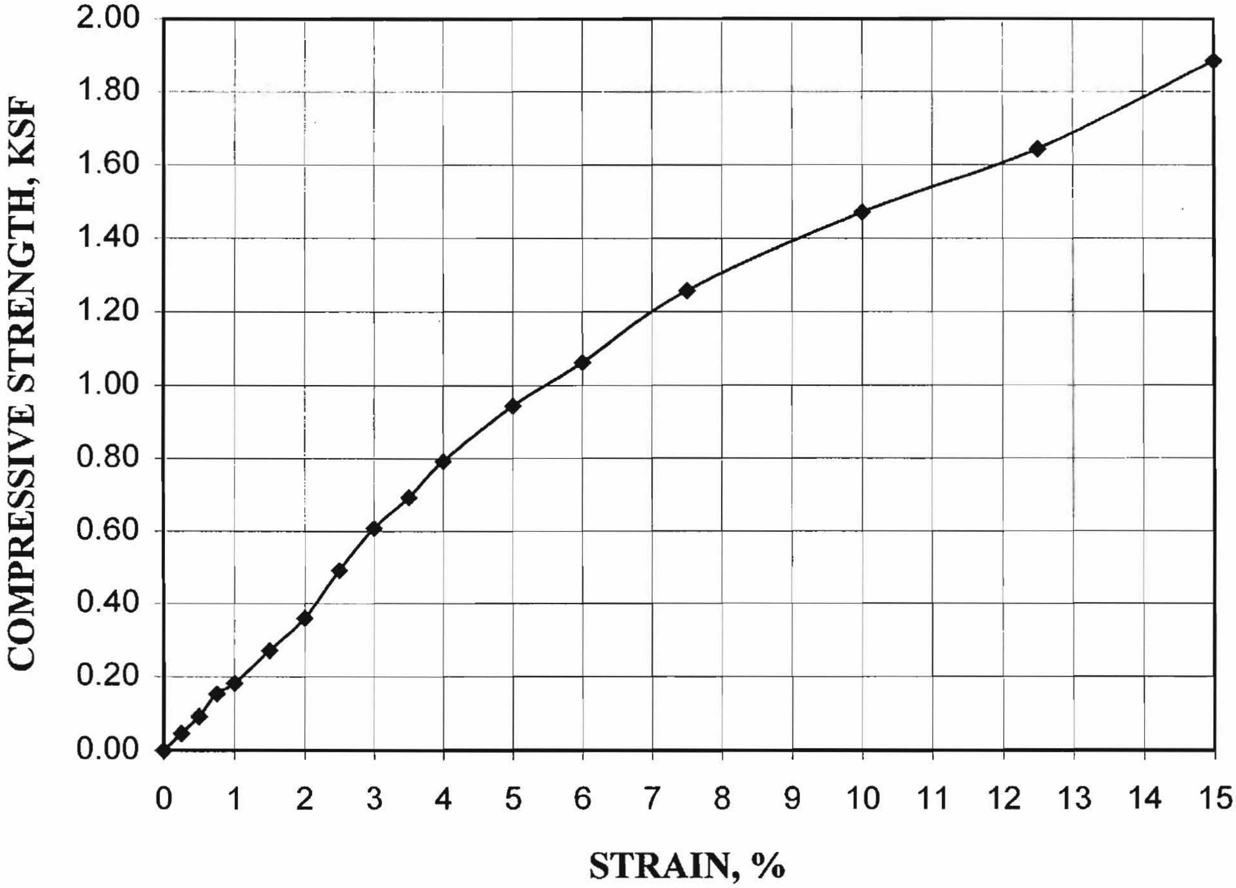
Sample I. D. TP1-2, TP2-2

Sample Data

Sample Description:	Dark Brown silty clay
Maximum Strength:	3.2 ksf
Moisture Content:	19.3 %
Density:	102.7 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-18
Drafted By:EAC / File No.:20-4561-01.G01		

UNCONFINED COMPRESSIVE STRENGTH



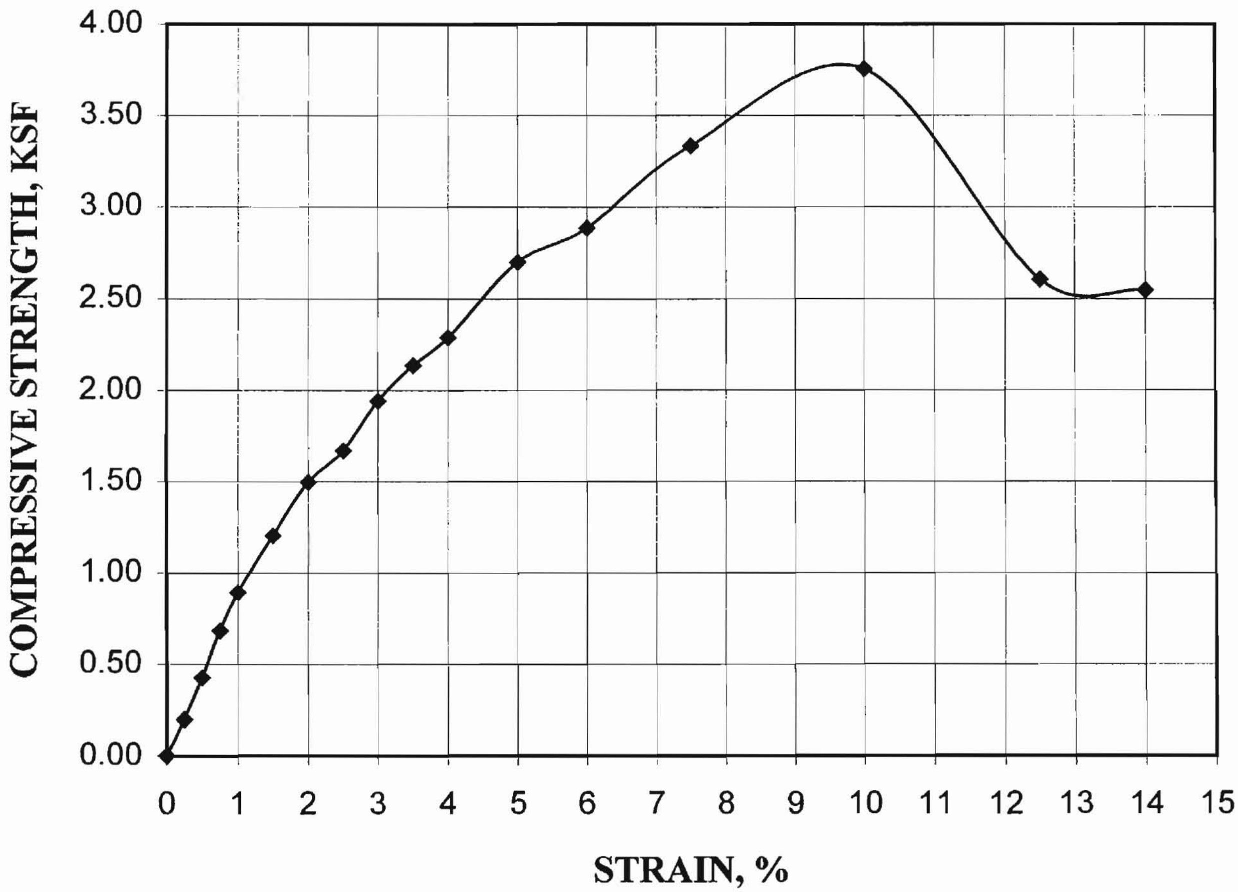
Sample I. D. TP5-4, TP2-3

Sample Data

Sample Description: Brown sitly clay w/ sand
Maximum Strength: 1.9 ksf
Moisture Content: 20.2 %
Density: 102.5 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-19
Drafted By:EAC / File No.:20-4561-01.G01		

UNCONFINED COMPRESSIVE STRENGTH

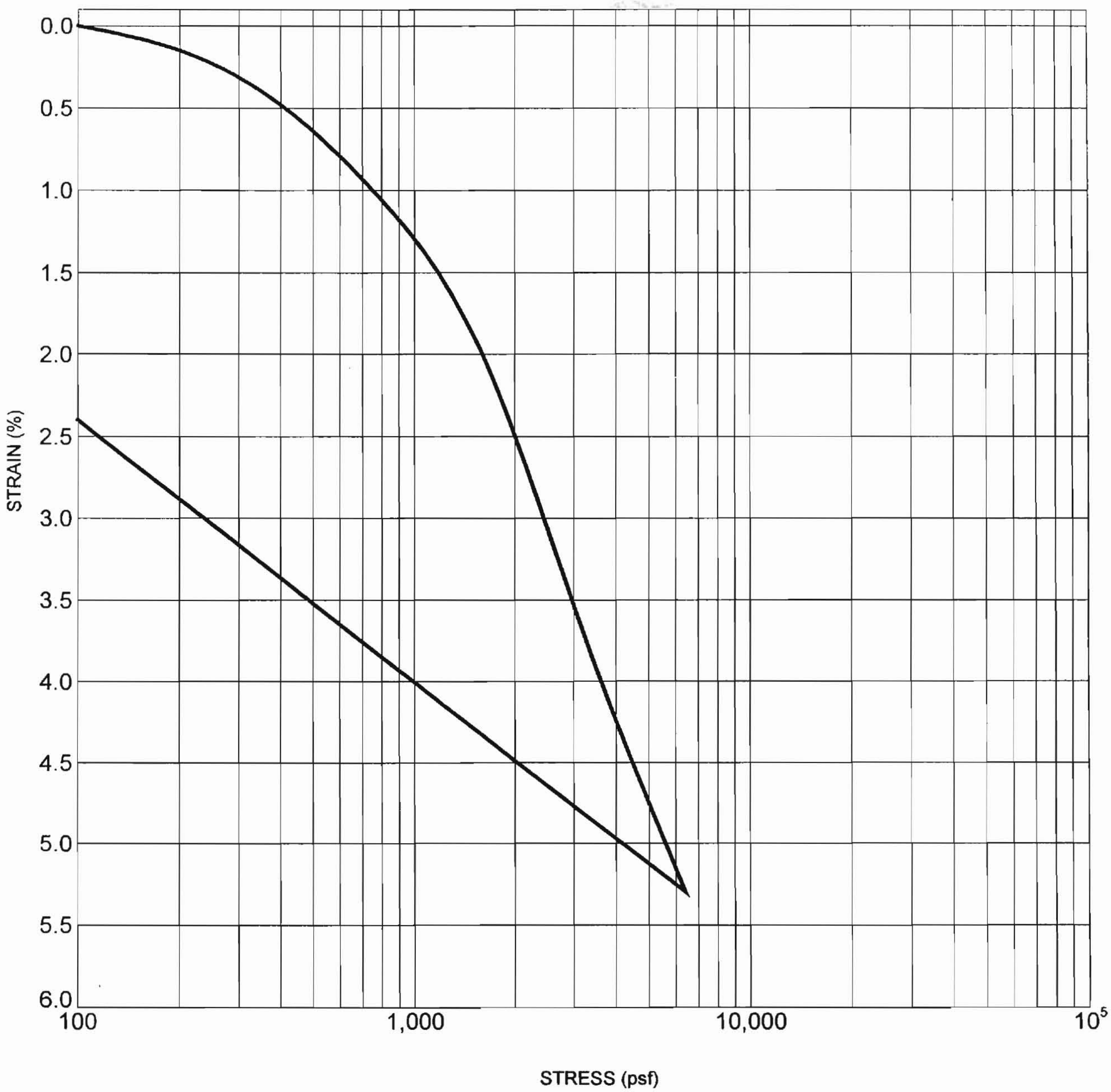


Sample I. D. TP9-3, TP 1-3.5

Sample Data

Sample Description: Brown silty clay w/ sand
Maximum Strength: 3.8 ksf
Moisture Content: 17.4 %
Density: 107.1 pcf

Kleinfelder, Inc.	EAST ALTAMONT ENERGY CENTER	PLATE C-20
Drafted By:EAC / File No.:20-4561-01.G01		



BORING: B- 5

At a depth of approximately 3.0 feet

Test Results: SATURATED

	Before	*After*
Wet Unit Weight (pcf) =	131.2	141.9
Moisture Content (%) =	16.1	17.7
Dry Unit Weight (pcf) =	113.0	120.6

KA_CONSOL_STRAIN 2011G045.GPJ 8/29/01

KLEINFELDER

Drafted By: G. Gomez
Date: 08/29/2001

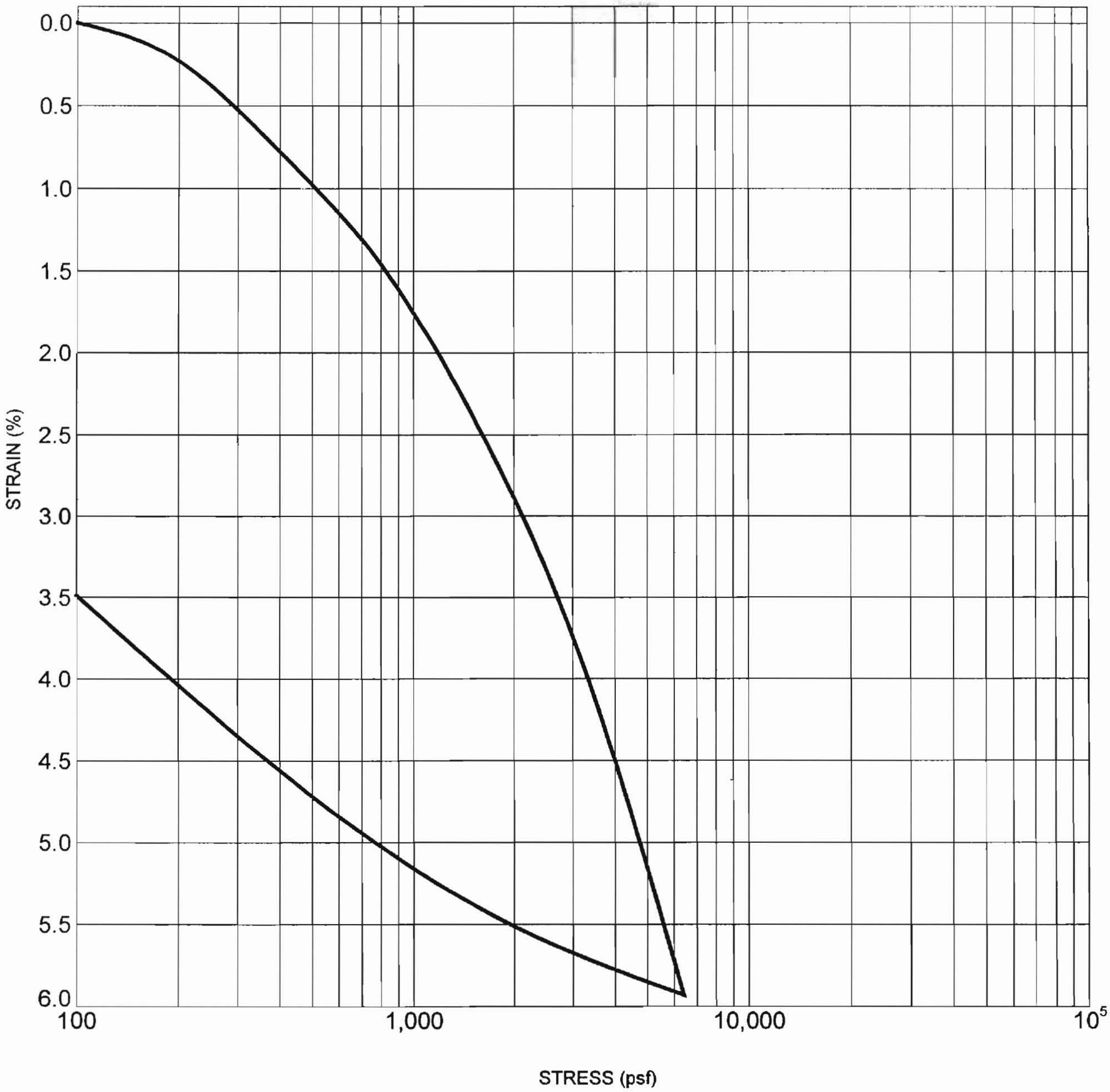
Project No.: 20-4561-01
File Number: 2011G045

CONSOLIDATION TEST

EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE

C-21



			Before	After
BORING: B- 6		Wet Unit Weight (pcf) =	128.5	136.9
At a depth of approximately 20.0 feet		Moisture Content (%) =	16.8	17.1
Test Results: SATURATED		Dry Unit Weight (pcf) =	110.0	118.7

KLEINFELDER

Drafted By: G. Gomez
Date: 08/29/2001

Project No.: 20-4561-01
File Number: 2011G045

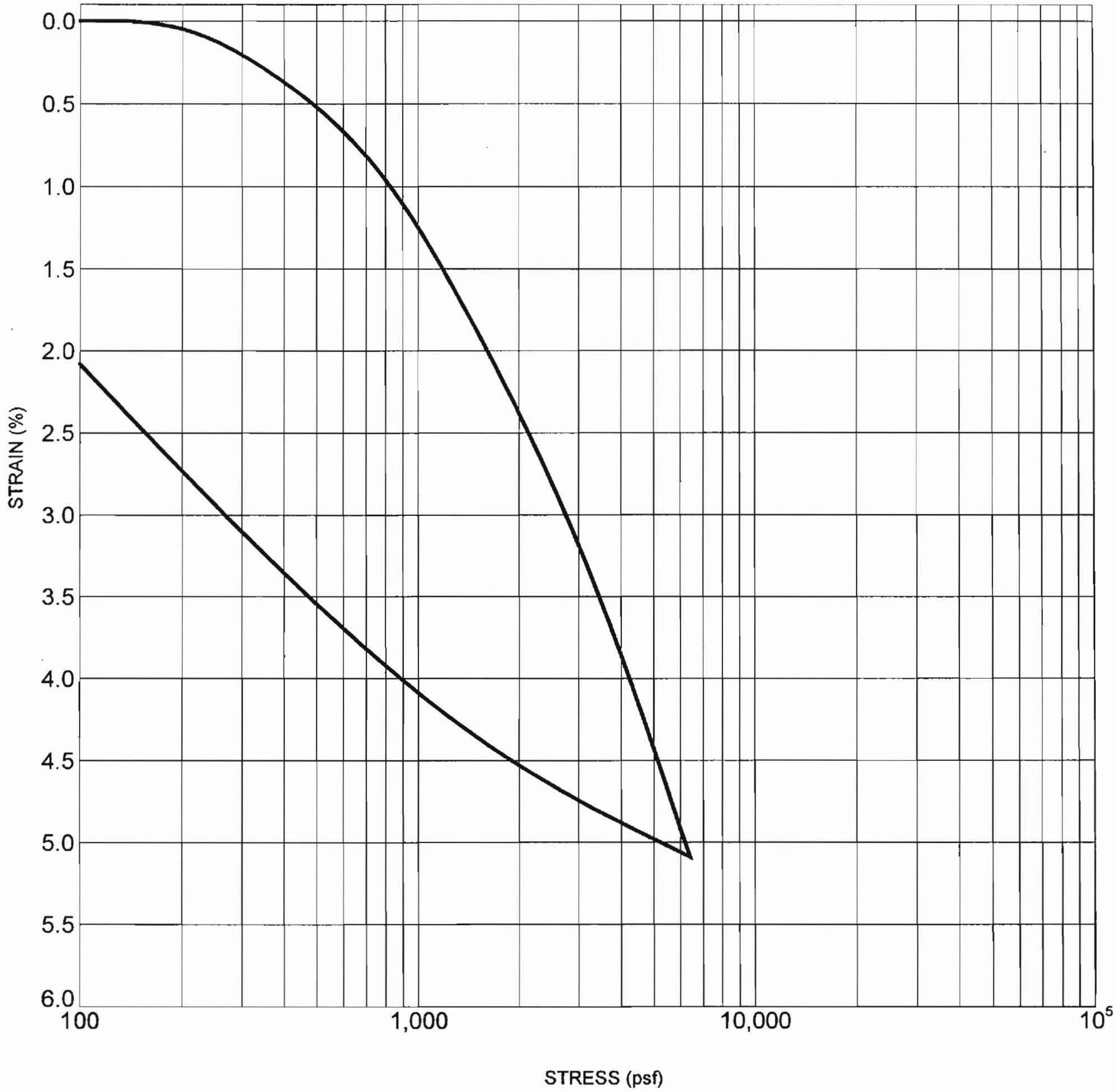
CONSOLIDATION TEST

EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE

C-23

KA_CONSOL_STRAIN 2011G045.GPJ 8/29/01



BORING: B-10

At a depth of approximately 5.0 feet

Test Results: SATURATED

	Before	*After*
Wet Unit Weight (pcf) =	132.6	139.8
Moisture Content (%) =	18.3	18.4
Dry Unit Weight (pcf) =	112.1	118.1

KLEINFELDER

CONSOLIDATION TEST

EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

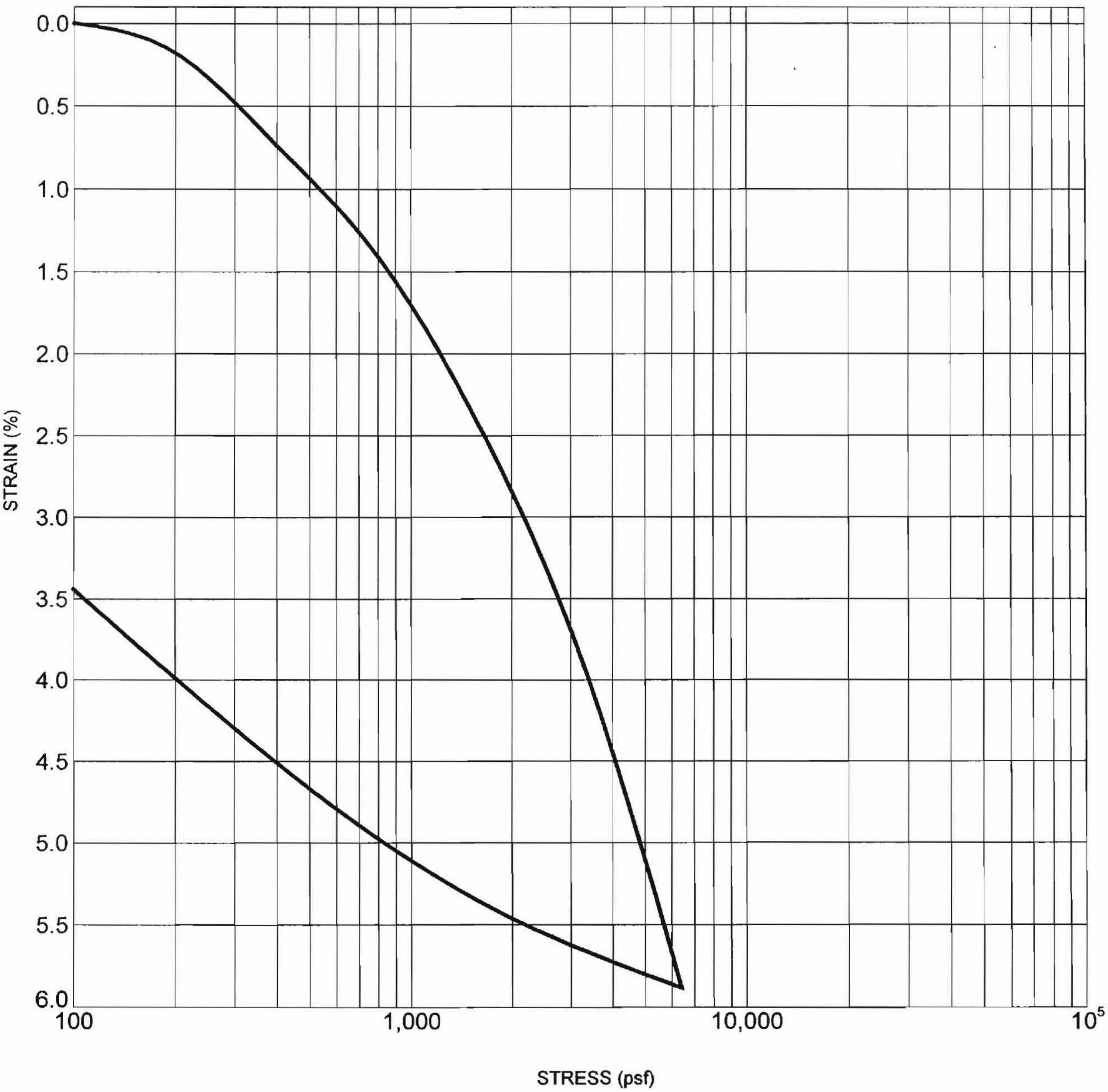
PLATE

C-24

Drafted By: G. Gomez | Project No.: 20-4561-01

Date: 08/29/2001 | File Number: 2011G045

KA_CONSOL_STRAIN 2011G045.GPJ 8/29/01



		Before	After
BORING: B-12	Wet Unit Weight (pcf) =	127.2	136.9
At a depth of approximately 20.0 feet	Moisture Content (%) =	16.8	17.1
Test Results: SATURATED	Dry Unit Weight (pcf) =	108.9	116.9

KA_CONSOL_STRAIN 2011G045.GPJ 8/29/01

KLEINFELDER

CONSOLIDATION TEST

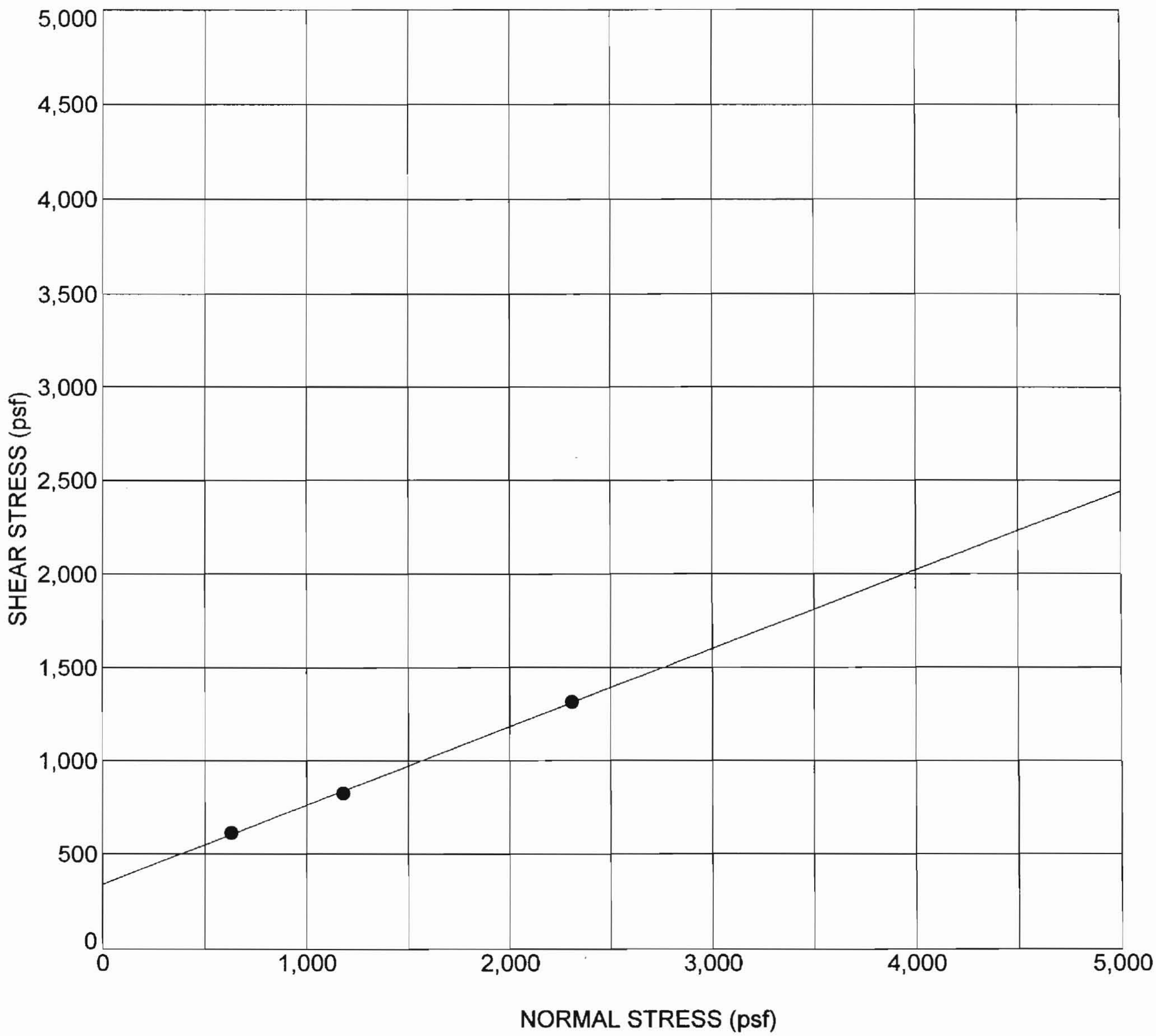
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE

C-25

Drafted By: G. Gomez
Date: 08/29/2001

Project No.: 20-4561-01
File Number: 2011G045



SOURCE: B-12
DEPTH: 10 ft
SOIL DESCRIPTION:

FRICTION ANGLE = 23 deg
COHESION = 340 psf

FINAL DRY DENSITY (pcf)	113.7	113.7	113.7
INITIAL WATER CONTENT (%)			
FINAL WATER CONTENT (%)	15.5	15.5	15.5
NORMAL STRESS (psf)	629.7	1180.8	2308.6
MAXIMUM SHEAR (psf)	613.4	823.6	1314.3

KLEINFELDER

DIRECT SHEAR TEST

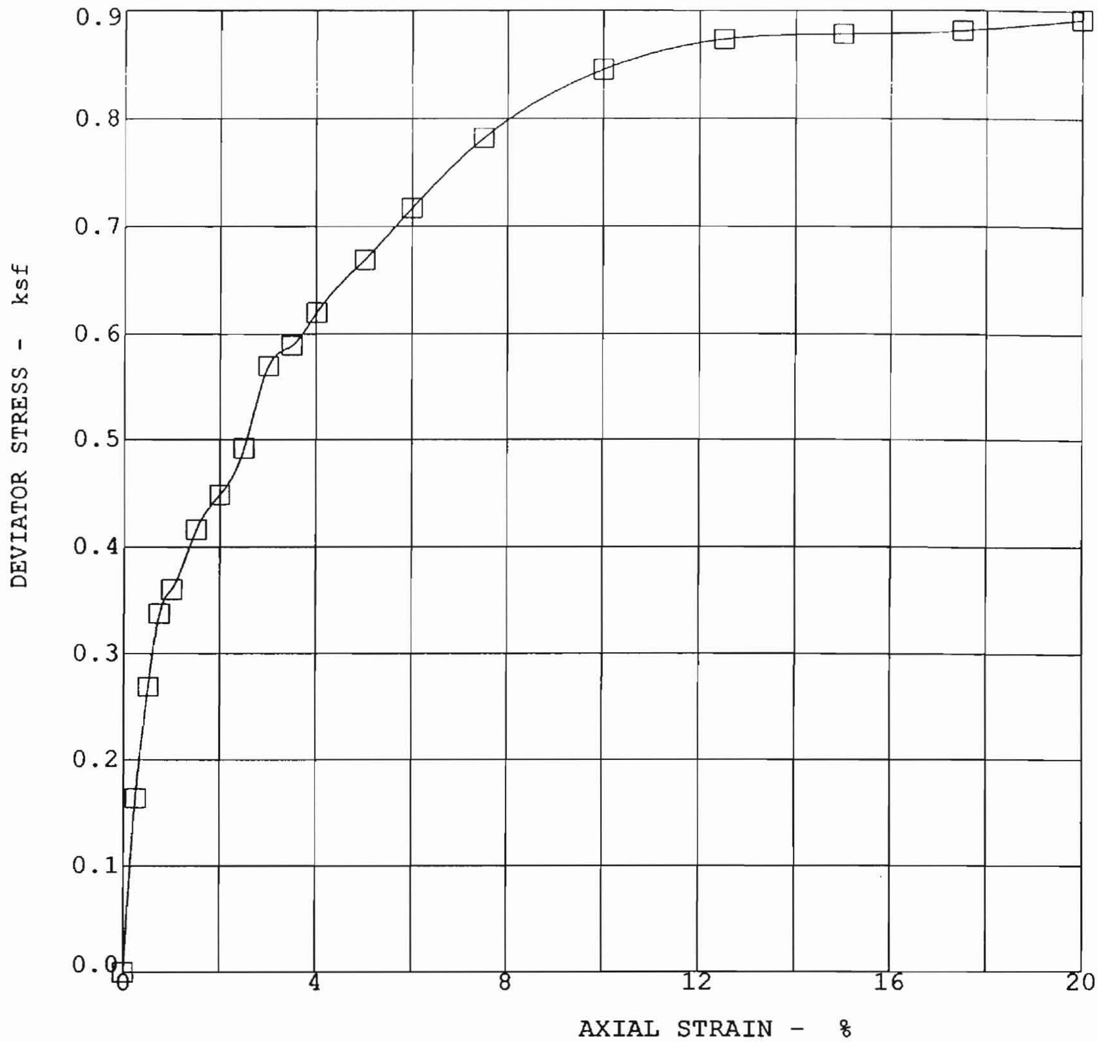
EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE

C-26

Drafted By: G. Gomez
Date: 08/28/2001

Project No.: 20-4561-01
File Number: 2011G045



BORING NO.	**B-1**	**DRY DENSITY - pcf**	**106**
DEPTH - ft	**20**	**WATER CONTENT - %**	**24**
SOIL DESCRIPTION	**Yellow-Brown Clay**		
SIGMA 3 - ksf	**1.8**		

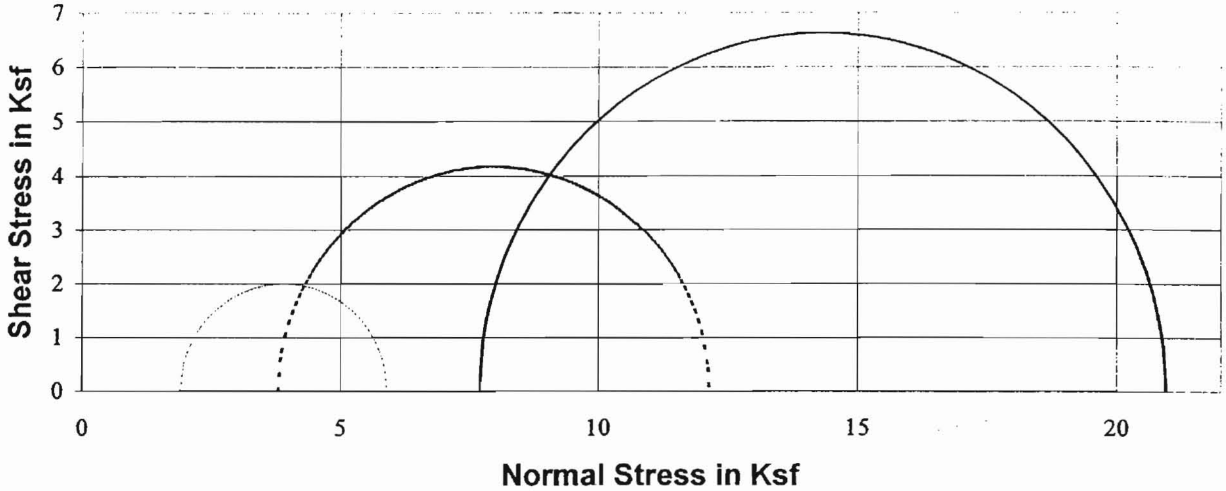
MAX. DEVIATOR STRESS= 0.89 ksf at 20.0 % STRAIN

L:\2001\01PROJ\20456101\20456101.GPJ

KLEINFELDER	**East Altamont Energy Center**	*PLATE*
PROJECT NO. **20-4561-01/G01**	**UU TRIAXIAL TEST/UNSATURATED**	C-27

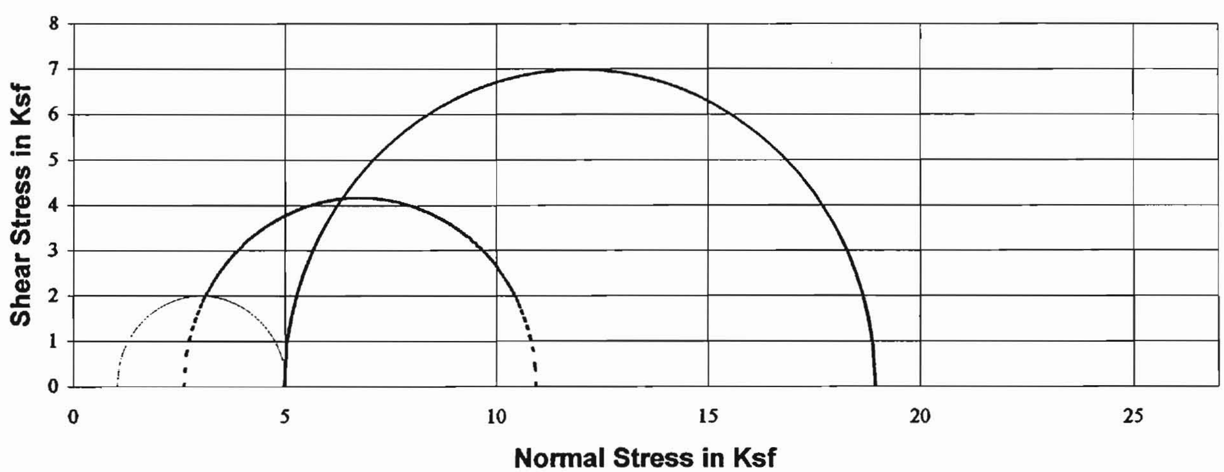
06/11/2001 10:59:57 AI

TOTAL STRESS MOHR CIRCLE



Boring: B-1 @ 15'

EFFECTIVE STRESS MOHR CIRCLE



Boring: B-1 @ 15'

KLEINFELDER	East Altamont Energy Center	*Plate*
Project No.. 20-4561-01/G01	**MOHR CIRCLES**	C-28

SUMMARY OF RESULTS OF MULTI-STAGED CONSOLIDATED - UNDRAINED COMPRESSION TEST

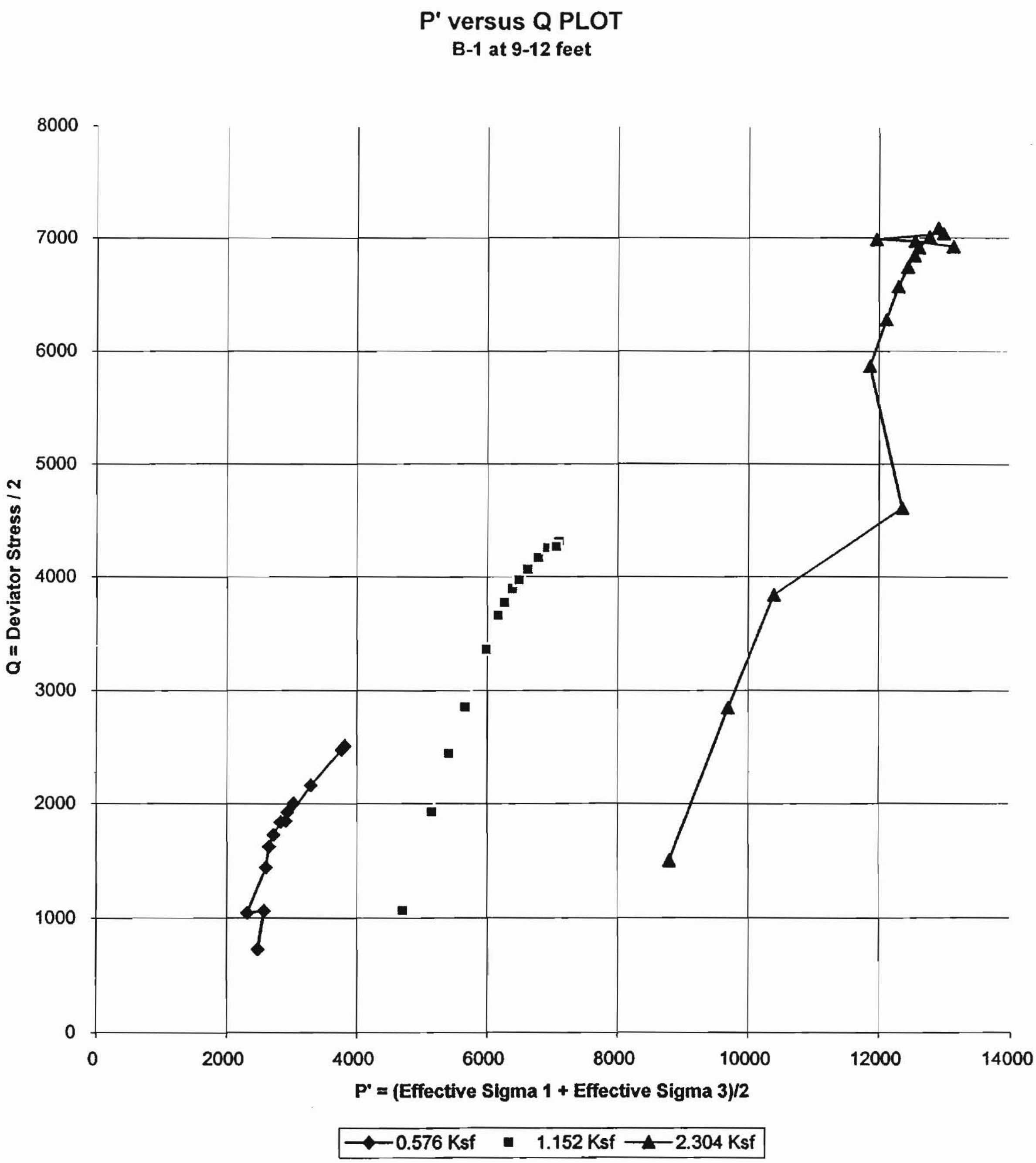
	Samples #1	#2	#3
BEFORE TEST			
PHYSICAL CONDITIONS			
Diameter (inches)	1.91	2.03	2.16
Height (inches)	4.87	4.55	4.25
Water Content (%)	14.4		
Dry Density (pcf)	117.9		
Confining Pressure (ksf)	1.90	3.80	7.70
Back Pressure (ksf)	5.76		
AFTER TEST			
PHYSICAL CONDITIONS			
Water Content (%)	16.0		
AT FAILURE			
PHYSICAL CONDITIONS			
Total Major Principal Stress (ksf)	5.901	12.141	20.946
Total Minor Principal Stress (ksf)	1.900	3.800	7.700
Pore Pressure (ksf)	0.881	1.194	1.997
Effective Major Principal Stress (ksf)	5.020	10.947	18.949
Effective Minor Principal Stress (ksf)	1.019	2.606	4.978
Axial Strain at Failure (%)	3.50	5.08	10.00
Time to Failure (minutes)	238	356	478

SAMPLE

Sample Source: Boring: B-1 Depth: 15

Classification: Yellow-Brown Sandy Clay

KLEINFELDER	East Altamont Energy Center	Plate
Project No.: 20-4561-01/G01	**TRIAXIAL SUMMARY**	C-28



KLEINFELDER	East Altamont Energy Center	Plate
Project No.. 20-4561-01/G01	**PQ CHART**	C-28

Triax B1@15

Sequoia Analytical

819 Striker Avenue, Suite 8
Sacramento, CA 95834
(916) 921-9600
FAX (916) 921-0100
www.sequoialabs.com

Kleinfelder - Stockton 2825 East Myrtle Street Stockton CA, 95205	Project: E. Altamont Project Number: 20-4561-01.G01 Project Manager: Emmy Allen-Crossman	**Reported:** 07/05/01 17:21

Anions by EPA Method 300.0
Sequoia Analytical - Sacramento

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
21668 (S106319-01) Soil Sampled: 06/01/01 00:00 Received: 06/20/01 08:45									
Chloride	**160**	20	mg/kg	10	1070012	06/29/01	06/29/01	EPA 300.0	
Sulfate as SO4	**110**	20	"	"	"	"	"	"	

Sequoia Analytical

819 Striker Avenue, Suite 8
Sacramento, CA 95834
(916) 921-9600
FAX (916) 921-0100
www.sequoialabs.com

Kleinfelder - Stockton	Project:	East Alt. Engergy Cnt.	
2825 East Myrtle Street	Project Number:	20-4561-01.G01	**Reported:**
Stockton CA, 95205	Project Manager:	Emmy Allen-Crossman	07/05/01 17:19

Anions by EPA Method 300.0

Sequoia Analytical - Sacramento

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
26175 (S106317-01) Soil Sampled: 05/29/01 00:00 Received: 06/20/01 08:45									
Chloride	**110**	20	mg/kg	10	1070012	06/29/01	06/29/01	EPA 300.0	A-01
Sulfate as SO4	**100**	20	"	"	"	"	"	"	A-01

KLEINFELDER

DOCKET # 010744

File No: 204561-01.G01 Project: East Altamont Energy Center

Subject: METHOD FOR ESTIMATING THE TIME TO CORROSION OF REINFORCED CONCRETE SUBSTRUCTURES

Borings B-8, 9, 10 @ 1'

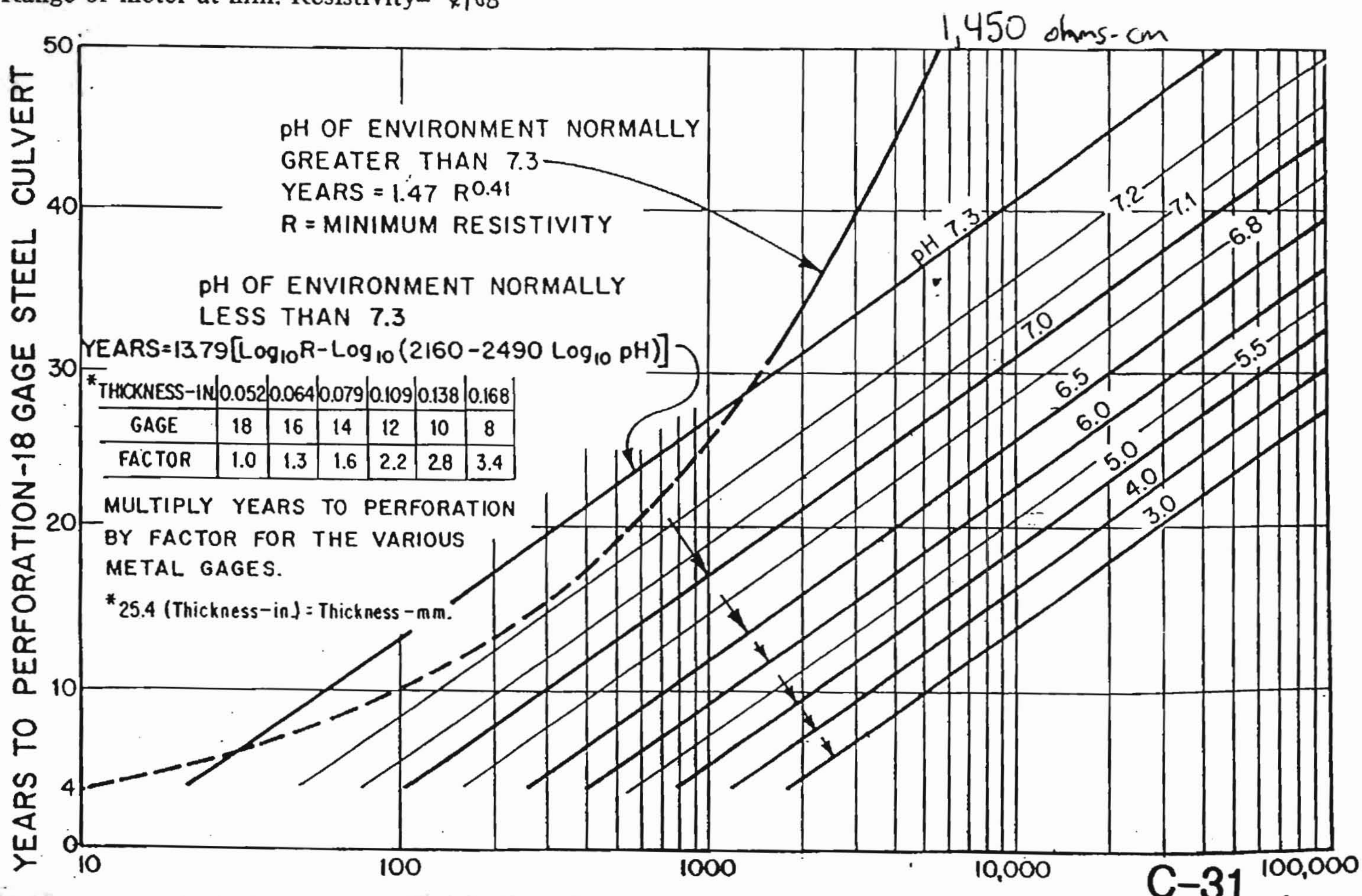
By: K.M. Date: 6/14/01

Reviewed By: EAC Date:

	H_2O Kohms	H_2O ph	Specimen Kohms Hi	Specimen Kohms Low	Specimen ph	H_2O ML.	OHM/Factor
1					7.7		100
2							
3							
4							
5							
6							
7							
8							
9							
10							

Average Min. Resistivity ohms= 220
Factor = ~~7.02 cm~~ 6.59 cm
ph at min. Resistivity= 7.7
Range of meter at min. Resistivity= x100

Results in years ______



KLEINFELDER

DOCKET # ______

File No: 20-4561-01.G01 Project: East Altamont Energy Center

Subject: METHOD FOR ESTIMATING THE TIME TO CORROSION OF REINFORCED CONCRETE SUBSTRUCTURES

Borings B-13, B-15, B-20 @ 1'

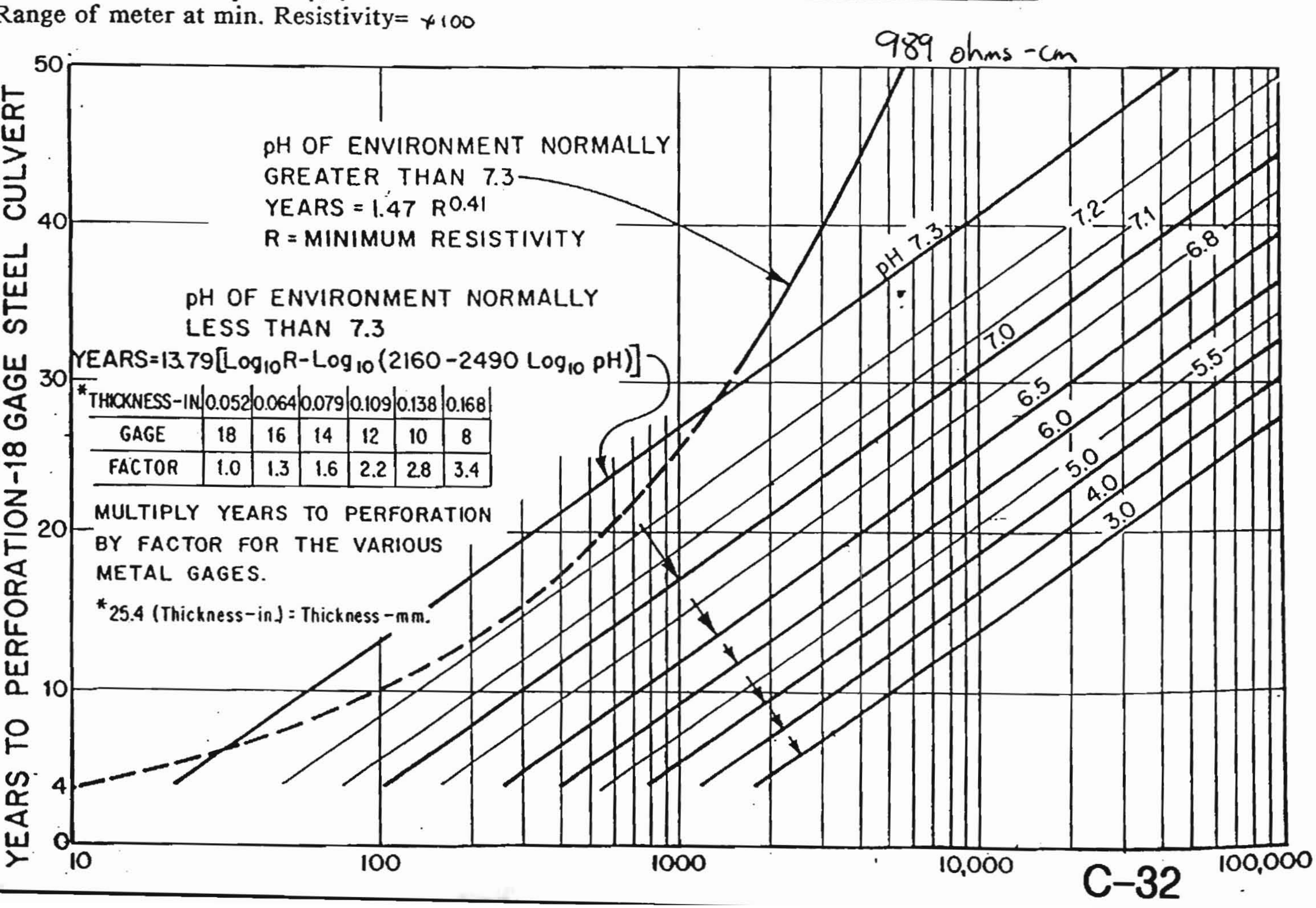
By: K.M. Date: 6-15-01

Reviewed By: EAC Date: ______

	H_2O Kohms	H_2O ph	Specimen Kohms Hi	Specimen Kohms Low	Specimen ph	H_2O ML	OHM/Factor
1					7.9		100
2							
3							
4							
5							
6							
7							
8							
9							
10							

Average Min. Resistivity ohms= 150
Factor = 6.59 cm
ph at min. Resistivity= 7.9
Range of meter at min. Resistivity= x100

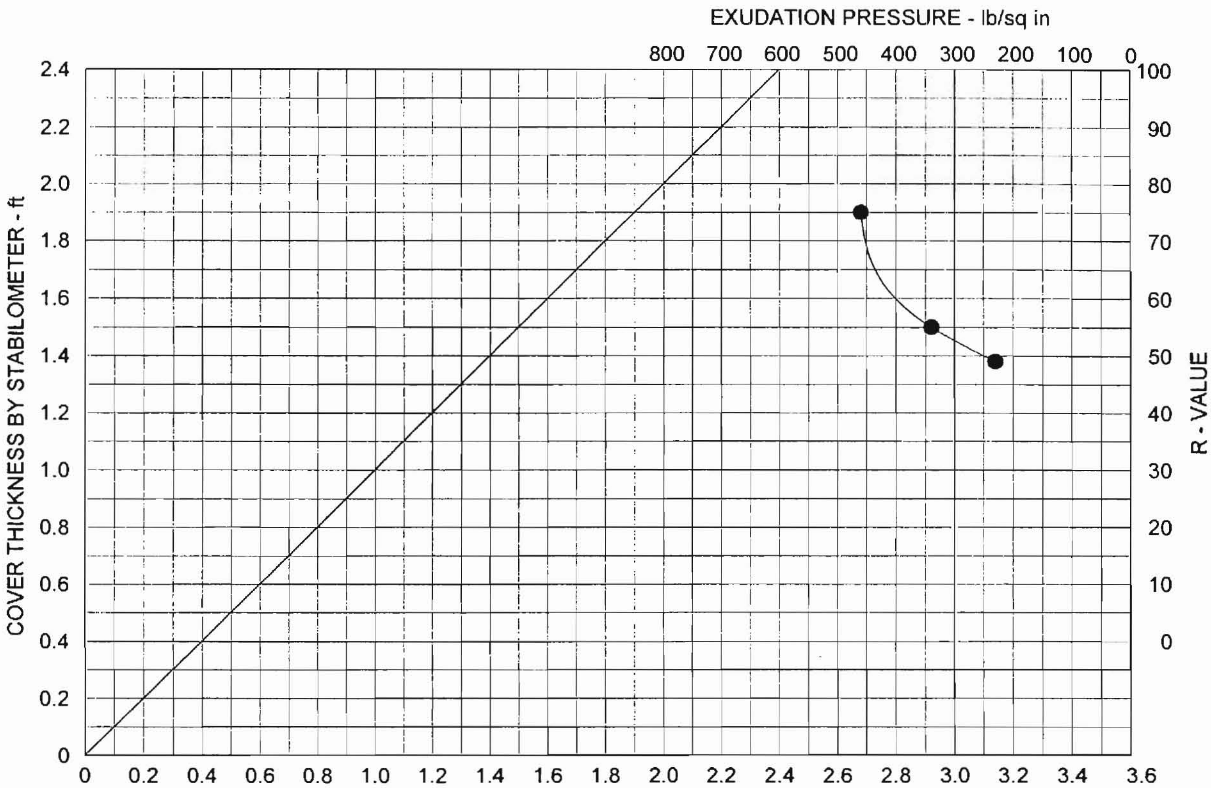
Results in years ______



SAMPLE LOCATION: RV-1

SAMPLE DESCRIPTION: 4% LIME TREATED BROWN SANDY SILT

DATE SAMPLED: 05/16/2001



SPECIMEN	A	B	C
EXUDATION PRESSURE, lb/sq in	460	340	230
EXPANSION PRESSURE, lb/sq ft	0	0	0
RESISTANCE VALUE, R	75	55	49
MOISTURE AT TEST, %	23.2	24.1	25.4
DRY DENSITY AT TEST, lb/cu ft	104.6	99.0	97.8
R-VALUE AT 300 lb/sq in EXUDATION PRESSURE	**52**		
R-VALUE BY EXPANSION PRESSURE (TI=N/A)	N/A		

KA_R_VALUE 2011G045.GPJ 8/28/01

KLEINFELDER

Drafted By: G. Gomez
Date: 08/28/2001

Project No.: 20-4561-01
File Number: 2011G045

RESISTANCE VALUE

EAST ALTAMONT ENERGY CENTER
ALAMEDA COUNTY, CALIFORNIA

PLATE

C-33

Lab No: 10763

UNCONFINED COMPRESSIVE STRENGTH

CTM 373

Project Number: 20-4561-01
Project Name: EAST ALTAMONT ENERGY CENTER

Point	1	2	3	Average
Moisture at Compaction, %	18.2	18.2	18.2	
Sample Height, in	3.7	3.84	3.65	
Wet Weight, g	1552.8	1590.8	1553.1	
Dry Density	107.5	106.2	109.0	
Max Load	2340	2640	2450	
Compressive Strength, psi	186	210	195	197

Date In 6/13/01
Date Out **6/20/01**

Moisture Content

Wet Weight	1918.4
Dry Weight	1622.4
Moisture Content, %	18.2

Description BROWN SILTY CLAY TREATED WITH 4% LIME

PLATE

C-34