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April 24, 2009

VIA HAND DELIVERY &
ELECTRONIC TRANSMISSION

Mr. Mike Monasmith, Siting Project Manager
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814

Re: Carlsbad Energy Center Project (07-AFC-6)
Supplemental Fire Risk Assessment

Dear Mr. Monasmith:

On behalf of Applicant Carlsbad Energy Center LLC ("Applicant"), pursuant to the request of Dr. Alvin Greenberg, CEC staff, please find enclosed for docketing Applicant's Supplemental Fire Risk Assessment dated April 23, 2009.

Respectfully submitted,

Melissa A. Foster
MAF:jmw
Enclosure

cc: See Attached Proof of Service

CARLSBAD ENERGY CENTER PROJECT

Carlsbad Energy Center LLC

SUPPLEMENTAL FIRE RISK ASSESSMENT

APRIL 23, 2009

PREPARED BY:
CH2M HILL AND SHAW STONE AND WEBSTER

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SECTION 1

Executive Summary

Carlsbad Energy Center LLC (Applicant) submits this Supplemental Fire Risk Assessment in response to the California Energy Commission (CEC) Staff's request and City of Carlsbad (City) and Carlsbad Fire Department (CFD) comments. This assessment evaluates the potential incremental risk to the public from the construction and operation of the Carlsbad Energy Center Project (CECP), including potential risks from a major emergency event such as a regional-wide seismic event that could affect the ability of the CFD to respond in a timely manner. This Supplemental Fire Risk Assessment is a follow-up to the CECP Fire Risk and Emergency Response Assessment Report, dated November 7, 2008 (NRG, 2008) previously docketed with the CEC, and the CECP Fire Code Compliance transmittal to the City and CFD dated March 13, 2009, a copy of which was also docketed with the CEC. (NRG, 2009).

Through this risk analysis, it has been determined that the principal concern for potential off-site risks from CECP arises from the potential failure of CECP's 1,100 foot-long natural gas pipeline that will connect to an existing San Diego Gas & Electric (SDG&E) 20-inch natural gas pipeline. CECP's natural gas pipeline will be located at least 1,300 feet from any existing building. As compared to the existing 20-inch SDG&E natural gas pipeline and the miles of other natural gas distribution pipelines throughout the City, the risk from the CECP natural gas pipeline is much less than 1 percent of the cumulative risk from the other natural gas pipelines within the City. This analysis also considers the risk of a leak or rupture of the CECP natural gas pipeline as a result of a major seismic event, and determines on a quantitative basis that the worse case scenario of a rupture in the CECP natural gas pipeline has an annual probability of occurrence of approximately 5 in 10 million (or approximately 0.5 in one million).

In addition, this assessment includes information related to CEC staff's discussion as to how to prevent a truck or other vehicle from leaving the Interstate 5 (I-5) right-of-way in the event of an accident and entering the CECP site. Caltrans has specific, detailed design standards and specifications that dictate the type of barrier systems that are in place along I-5 in the vicinity of the CECP site, and those standards will dictate the barrier systems that will protect the CECP site, or any other facility for that matter, as part of any eventual improvements to I-5 in the proximity of the CECP site.

This Supplemental Fire Risk Assessment is organized as follows:

- Background
- Overview of CECP project site, project design and safety features
- Overview of City's programs for fire protection and emergency response planning

- CECP risk evaluation and analysis
  - Evaluation of on-site fire risk
  - Evaluation of on-site hazardous materials
  - Qualitative and quantitative evaluation of risk of natural gas line failure
  - Evaluation of barrier system along I-5
- Summary and Conclusions

SECTION 2

Background

Carlsbad Energy Center LLC submitted the CECP Application for Certification (AFC) on September 14, 2007 (07-AFC-6). On July 25, 2008, the Applicant submitted the Project Enhancements and Refinements (PEAR) document to the CEC; the document detailed such enhancements as the ocean water purification system – an alternative to City-supplied reclaim water which has not been made available – and interconnect to the proposed 230-kV switchyard to be permitted and constructed by SDG&E. The CECP project description, including the site layout and preliminary design details which address Fire Protection and Worker Safety are documented in these two documents.

In May 2008, the City Fire Marshal communicated to CEC staff his concern regarding CFD's ability to respond to CECP in the event of a major regional seismic event (See Attachment A, CEC Record of Conversation [ROC] with Fire Marshal). In the ROC, the City Fire Marshal confirmed that CFD has six fire stations in Carlsbad. Normal response time to CECP from the closest fire station would be 6 minutes, and 7 to 8 minutes from the next closest fire station.

Applicant subsequently filed the CECP Fire Risk and Emergency Response Assessment Report, dated November 7, 2008 (NRG, 2008) that provided an overview of the CECP design requirements for fire protection and control systems and fire and emergency vehicle access. That document also provided an overview of the California Building Standard Code, California Fire Code, Uniform Fire Code and National Fire Protection Association Standards as it pertains to specific engineering, seismic, hazardous material storage and fire suppression requirement for industrial facilities such as natural gas-fired power plants. One of the intents of these requirements is to ensure that an emergency situation at industrial facilities does not spread to nearby areas allowing emergency response agencies to priority their response to more critical facilities. The document also detailed how risks associated with onsite storage of hazardous materials would be reduced by CECP, and the associated shutdown of Units 1 through 3 at Encina Power Station (EPS) and removal of fuel oil tanks 5 through 7.

CEC staff submitted their Preliminary Staff Assessment (PSA) for CECP in December 2008 and subsequently held the CECP PSA Workshop on January 7 and 8, 2009. The City provided written comments to Applicant's Fire Risk and Emergency Response Assessment Report in December and to the PSA in January 2009. During the PSA Workshop, CEC staff requested that the Applicant prepare a supplemental fire risk assessment to determine the potential impacts to the public from CECP in the event of a major emergency event, such as a major regional-wide seismic event, and the corresponding impacts to CFD's ability to respond to CECP in a timely manner if routes to CECP were blocked. A meeting with the City, CFD and NRG representatives was held on January 26, 2009 to further discuss the City's comments to the Fire Risk and Emergency Response Assessment Report and the CEC's PSA, as well as CFD's issues related to fire and emergency response to CECP.

Applicant has prepared this Supplemental Fire Risk Assessment and has provided supporting analysis demonstrating that CECP shall conform to all applicable fire code requirements for site access. See Attachment B for a table that provides a summary of CECP's design adherence to fire code requirements for site access. Attachment B also provides a figure showing CECP three points of Fire/Emergency Site Access. The final approved design of CECP will be compliant with applicable national, state and local fire code requirements through the collaborative process with the CEC's Chief Building Official (CBO), the City and the CFD.

This analysis supports the finding that the potential impacts to CECP and corresponding impacts to the public from a major emergency event, such as a seismic event that may result in impacts in CECP operations and/or restrict CFD's access to CECP due to damage to or blockage of City streets and roads, and to I-5 are less than significant on a project basis. Further, the analysis supports the finding that CECP will not result in an incremental increase or a cumulative impact on CFD's ability to respond in a major, regional-wide emergency.

The analysis also supports the finding that Caltrans' design standards and specifications will ensure that a barrier system will prevent trucks and other vehicles from leaving the Caltrans' right-of-way near the CECP site. These standards and specifications are robust and flexible to address site specific conditions, and will be incorporated by Caltrans as part of any eventual improvements to I-5 in the proximity of the CECP site. The Caltrans standards and specifications will meet the objectives of CEC staff to prevent a truck or other vehicle from leaving the I-5 right-of-way in the event of an accident and entering the CECP site and potentially damaging a CECP component.

SECTION 3

Project Description

This section describes the CECP including the planned equipment, site layout and its proximity to neighboring public areas and public access, and associated fire protection and safety features. CECP is a 540 MW combined-cycle generating facility using two trains with one natural-gas-fired combustion turbine (CTG) and one stem turbine per train (or unit). The CTGs will be Siemens Rapid Response SCC6-5000F Combine Cycle machines designed and equipped with state-of-the-art fire detection and fire protection systems. The fuel supply to the CECP will be provided by the SDG&E via an existing 20-inch, high pressure gas pipeline through a new connection. Approximately 1,100 feet of 18-inch natural gas pipeline will be installed on-site to connect the CECP to the existing SDG&E natural gas line; a metering station, a compressor station, and automatic shut-off valves between the SDG&E natural gas line and the CECP turbines will be included. CECP will be interconnected to the proposed ocean water purification system for needed industrial process water (in lieu of City-provided reclaimed water as documented in the AFC) and to the proposed 230kV switchyard and the existing SDG&E switchyard.

CECP will be located on the 23-acre portion of the EPS site currently occupied by three out-of-service fuel oil tanks 5, 6, and 7. The tanks will be removed prior to construction as part of the CECP license and correspondingly, three existing steam boiler units (Units 1 – 3) at EPS will be retired. EPS Units 4 and 5 will remain in operation.

3.1 Project Layout

The CECP site is located in the eastern portion of the existing EPS site, between I-5 and the North County Transit District (NCTD) rail line, at a grade of approximately 25 to 30 feet below surrounding grade within the bermed tanks basins of Tanks 5, 6 and 7. In addition, an earthen, vegetated berm located on the eastern boundary of the CECP site separates the CECP site from I-5. An earthen berm is planned west of the CECP site layout between the NCTD right-of-way the generating unit.

CECP includes three emergency access routes (see Attachment B) that will allow emergency response equipment to enter the CECP site. These access routes include:

- The existing main entrance to EPS from Carlsbad Boulevard that leads to the NCTD railroad crossing west of existing Tank 4
- An existing entrance through SDG&E's maintenance yard located on Cannon Road immediately west of the NCTD rail line crossing.
- An entrance from Cannon Road via Cannon Court (through an existing public access easement), thereby eliminating the need for emergency response equipment to cross the railroad tracks located west of I-5

Collectively, the existing vegetated earthen berm on the eastside of the CECP site along I-5, and the recessed CECP site (i.e., 25 to 30 feet) basins that are currently occupied by Tanks 5,

6, and 7, will substantially reduces the visibility of the CECP from surrounding areas. The berm and security fence and security system will restrict public access to CECP, aside from plant operations and fire/emergency services. The three controlled access points to CECP will enable access for fire protection and emergency services and equipment, as well as maintenance services to the site.

3.2 Surrounding Land Uses (North, South, East, West)

This section provides an overview of the existing land uses in the vicinity of CECP.

North: The CECP site is bounded on the north by undeveloped land and a portion of the Agua Hedionda Lagoon. The closest buildings to the north are residential units, located on the north side of the lagoon. These residential units are approximately 1,700 feet from the gas conditioning facilities which are located north of the northern CECP turbine. There are buildings located within 50 feet of the existing SDG&E natural gas pipeline, which extends northward past the CECP site in a right-of-way along the NCTD rail line.

South: The CECP site is bounded on the south by a large parcel owned by SDG&E, which contains an existing electrical switchyard and will contain a new SDG&E 230 kV switchyard. The remainder of the SDG&E parcel is vacant land. The nearest buildings in this direction are approximately 1,300 feet from the south CEPC turbine. There are buildings located within 100 feet of the existing SDG&E natural gas line, which extends southward past the CECP site in a right-of-way along the NCTD rail line.

East: The CECP site is bounded on the east by I-5, approximately 250 feet from the CECP south turbine. East of I-5, the CECP vicinity includes agricultural land, open space lands, and the Agua Hedionda Lagoon, with the nearest buildings being approximately 2,100 feet from the CECP turbines.

West: The CECP site is bounded on the west by the NCTD rail line, which is outside of the perimeter berm, and further west by the Carlsbad Boulevard, beaches and the Pacific Ocean. There are no off-site buildings west of the CECP site and the EPS. Carlsbad Boulevard is approximately 1,400 feet west of the proposed CECP natural gas pipeline interconnect with the existing 20-inch SDG&E natural gas pipeline.

3.3 Project Safety Features

CECP will comply with all applicable national, state and local LORS for fire protection, hazardous materials storage and handling procedures, and emergency response planning requirements during the decommissioning of the respective units, tanks and associated ancillary equipment and piping, and the construction and operation of the CECP. As discussed in the AFC (Section 2.0 Project Description), CECP will be constructed using the latest process and control technology systems for fire detection and protection; it will consist of wet pipe sprinkler systems, closed head (pressurized) dry pipe deluge systems, water mist local applications, and CO_2 or FM200 fire suppression agent for total flooding applications. The fire detection elements of the fire protection systems include fuel gas leak detectors, thermal rate compensated smoke detectors, and manual pull stations. These modern devices are digital which have quick response capabilities for responding to any fire

potential. Fire Alarm Control Panels (FACPs) are capable of identifying the exact location of activated detector(s), and will activate automatically following a release of extinguishing agents to put out fires and simultaneously shut down affected equipment. While the CECP fire protection systems will be state-of-art and generally improved as compared to the existing EPS systems, the existing EPS systems continue to meets applicable engineering and regulatory standards and requirements for fire protection and emergency response.

CECP buildings and structures will be designed to the California State Building Code (CBC 2007) and federal, state and local fire codes, and will be designed to withstand an earthquake (Seismic Zone 4). Structures will be designed to withstand a major (1 in 500 years) earthquake without failure (reaching yield stress). The tallest structures would be the stacks which, in the very highly unlikely event of failure, would fall within the CECP site. Therefore, structural failure would not impact the general public, I-5, or the NCTD rail line.

3.3.1 Mechanical Equipment and Systems

Combustion Turbines

The planned combustion turbines will fire only on natural gas, have lubrication oil systems, and have generators that will be air cooled. The combustion turbines and protective systems will be designed to ANSI B133.4 standards and will be mounted on a foundation designed to meet Seismic Zone 4 requirements, which will prevent significant movement of the combustion turbines during a seismic event.

In the unlikely event of a rupture of the CECP natural gas line that connects to the existing SDG&E natural gas pipeline, the rupture will be detected by one of several detection systems included in the design of CECP. These detection systems would automatically isolate and shutdown the flow of natural gas at the combustion turbine isolation valve or the master isolation valve at the CECP metering station. In addition, the SDG&E pipeline also includes systems to detect ruptures and to isolate and shutdown the gas flow to the affected segment. This combination of systems will limit any natural gas release to a short duration and will prevent the significant accumulation of natural gas at CECP.

The lubrication oil systems provide oil to the combustion turbines and contain approximately 5,600 gallons in each of the two turbines of Class III oil. The oil reservoir will be equipped with secondary containment and the oil pumps will be contained within the same enclosure. The turbine bearings will hold a small amount of oil but will not represent a major hazard. The worse case scenario would be the failure of a connection flange between the oil equipment and the combustion turbine. These systems would have the highly unlikely potential of pumping all 5,600 gallons on the ground in the event of an emergency situation. However, if this lubrication oil were to ignite and burn the entire volume of oil, the fire would not spread beyond the CECP site due to the physical confines of the site. In the event of a fire, the CECP fire suppression system would also be activated. As a result, the lubrication oil systems would not pose a hazard to the general public.

The combustion turbines would also be equipped with automatic FM200 gaseous extinguishing system and automatic dry chemical system which would be designed to extinguish a fire. Therefore, the unlikely failure of a combustion turbine or its auxiliaries would not be expected to impact the general public.

Heat Recovery Steam Generators (HRSG)

The HRSGs are steam boilers heated by the combustion gasses from the combustion turbines. Natural gas fire duct burners supplement the hot gasses from the combustion turbines when needed. The HRSGs would be ASME fired vessels and designed to Seismic Zone 4 design requirements.

A natural gas line rupture would be detected by one of several detection systems and the natural gas flow would be automatically isolated and shutdown at the combustion turbine or at the master isolation valve at the CECP metering station. This would limit a natural gas release to a short duration and prevent the significant accumulation of natural gas. Failure of one of the steam lines would vent high temperature steam to the atmosphere, but would not affect the general public and would only last a few minutes. Therefore, the unlikely failure of the HRSGs would not impact the general public.

Steam Turbines

The steam turbines will be provided steam from the HRSGs and exhaust steam to the air cooled condensers. The turbines would have lubrication oil systems and the generators would be air cooled. The turbines would be mounted on foundations designed to meet Seismic Zone 4 requirements that would prevent significant movement, and would be designed to ASME and ANSI codes. Failure of one of the steam lines would vent high temperature steam to the atmosphere, but would not affect the general public and would only last a few minutes.

The lubrication oil systems will contain approximately 10,000 gallons in each of the two steam turbines of Class III oil. The oil reservoir would be equipped with a secondary containment and the oil pumps would be contained within the same enclosure. The turbine bearings would hold a small amount of oil but would not represent a major hazard. The worse case scenario would be a failure of a connection flange between the oil equipment and the turbine. These systems will have the highly unlikely potential of pumping all 10,000 gallons on the ground floor of the turbines in the event of an emergency situation. However, if this combustible liquid were to ignite and burn the entire volume of oil the fire would not spread beyond the site due to the physical confines of the site and would not be a hazard to the general public. In the event of a fire, the CECP fire protection system would also be activated. As a result, the lubrication oil systems would not be a hazard to the general public.

Therefore, the unlikely failure of a steam turbine or its auxiliaries would not be expected to impact the general public.

Air Cooled Condenser (ACC)

The ACC will consist of exhaust steam from the steam turbine and small quantities of gear box oil. Therefore, the unlikely failure of the ACC would not be expected to impact the general public.

Main Transformers

The main transformers (two from the combustion turbines and two for the steam turbines) would be filled with mineral oil. Each transformer would be equipped with its own

containment sump and would be separated from the other structure by a distance of 50 feet or by a 2 hour fire wall. Therefore, a fire would be contained within the boundaries of each transformer. Therefore, the unlikely failure of a transformer would not be expected to impact the general public.

Natural Gas Compressors and Gas Metering/Conditioning Station

The CECP natural gas compressors and gas metering/conditioning station would be down stream of the pipe line supply automatic isolation and shutdown valve. This valve would automatically close on detection of gas at these locations and could also be remotely closed from the CECP control room located in the existing Unit 4-5 area, west of the NCTD rail line. Therefore, in the event of a gas leak, the gas leak would be limited in size and not extend beyond the CECP site.

Although the unlikely failure of an on-site natural gas line would not be expected to impact the general public, the potential risk is also discussed in more detail in Section 5.3.

Ammonia Storage Tanks

The CECP 19 percent Aqueous Ammonia Storage Tanks (two) are horizontal vessels located in their individual containments. The tanks will be seismically mounted and complete failure of a vessel would not be likely. An analysis has been performed and shows that even complete failure of an ammonia tank will not produce unsafe level of gaseous ammonia beyond the site boundaries (see Section 5.5, Hazardous Materials Handling, of the AFC).

Although the unlikely failure of the ammonia storage tanks would not be expected to impact the general public, the potential risk is also discussed in more detail in Section 5.2.

Water Treatment Area

The CECP water treatment area will have miscellaneous hazard chemicals but in insufficient quantities (less than 500 gallons of caustic materials and less than 100 gallons of acid materials) to impact the general public.

A more detailed discussion of risks associated with the hazardous materials stored on-site is included in Section 5.2.

Fire Pump House

The fire pump house would contain the diesel driven fire pump. The pump house would store approximately 200 gallons of No. 2 diesel oil for fire pump testing and emergency use. The pump house and pumps would be designed to the California Fire Code and the National Fire Protection Association Standards requirements. It is expected that the limited quantity of diesel oil would be insufficient to affect the general public.

SECTION 4

Regional Evaluation of Fire Risk

In considering the fire and emergency response requirements for CECP, it is important to understand and consider the City's existing process for evaluating projects with respect to fire projection and emergency response programs. An important element of the programs is the considerations of a project's fire and emergency response requirements and the project's compliance with the City Growth Management Program pursuant to Chapter 21.90 of the City's zoning ordinance, as well as the Public Safety Element of the City's General Plan and the City's Emergency Operations Plan.

As part of this analysis, the Applicant reviewed the City's California Environmental Quality Act (CEQA) analysis for various projects previously proposed in the vicinity of the CECP and west of I-5, as well as the City's determination regarding other projects that the City determined were consistent with the Growth Management Program, the Public Safety Element of the General Plan and the City's Emergency Operations Plan. Through this analysis, Applicant found that the City has routinely approved projects west of I-5. The City has consistently found no significant public safety issues regarding fire and emergency access to areas west of I-5, nor has the City raised a major regional-wide seismic event as an emergency concern for other projects. In addition, for these other projects approved west of I-5, neither the City nor CFD indicated that additional fire and emergency services or another fire station would be required.

The various projects reviewed as part of Applicant's analysis are discussed below.

4.1 Growth Management Program Overview

Fire protection is one of eleven public services that comprise the City's Growth Management Program. Under the Growth Management Plan, a key standard for fire protection is that no more than 1,500 dwelling units shall be outside of a CFD 5 minute response time. This level of fire protection service must be assessed and ensured with each project approval in Carlsbad, as part of every project's finding that it will be consistent with the General Plan and the City's zoning ordinance as part of the CEQA analysis, as well as the Public Safety Element of the City's General Plan and the City's Emergency Operations Plan. As discussed in the Growth Management Program, the focus is on residential structures as industrial facilities are assumed by the City to include self-contained fire monitoring and fire suppression systems. Thus, in accordance with the Growth Management Plan, the response time to industrial facilities does not need to meet the 5-minute response time requirement.

It is important to note that the issues associated with CFD's being potentially overwhelmed in the event of a major emergency such as a major regional-wide seismic event, or issues associated with not being able to reach a project because of block streets or failure of structures on I-5 are not raised in the Growth Management Program, nor are these issues

raised in the Public Safety Element of the City's General Plan or the City's Emergency Operations Plan.

The City's Growth Management Program divides the City into twenty-five Local Facility Management Zones. EPS and CECP are located in Zone 3. Zone 3 is serviced by Fire Station No. 3 (El Camino Real and Chestnut) with backup services provided by Fire Station No. 1 (Carlsbad Village Drive). No fire stations exist, or are planned, for the City west of I-5 in Zone 3 per the City's Growth Management Program, and the Growth Management Program does not identify the need for a fire station west of I-5 in Zone 3.

4.2 CEQA Overview

A review of environmental analyses conducted pursuant to CEQA for projects west of I-5 previously approved by the City are summarized below.

4.2.1 Desalination Project: Preliminary Development Plan (PDP) and Specific Plan Amendment (Approved May 2006 – Carlsbad City Council)

The fire protection analysis in the Environmental Impact Report (EIR) for the Carlsbad Desalination Project (Poseidon) noted that: "The Carlsbad Fire Department currently has the facilities and personnel to accommodate the project, and it is not anticipated that any adverse impacts to (fire) service delivery would result from implementation of the project, and impacts are less than significant." Furthermore, the EIR determined that the project was consistent with the City's Growth Management Program and no mitigation measures were required to address fire protection or emergency services.

The hazards analysis in the Poseidon EIR addressed chemical spills and related handling and storage issues and mitigation measures were included in the EIR. However, there is no discussion or analysis about the challenge of accessing the project site due to the site being located west of I-5. In addition, there is no discussion of the potential impacts from an active fault or from a major seismic event relative to the project, nor are the needs for additional fire stations or resources west of I-5 discussed in the EIR.

4.2.2 Encina Wastewater Treatment Facility: PDP and Mitigated Negative Declaration (Approved July 2002 – Carlsbad City Council)

The PDP and Mitigated Negative Declaration for the Encina Wastewater Treatment Plant notes that: "[T]he proposed project would not result in a need for new or altered fire, police, school, parks or other public facilities"; and that: "the site is in an urbanized area served adequately by existing fire, police, and other services." Furthermore, the analysis of hazards does not highlight any additional concerns regarding access to areas west of I-5, nor does it note the need for additional fire stations or resources west of I-5 when addressing the ability of the City to provide hazard and emergency response. No mitigation measures were included related to fire protection resources.

4.2.3 Encina Power Station Ammonia Safety/Risk Management Plan (Approved November 2000 – City of Carlsbad Staff)

As part of an air emission control project at the EPS, the City approved the aqueous ammonia storage and associated safety protocols and determined that there were adequate fire protection services. There was no discussion about the potential need for a fire station or fire/emergency response resources west of I-5, nor did the City raise an issue concerning the potential for major seismic events that could impact public safety related to the storage of aqueous ammonia at EPS.

4.2.4 Poinsettia Commuter Rail (Approved May 1994 – Carlsbad Planning Commission)

The environmental analysis for SDP 93-03 included findings regarding the adequacy of public improvements. There was no mention of public safety concerns given the location of the project west of I-5. There was no discussion about the potential need for a fire station or fire/emergency response resources west of I-5, nor did the City raise an issue concerning the potential for major seismic events that could impact public safety. Existing fire stations and citywide resources were deemed adequate for the Poinsettia Commuter Rail project and transit center project. In addition to the above, the environmental analysis included a finding that the project was consistent with the City's General Plan, which includes various programs such as the Growth Management Program.

4.2.5 Ponto Vision Plan EIR (Approved September 2007 – Carlsbad City Council)

The Ponto Vision Plan EIR does not include any mitigation measures for fire protection resources. The EIR noted that wild land fires are an insignificant threat due to location near a lagoon (Batiquitos) and the Pacific Ocean, and it was also found that wild land fires were an insignificant threat as the project was to be located within a developed urbanized area. There is no discussion regarding whether a fire station or additional fire resources could be required for the Ponto Vision Plan. No active or current earthquake issues were noted and access to the project location west of I-5 was not highlighted as a public safety issue or challenge.

4.2.6 Redevelopment Projects

- DKN Hotel - May 2007 by City Council/Housing and Redevelopment Commission
- Lumiere Village Hotel - July 2008 by Housing and Redevelopment Commission

The City determined that the two above mixed-use projects in the Village Redevelopment area were exempt from CEQA. The DKN Hotel by Marriott included 104 rooms. The Lumiere Carlsbad Village Hotel is located north of and adjacent to Harbor Fish House, which is a mixed-use project with hotel rooms, residential condominiums, and restaurant. No issues regarding the need for a new fire station or resources west of I-5 were raised, nor were there concerns raised regarding the potential for earthquakes.

4.3 General Plan

The Public Safety Element of the General Plan addresses City-wide issues related to fire protection, disaster preparedness, and hazardous materials. With specific regard to the transport of hazardous materials in the City and related emergency scenarios, the Public Safety Element notes that: "while the potential exists for a hazardous materials transportation emergency in Carlsbad, such emergencies are in fact historically rare; however, the Fire Department is prepared to deal with an incident should one occur." The Public Safety Element also does not include any discussion regarding challenges for sites west of I-5. In addition, there is no discussion regarding the need for additional fire stations or fire and emergency services or resources beyond the Growth Management Program, and there is no discussion of the need for a new fire station west of I-5. In addition, is there no discussion of a major regional-wide seismic event that could result in the CFD being overwhelmed or not being able to respond to areas within the City.

4.4 City's Emergency Plan

The existing City Emergency Plan, approved in June 2003, establishes the City's organizational protocols and responses for city-wide emergencies. While the primary function of the Emergency Plan is to set up training and emergency management procedures, it does not outline the need for additional fire stations or fire/emergency resources west of I-5, nor does it outline any inadequacy with respect to the City's Growth Management Program.

SECTION 5

CECP Risk Evaluation

CECP will include a combination of design components and emergency response procedures that will comply with all applicable national, state and local LORS. Emergency response capabilities of the CFD and other fire and emergency response capabilities in the region that are provided by other agencies as part of a coordinate mutual aid agreement will support CECP to ensure public safety. Mutual aid agreements are a mainstay of local, state and federal emergency agencies coordinated response to major emergency situations. Under normal circumstances, any potential incident at the CECP would be an isolated event and the CFD would have the resources to respond in a timely manner; the response time from the nearest CFD fire station to EPS has been estimated to be 6 minutes according to CFD (see Attachment A). The response time from the second closest CFD fire station is 7 to 8 minutes. A response time of 6 minutes is considered excellent as most municipalities have established a response time goal of 8 minutes or less, 90 percent of the time, from the full first alarm assignment of response resources.

During a major regional-wide emergency, such as a major seismic event, the demand for emergency response throughout the region is likely to exceed the capability of the various fire and emergency response agencies in the region, including the CFD. This is not a unique situation to the City. Rather, this type of situation is recognized by the various emergency response agencies in the region and by the State of California, and it is for this reason that the State Office of Emergency Preparedness recommends that the people of California be prepared to be without emergency services for up to 72 hours after a major seismic event or other region-wide emergency event. The recent California-wide "Great Shake Out" was a state-wide exercise for emergency responders and emergency planners that focused on the need for regional and state-wide coordination between the various emergency response agencies.

A major seismic event in the region may also result in damage to transportation systems and limit access to various locations throughout the region and in the City. In this event, the various fire departments and other emergency response agencies in the region would by necessity prioritize emergency response, focusing on the facilities deemed most important, such as hospitals or schools, or large public gathering facilities, such as shopping centers and major sport venues. This prioritization of emergency response is an important factor considered by all emergency response agencies and these agencies train specifically for how to prioritize emergency response. It is for this reason that the California Building Standard Code, California Fire Code, Uniform Fire Code and National Fire Protection Association Standards include specific engineering, seismic, hazardous material storage and fire suppression requirements for industrial facilities such as natural gas-fired power plants. The intent of these requirements is to ensure that an emergency situation at industrial facilities does not spread to nearby areas, and allows emergency response agencies to prioritize their response actions to the most critical facilities.

The risk of a major emergency event is not related to CECP, nor will CECP exacerbate the magnitude of an emergency situation within the City in the event of a major seismic event or other regional emergency. Further, the risk of such an event exists regardless of CECP, and CECP, as we concluded in this report, does not represent an incremental increase in the risk of the occurrence of such an event. In fact, Applicant concludes that CECP will meet all national, state and local fire and hazardous materials LORS and will reduce the existing risk of fire or emergencies through the reduction of the quantity of hazardous materials used and stored at the combined CECP and EPS Units 4 and 5.

5.1 Evaluation of On-Site Fire Risk

As discussed in Section 3.3, the CECP structures would be predominantly metal structures with a generally low content of flammable materials. Therefore, the fire risk at the CECP (other than natural gas) is predominantly due to flammable liquids, present in small quantities, or lubricating oil, which is present in larger quantities.

An evaluation of the fire and explosion risks for on-site flammable liquids proposed for CECP was included in the CECP Fire Risk and Emergency Response Assessment Report (November 7, 2008) included as Appendix B and previously docketed with the CEC. The following bullets highlight the results of that evaluation:

- CECP will include state-of-the-art fire detection and protection systems that meet all applicable national and state fire code requirements, and will meet all applicable fire protection and hazardous materials handling LORS.
- CECP will allow for the retirement of three (Units 1, 2 and 3) of the five older technology steam boiler electrical generation units at the existing EPS. While the existing generation units at EPS have robust fire detection and protection systems that meet all fire code requirements, the retirement of Units 1, 2 and 3 does result in an overall reduction of fire risk at EPS since 60 percent of the existing units which are more than 50 years old will be retired.
- CECP is to be located within the existing EPS's eastern tank farm and, as such, three surplus fuel oil tanks (Tanks 5, 6 and 7) will be demolished to as part of CECP.
- A combined fuel oil storage capacity of 30 million gallons at EPS will be eliminated based on a change in CAISO operating requirements. While not related to CECP, this represents a significant reduction in the overall potential fire and emergency response requirement at EPS.

The natural gas fuel supply to the CECP could also pose a fire and explosion hazard in the event of a pipeline leak from the new natural gas pipeline installed for CECP. However, on-site fire risk associated with a natural gas line rupture or leak would be minimized using the natural gas leak detection systems and isolation valves described in Section 3.3 (Project Safety Features). The CECP fire protection system described in the AFC also addresses this potential hazard by assuring full compliance with applicable codes, regulations, and industry design/construction standards in the design and construction of the CECP gas pipeline interconnection. In fact, the CECP AFC further includes proposed Conditions of Certifications (COCs) requiring the CECP-owned natural gas pipeline undergo a complete

design review and detailed inspection every 30 years after initial installation and each five years thereafter to ensure proper integrity and to ensure compliance with applicable LORS.

An independent survey completed in 2003 of off-site emergency responses to power plants in California found that "gas-fired power plants pose a certain finite risk of fire or injury due to the nature of the facility and the chemicals and fuel stored and used on-site. However, because of the types of construction used in these plants, the requirements for fixed automatic and manual fire suppression systems, and the training required for both management and employees, this finite risk is mitigated and reduced to an insignificant level." (Greenberg, 2003).

As noted in the CEC's PSA for CECP, a particular concern of the CFD is the likelihood of a seismic event in the region, which would require that all of CFD's resources be utilized. In CFD's opinion, if such a regional event were to occur, CECP would impact CFD's ability to respond. According to the CFD, any new project in its jurisdiction, especially a facility that stores and uses hazardous and flammable materials such as the CECP, is likely to impact the CFD.

While damage to the CECP might result in significant damage to, or even the complete loss of, the CECP facility for this worse case scenario (i.e., assuming a zero response from the CFD), the on-site damage would be of minimal, if any, public concern, because the losses would be born entirely by the owner of CECP and/or by CECP's insurance carriers and would not spread to nearby areas. Furthermore, even in this worse case scenario, acceptable levels of life safety risk for employees would be achieved by CECP's compliance with all applicable national, state and local building codes and safety regulations, and by the combination of on-site safety measures and procedures that are also required by national, California and local building codes.

Therefore, as discussed in Section 3.3 above and in the analysis below, there is no credible scenario that would result in significant project level impacts to offsite locations or cumulative off-site impacts from on-site fires. This analysis further supports the finding that the potential impacts to CECP and corresponding impacts to the public from a major emergency event, such as a seismic event that may result in impacts in CECP operations and/or restrict CFD's access to CECP due to damage to or blockage of City streets and roads, and to I-5, as postulated by the City Fire Marshal and CFD, are less than significant on a project basis, and that CECP will not result in an incremental increase to a cumulative impact to the City or to CFD's ability to respond to a major emergency event.

5.2 Evaluation of On-Site Hazardous Materials

In general, the CECP's state-of-the-art, combined-cycle units and its supporting systems generally use fewer hazardous materials and reduced volumes of hazardous materials as compared to the existing EPS. The use of hazardous materials by CECP would be managed in strict accordance with all applicable LORS. As documented in the Hazardous Materials Handling section of the AFC (Section 5.5) and in the CECP Fire Risk and Emergency Response Assessment Report (NRG, 2008), CECP will result in a less than significant impact from hazardous materials handling. In addition, with the retirement of Units 1, 2 and 3 at

EPS, the volume of hazardous materials used to support operations of EPS will generally be reduced as compared to the volumes currently used.

As discussed in Section 5.5 of the AFC, CECP operations will involve the use of aqueous ammonia (19 percent solution) as part of its air emissions control system as well as other miscellaneous hazardous materials necessary to support the operation of CECP. Aqueous ammonia will be stored in two stationary aboveground storage tanks. The capacity of the tanks will be approximately 10,000 gallons each: however each tank will only be filled to a maximum of 85 percent of the tank capacity or 8,500 gallons, for a total maximum storage of 17,000 gallons. Aqueous ammonia will be delivered to the site by truck, with an average of one to two deliveries per month, with a maximum of five deliveries per month during peak operations. Based on the results of the offsite consequence analysis presented in the AFC, the general public would not be exposed to concentrations above 75 parts per million (ppm) during a worst-case release scenario. Therefore, the storage of aqueous ammonia on-site would not pose a significant risk to the public.

In addition to the evaluation of ammonia risk, the CECP Fire Risk and Emergency Response Assessment Report (NRG, 2008) provides a list of the existing EPS and CECP quantities of hazardous materials. The report grouped the hazardous materials into the following four categories: aqueous-based, fuel oils, petroleum-based, and gases. The report summarized the reduction in hazardous materials volumes that would occur after the retirement of the EPS Units 1, 2 and 3, and the revised combined volume of hazardous materials for the operation of CECP and continued operations of Units 4 and 5. The combined qualities of hazardous materials for operation of CECP and the continued operations of Units 4 and 5 at the EPS are as follows:

- Aqueous-Based: with exception of aqueous ammonia, volumes are reduced or are only minor increases
- Fuel Oil: Elimination of 30 million gallons of storage capacity for Fuel Oil No. 6.
- Petroleum-Based: Minor increases
- Gases: Significant reduction in volumes

This combined reduction in the volume of hazardous materials at EPS compared to the proposed CECP would represent a reduction in the overall fire and emergency response requirements at EPS.

5.3 Evaluation of Risk Associated with a Potential Natural Gas Line Failure

Based on the risk evaluations presented in the previous sections, the principal concern for potential off-site risk from CECP arises from the potential failure of the natural gas pipeline, either on- or off-site. However, natural gas releases, either leaks or ruptures, do not necessarily result in severe consequences for the following reasons.

- Natural gas is lighter than air and thus naturally rises and disperses in the atmosphere.

- Natural gas fires are possible only within specific limits of gas concentrations and only when an ignition source is also present.
- Natural gas explosions are possible only within the right combinations of parameters and are extremely rare except in confined spaces.
- The severity of possible consequences from natural gas releases from pipelines depends on the total quantity of gas released and the pressure of the gas.
- The level of risk also depends on a host of other factors, including the design, condition and location of a pipeline relative to potentially at-risk buildings or people, and on the robustness of safety measures such as automatic gas shut off valves and automatic fire suppression systems.

Because there are a number of variables which may affect the severity of risk, the following sections present the results of a qualitative and quantitative risk evaluation for CECP, including a qualitative comparison to the risk associated with the existing off-site natural gas line.

5.3.1 Qualitative Risk

Qualitative Risk Based on the California Department of Education (CDE) Risk Evaluation Regulations for Schools

One well-established method for evaluating public safety issues for natural gas pipelines is the method developed for the California Department of Education (CDE) for school sites near natural gas pipelines (URS, 2007). The guidance protocol incorporates CCR Title 5, Section 14010(h) which states that school sites "shall not be located near an above ground water or fuel storage tank or within 1,500 feet of the easement of an above ground or underground pipeline that can pose a safety hazard as determined by a risk analysis study, conducted by a competent professional."

Based on this guidance, it is concluded for this qualitative risk evaluation that the potential risk associated with natural gas pipelines beyond 1,500 feet from a school would be deemed acceptable. Therefore, because special safety requirements are often applied to schools relative to the general building requirements, it is assumed the risk standard applied to other buildings would be no more stringent than that required for schools.

As discussed above in the site layout section (Section 3.3), there are no buildings within 1,500 feet to the north or east of the new CECP natural gas pipeline to be installed on-site or the turbines. Therefore, based on the CDE risk evaluation regulations, the potential risk to the north and east of the CECP would be deemed acceptable. To the south and west of CECP, the nearest buildings (residences) would be approximately 1,300 to 1,400 feet from the nearest on-site CECP natural gas pipeline.

Based on the CDE guidance, a risk assessment would be required before a school (or building in the case of this analysis) could be built at the nearest location to the CECP. Qualitatively, however, the existing 25- to 30-foot berm around the proposed CECP gas line would substantially reduce the off-site risks at a distance of 1,300 from the facility. Thus, it appears very likely that, given a full risk assessment, the CDE risk evaluation regulations would conclude the risks would be deemed acceptable even within 1,300 feet of the facility.

The nearest off-site infrastructure components include I-5 to the east of the CECP site, and the rail line and Carlsbad Blvd to the west of the facility. Because CECP would be surrounded by a 25- to 30- foot berm, the berm would provide a substantial measure of protection. For Carlsbad Blvd, which is approximately 1,400 feet from the nearest CECP facility, the CDE regulations would likely allow a new school to be built on Carlsbad Blvd given the distance from the plant and the protection provided by the berm. Thus, qualitatively, the risk to off-site infrastructure appears to be well within accepted limits.

Qualitative Risk Based on a Comparison to the Existing Natural Gas Pipeline

For natural gas pipelines, the total level of risk from a pipeline from natural or anthropogenic causes is generally considered to be linear with pipeline risk. For example, seismic risks for pipelines are calculated as the probability of failures per mile of pipeline for a given level of ground shaking.

For the CECP and vicinity, the existing 20-inch SDG&E natural pipeline poses a greater level of risk to buildings and people in Carlsbad than the proposed CECP pipelines for the following reasons.

- The diameter of the SDG&E pipeline is larger than the proposed CECP pipeline. Therefore, the SDG&E pipeline contains more gas.
- There are several miles of SDG&E natural pipe running through the City of Carlsbad compared to only 1,100 feet of new pipeline proposed for the CECP.
- The existing SDG&E pipeline, which runs north and south along the CECP site, is within 50 to 100 feet of existing buildings. In contrast the minimum distance between the proposed CECP natural gas pipelines and existing buildings would be approximately 1,300 feet.
- The proposed CECP pipeline would be surrounded by a 25- to 30- foot berm.
- The proposed CECP pipeline would be protected by additional gas leak detection systems, fire suppression systems, and automatic shutoff valves, which greatly reduce the risk of a major fire or explosion if a leak/break were to occur.

Furthermore, there are other natural gas pipelines within the City, including several hundred miles of gas distribution mains, the vast majority of which are located in rights of ways along streets and within close proximity to buildings and people. Therefore, the risk from the proposed 1,100 feet of CECP natural gas pipelines, which would be located at least 1,300 feet from existing buildings, would be a small fraction (much less than 1percent) of the cumulative risk from the other existing natural gas pipelines and gas distribution mains within the City.

5.3.2 Quantitative Risk

Based on the location of the two new CECP combined cycle units in a recessed bermed area where three fuel oil tanks were installed (these three tanks will be removed as part of the construction of CECP), internal events such as fires, spills or equipment failures at the CECP site could potentially be caused by external events such as earthquakes, plane crashes, terrorist attacks or serve weather. Of these external events, a major regional seismic event is

the bounding case because it could result in the potential worse case on site failure and the greatest impact on fire/emergency services. This risk assessment evaluates and documents the probability of a major seismic event in the region and the resulting probability of such a seismic event to results in an equipment or safety features failure at the CECP site, and the probability that such a failure would result in a fire or emergency situation at the CECP site that could potential affect offsite areas.

The quantitative analysis of off-site risk from a natural gas pipeline failure at the CECP site was conducted in two steps. First, the probability of a natural gas pipe failure during the maximum credible earthquake (MCE) for this site was calculated (see Section 5.4: Geologic Hazards and Resources of the AFC for a discussion of the MCE). The MCE was considered the worse-case scenario for a disaster event in Carlsbad because the damage levels would be severe on a regional and city-wide basis and likely result in a demand for emergency response services beyond the capacity of responders. The worse case scenario of the MCE was evaluated for the consequences of gas pipeline failures at the CECP site.

Seismic Risk Assessment Approach for the Proposed CECP Pipeline

Nationally-recognized, industry-consensus seismic fragility data for pipelines were used to estimate the probability of a failure along the proposed 1,100-foot on-site CECP natural gas pipeline for a 7.5 magnitude MCE along the Rose Canyon Fault. Current methods of estimating earthquake damage to pipeline systems rely heavily on observed rates of damage in past earthquakes. The most recent summary of consensus seismic fragility data for pipelines is the FEMA-American Lifelines Alliance report (ALA, 2001a).

There are two distinct failure modes for pipelines which are subject to earthquake ground motions, wave propagation (ground motion only), and permanent ground displacement (liquefaction, settlement, or lateral spreading). Because the CECP site is an engineered soil site with firm, dense, well compacted soils; there is no geotechnical evidence suggesting a possibility of liquefaction settlement or lateral spreading on the portions of the site where gas pipelines will be located. Therefore, the potential for CECP pipeline failures would only be expected for wave propagation (ground motion only).

For the CECP natural gas pipelines, the number of pipeline repairs (i.e., failures) expected from ground shaking for the maximum credible earthquake ground motions was calculated using Equation (1) from ALA (2001a):

$$\lambda = 0.00187 K_1 (PGV) e^{\beta \Phi^{-1}(x)} \quad (1)$$

where:

λ	=	median repair rate per 1,000 feet of pipe.
K_1	=	modification factor (see Table 1)
PGV	=	median estimate of peak ground velocity
β	=	lognormal standard deviation in estimate of λ = 1.15 (factor of ±3.2 for ± one standard deviation)
$\Phi(x)$	=	standard normal probability function.

An extensive review of historical damage data undertaken during the development of ALA (2001a) did not find meaningful diameter dependence for pipeline damages. Therefore, the

pipe damage estimates presented below consider pipe materials and soil conditions, but do not consider diameter dependence except to the limited extent indicated by the consensus ALA interpretation of historical damage data.

The *K* values presented in Table 1 represent pipe materials and joint types common in potable water systems and in the older portions of natural gas distribution systems. There is no ALA consensus pipe damage parameters applicable to gas transmission or distribution lines fabricated of steel or polyethylene (PE) with welded or fused joints. Historically, in past earthquakes, there are almost no pipe failures in modern steel or PE gas pipelines, except in areas with permanent ground deformation, because of the strength and ductility of such pipelines.

TABLE 1
K_1 and K_2 Pipe Damage Factors

Pipe Material	Joint Type	Soils	Diameter[a]	K_1	K_2[b]
Cast iron	Cement	All	Small	1.0	1.0
Cast iron	Cement	Corrosive	Small	1.4	—
Cast iron	Cement	Non-corrosive	Small	0.7	—
Cast iron	Rubber gasket	All	Small	0.8	0.8
Welded steel	Lap – Arc welded	All	Small	0.6	—
Welded steel	Lap – Arc welded	Corrosive	Small	0.9	—
Welded steel	Lap – Arc welded	Non-corrosive	Small	0.3	—
Welded steel	Lap – Arc welded	All	Large	0.15	0.15
Welded steel	Rubber gasket	All	Small	0.7	0.7
Welded steel	Screwed	All	Small	1.3	—
Welded steel	Riveted	All	Small	1.3	—
Asbestos cement	Rubber gasket	All	Small	0.5	0.8
Asbestos cement	Cement	All	Small	1.0	1.0
Concrete w/Stl Cyl.	Lap – Arc Welded	All	Large	0.7	0.6
Concrete w/Stl Cyl.	Cement	All	Large	1.0	1.0
Concrete w/Stl Cyl.	Rubber Gasket	All	Large	0.8	0.7
PVC	Rubber gasket	All	Small	0.5	0.8
Ductile iron	Rubber gasket	All	Small	0.5	0.5

[a]Small diameter refers to pipelines with 4 to 12 inches in diameter and large diameter refers to pipelines with 16 inch diameter and larger.

[b]The K_2 parameter applies only to pipe damage due to permanent ground displacements and is not used in the present analysis.

Source: ALA, 2001a

The pipe fragility estimates for other types of pipe for gas systems presented in Table 2 were developed by Douglas Honegger, the project manager for the FEMA-ALA pipeline vulnerability study (ALA, 2001a) and an internationally recognized expert on the seismic performance of pipelines, especially gas pipelines.

TABLE 2
K_1 and K_2Factors for Other Pipe Types

Pipeline System	Category	K_1 and K_2	Notes
Gas	Bare Steel (BS)	1.0	1
	Cast Iron with or without mechanical Joints (CI, CIMJ)	1.0	1
	Coated Welded Steel (CWS)	0.05	2
	Polyethylene (PE)	0.05	3
	Polyvinylchloride (PVC)	0.7	4
	Steel	0.3	5
	Welded Wrought Iron (WWI)	1.0	1

[1]Assumed to be no better than "all" cast iron because of potential corrosion and construction practices at the time of installation.

[2]K_1 value for large steel with lap welds reduced by a factor of three considering (1) the diameter-to-thickness ratios for gas pipe are similar to small diameter water pipelines, (2) the pipelines are coated, and (3) butt-welded joints typically used for these pipes can develop pipe material yield strength while lap welds can typically only develop 30 percent to 40 percent of material yield strength (Tawfik and O'Rourke, 1985).

[3]PE pipe assumed to have same vulnerability as coated welded steel because of integrity of fusion weld joints.

[4]PVC assumed to be more vulnerable based upon majority of pipe is 2-inch or less, increasing likelihood for glued joints.

[5]Assumed to be same as small lap-welded steel water pipe

Peak ground velocity (PGV) was used as the ground motion parameter for pipe damage because PGV correlates better with pipe damage than other measures of ground motion such as peak ground acceleration (PGA). The consensus relationships between PGV and PGA as a function of earthquake magnitude and distance from the epicenter are shown below in Table 3.

For the CECP site, an MCEof magnitude 7.5 along the Rose Canyon Fault was used, which is less than 20 km from the CECP site. Per the analysis of geologic hazards at the CECP site, the peak bedrock acceleration for the MCE was estimated to be 0.42 g (see Section 5.4: Geologic Hazards and Resources of the CECP AFC).

TABLE 3
Relationships Between PGA and PGV

	Ratio of Peak Ground Velocity (cm/sec) to Peak Ground Acceleration (g)		
	Source-to-Site Distance (km)		
Moment Magnitude, M	**0-20**	**20-50**	**50-100**
Rock*			
6.5	66	76	86
7.5	97	109	97
8.5	127	140	152
Stiff Soil*			
6.5	94	102	109
7.5	140	127	155
8.5	180	188	193
Soft Soil*			
6.5	140	132	142
7.5	208	165	201
8.5	269	244	251

*The sediment types represent the following shear wave velocity ranges: rock greater than or equal to 750 meters per second, stiff soil 200 meters per second to 750 meters per second, and soft soil less than 200 meters per second. The relationship between the peak ground velocity and peak ground acceleration is less certain in soft soils.

Source: ALA, 2001b

Using the International Building Code soil amplification factors for short period spectral acceleration (applicable to PGA), the corresponding PGA for the firm soil (Type D) CECP site is approximately 0.457 g. Using the ratio between PGV (cm/sec) and PGA (g), 140 from Table 3, the corresponding PGV value for the CECP site is 63.98 cm/sec.

Using the pipe fragility equation (1) above and a K1 value of 0.05 from Table 2, the estimated median number of pipe repairs necessary for 1,000 feet of pipe for a PGV of 63.98 cm/sec would be 0.00598. For 1,100 feet of pipe at CECP, the estimated median number of pipe repairs necessary would be 0.00658. These results are for the MCE, the 2percent in 50 year ground motion which has an annual probability of 0.004. Therefore, combining the probability of the MCE ground motion, the probable number of pipe repairs necessary given the MCE would be 2.63×10^{-6} or 0.00000263, which is equivalent to only a 2.6 in one million chance per year.

The above annual probability of pipe failure at the CECP due to the maximum credible earthquake is a very conservative, an upper-bound type estimate. For a new natural gas pipeline installed and inspected to current codes, the probability of failure is virtually zero. In fact, the probability of failure is low enough that natural gas mains are allowed by regulatory agencies to be located very close to (within a few feet) of occupied structures.

This is the case in several areas within the City of Carlsbad, where the SDG&E natural gas pipeline is located approximately 50 feet from the nearest buildings south of the CECP site.

Thus, in reality, the annual probability of failure of a gas pipeline at the CECP from the maximum credible earthquake ground motions may be much lower than the 2.63×10^{-6} value calculated above, perhaps by an order of magnitude or more less.

There are two important caveats on the above probability of failure calculations:

- Pipe "failure" simply means damage that requires repair; "failure" does not necessarily mean complete rupture of the pipe. For welded steel gas pipelines, failure almost certainly means a crack at a weld. The probability of complete rupture of a welded steel gas pipeline from ground shaking is virtually zero. Thus, given a crack "failure" implies a gas leak with a jet of escaping gas.
- A gas release from a damaged pipe, either a leak (jet) or complete rupture does not mean that dire consequences necessarily follow. Released gas may simply rise and dissipate into the atmosphere, or there may be a fire, a flash fire, or (in very limited circumstances) and explosion.

5.3.3 Worse Case Scenarios for Natural Gas Pipeline Failures

The CDE Guidance Protocol for School Site Pipeline Risk Analysis (URS Corporation, 2007) provides an accepted methodology to evaluate risk for natural gas pipeline failures. Given a pipe failure, the consensus probabilities of various types of consequences are shown in the left two columns of Table 4 below. Table 4 also presents the probabilities of various pipe failures given that the maximum credible earthquake occurs and the annual probability of the maximum credible earthquake with the various pipe failures. For clarity, probabilities are shown in both decimal (fractional) format and in scientific notation. For example, the annual probability at CECP that the MCE occurs and results in a pipe rupture is 0.00000053 or 5.264E-07 (same as 5.264×10^{-7}). This probability is about 5 in 10 million or about 0.5 in one million.

TABLE 4
Probabilities of Various Consequences of Pipe Failures at CECP

Type of Event Given Pipe Failure	Probability Given Pipe Failure	Probability Given MCE at CECP		Annual Probabilty from MCE at CECP	
Leak	0.80	0.005264	5.264E-03	0.00000211	2.106E-06
Rupture	0.20	0.001316	1.316E-03	0.00000053	5.264E-07
Ignition from Leak	0.30	0.001579	1.579E-03	0.00000063	6.317E-07
Ignition from Rupture	0.45	0.000592	5.922E-04	0.00000024	2.369E-07
Ignitiion from Leak or Rupture	0.33	0.002171	2.171E-03	0.00000087	8.686E-07
Fire from Ignition	0.99	0.002150	2.150E-03	0.00000086	8.599E-07
Jet fire from Ignition	0.98	0.002128	2.128E-03	0.00000085	8.512E-07
Flash fire from Ignition	0.01	0.000022	2.171E-05	0.00000001	8.686E-09
Explosion from Ignition	0.01	0.000022	2.171E-05	0.00000001	8.686E-09

As demonstrated by the above probabilistic risk calculations, the probability of a gas pipeline failure is extremely low even for the MCE which occurs on average only about once every 2,500 years.

The CDE Guidance Protocol for School Site Pipeline Risk Analysis (URS Corporation, 2007) provides an accepted methodology to calculate the radius (distance) from a pipe failure to which off-site effects extend. The detailed methodology, calculations and graphs are in Section 4 of Volume 1 of the CDE Guidance Protocol.

The 1,100 feet of on-site gas piping consists of approximately 550 feet of 18-inch diameter pipe and approximately 500 feet of 12-inch diameter pipe, at a maximum operating pressure of 900 pounds per square inch (psi). For the following worse case scenarios, only the 18-inch diameter pipe was considered as the possible impact radii for failures of the 12-inch diameter pipe are much smaller than those calculated for the 18-inch diameter pipe.

The CDE Guidance risk assessments assume gas leaks or breaks fed from both directions of a transmission pipe. For the CECP site, this situation is impossible, because the pipe is fed from only one end (the SDG&E natural gas pipeline). The volume of gas releasable from an 18-inch single end fed pipe is approximately equal to the volume of gas releasable from a 12-inch double end fed pipe. Therefore, for the following worse case evaluations, we use the CDE Guidance results for 12-inch double end fed releases, which correspond to the level of risk for an 18-inch single end fed release.

Furthermore, the calculations below ignore the automatic shut-off values in the CECP pipelines which will quickly shut off the gas supply very soon after any accidental release event. Thus, the scenarios noted below are truly worse case scenarios and the impact radii for more realistic possible failure events are almost certainly much lower than the calculated worse case results below.

Case Study 1

Pursuant to the CDE Guidance protocol, the limiting threshold for heat radiation resulting in mortality to exposed (outdoor) individuals from a gas jet fire is 5,000 BTUs per hour per square foot of surface. For an 18-inch diameter single end fed gas pipeline at an operating pressure of 900 psig, the maximum operating pressure of any on-site pipeline, the distance to the limiting threshold for heat radiation at the above heat flux is approximately 300 feet. This distance is the worse case, for an unprotected (outdoor) individual. Individuals in vehicles or buildings could be closer than 300 feet without mortality.

Given that the nearest off-site buildings are about 1,300 feet from the nearest CECP pipeline, the probability of off-site jet fire impacts to offsite buildings is zero. Considering the 25-foot berm surrounding the CECP site, the maximum possible radius of off-site effects from a full rupture jet fire is much less than 300 feet. Thus, given the minimum distances from the nearest CECP natural gas pipeline to any populated off-site area (i.e., I-5) would be about 250 feet, and as noted above does not take into account the emergency shut-off valves that would automatically stop the flow of natural gas in the event of a release, the probability of off-site mortality from jet fires would be zero.

For the much more likely event of a jet fire from a leak, the mortality radius threshold for exposed (outdoor) individuals would be much lower. For a 1-inch hole jet fire at 900 psig,

the mortality radius threshold would only be about 75 feet. Given this occurrence, the off-site effects would be zero.

Case Study 2

The CDE Guidance Protocol user guide has simplified calculations for dispersion of natural gas clouds to the lower flammability limit. These calculations ignore the buoyancy of natural gas and thus substantially overestimate the distance from the rupture to the lower flammability limit. More accurate calculations taking into account buoyancy show maximum downwind distances to the lower flammability limit of about 600 to 700 feet for a 16-inch pipeline at 345 psig with a complete double end rupture. At the maximum downwind distance the cloud height would be roughly 50 to 100 feet, depending on wind speed. For the CECP site, with a single gas feed direction and an 18-inch pipe at 900 psig, the downwind distance to the lower flammability limit would be similar to the above double end gas feed results. However, the cloud heights would be about 25 feet higher, because the gas cloud would not escape from the perimeter berm until the height exceeds 25 feet.

Flash fires cover a broader area than jet fires, but are less dangerous because the duration of burning would be very short, with the fire burning "backwards" towards the source as the gas fuel is consumed. Given the downwind distance, the cloud height, and the short duration, the offsite risk from flash fires, even with a complete rupture would be zero. Furthermore, as shown in Table 4 above, given a release and an ignition of fire, the probability of a flash fire is estimated at only 1 percent, again not taking into account the automatic shut-off values.

For the more likely event of a leak, rather than a rupture, with a flash fire, the CDE Guidance Protocol user guide includes an example for a 1-inch hole in the pipe. For 900 psig, the lower flammability limit for a natural gas cloud would have a downwind distance of only about 170 feet. This simplified calculation ignores the considerable effects of the buoyancy of natural gas and does not take into account the automatic shut-off valves; thus, a more realistic calculation would have an even lower downwind flammability limit. Given this occurrence, the off-site effects would be zero.

Case Study 3

The CDE Guidance Protocol user guide discusses the possibility of ignitions triggering an explosion, but does not present quantitative calculations. However, the draft version of this user guide, by the same authors, did include such calculations, including graphical results of explosion overpressures as a function of distance for double-ended pipe ruptures for pipes of various diameters and pressures. For the CECP site, a double-ended gas feed would not be possible since gas would only be fed at only one end. Interpolating between the pipe sizes and correcting for the volume of gas released, the distance where an explosion would yield an overpressure of 1 psig for an 18-inch pipe at 900 psig (the maximum diameter and pressure at CECP) yields a distance of approximately 1,400 feet.

The minimum distance from the CECP site to an off-site building is in the north direction, where the distance is about 1,300 feet. This distance would be similar to the expected mortality threshold distance (overpressure of 1 psig). However, the presence of the perimeter berm at the CECP site would deflect the blast front upwards and result in

somewhat lower over pressures near ground level. Thus, the potential for fatal off-site exposures appears to be low. Furthermore, as shown in Table 4 above, given a release and an ignition of fire, the probability of an explosion has been estimated to be 1 percent. For the CECP site, with very little confined space, the probability of a major explosion would be much lower than 1 percent, given a release and an ignition. Even using the 1 percent estimate, however, the probability of an explosion, given the MCE would only be about 2×10^{-5} or about one in 200,000. The annual probability of the CECP site experiencing the MCE and an explosion would be about 8×10^{-9} or less than one in 100 million, and does not take into account the automatic shut-off valves. Overall, the off-site risk from explosion appears to be virtually zero.

For a leak, rather than a rupture, the mortality threshold distance would be drastically less than for a complete rupture and explosion. Thus, for this more likely scenario the off-site risks would be zero.

5.4 Evaluation of I-5 Barrier System

During the PSA Workshop on January 7, 2009, CEC staff indicated that CECP will be required to include an appropriate design system to prevent a truck or other vehicle from leaving the I-5 right-of-way (ROW) in the event of an accident and entering the CECP site and potentially damaging a CECP component. While the Applicant understands the issue, Caltrans has specific design standards and specification to prevent a truck or other vehicle from leaving a highway or freeway ROW in the event of an accident. Therefore, it is Caltrans' design standards and specifications that dictate the barrier systems that are currently included along I-5 in the vicinity of the CECP site, and that will dictate the barrier systems that will protect the CECP site, or any other facility for that matter, as part of any eventual improvements to I-5 in the proximity of the CECP site.

Specifically, the California Manual of Uniform Traffic Control, September 26, 2006, Topic 309 – Clearance and the Caltrans Traffic Manual, 1996, Chapter 7.0 - Barrier Systems will be used by Caltrans in the design of any eventual improvements to I-5 in the proximity of the CECP site. These Caltrans design standards and specifications are based on site specific conditions to design a barrier system to prevent trucks and other vehicles from leaving the Caltrans' ROW. These standards and specifications are robust and flexible to address site specific conditions and are used on all state highways and freeways in California. These standards and specifications that will be incorporated by Caltrans as part of any eventual improvements to I-5 in the proximity of the CECP site will meet the objectives of CEC staff to prevent a truck or other vehicle from leaving the I-5 ROW in the event of an accident and entering the CECP site and potentially damaging a CECP component; therefore, Applicant does not believe a specific CEC Condition of Certification is required for this matter.

Applicant has provided the CECP Site Plan to Caltrans and will continue to coordinate with Caltrans as the CECP site plan and design is finalized. Caltrans will follow its design standards and specifications to design a barrier system to prevent trucks and other vehicles from leaving the Caltrans' ROW and entering the CECP site.

SECTION 6

Summary and Conclusions

Based on previous assessments and confirmed by this supplemental analysis, the Applicant concludes that CECP will not result in a significant project-specific impact to public health and worker safety. To more specifically address CFD's concerns regarding CECP, Applicant concludes that CECP will not result in an incremental increase or a cumulative impact on CFD's ability to respond in a major, regional-wide emergency. It is also important to recognize that the risk of a major emergency event, such as a major seismic event that may affect the City, is an existing risk that is not related to CECP, nor will CECP exacerbate the magnitude of the emergency situation within the City in the event of a major seismic event or other region wide emergency. Furthermore, CECP will reduce the existing risk at the EPS through the reduction of the quantity of hazardous materials used and stored at EPS with the retirement of Units 1 through 3 and the removal of fuel oil with the construction of CECP (i.e., removal of tanks 5, 6, and 7).

Finally, Applicant conducted specific risk scenarios that include the potential for the rupture or leaks from the CECP natural gas pipeline and concluded that the existing 20-inch SDG&E natural pipeline poses a greater level of risk to buildings and people in Carlsbad than the proposed CECP natural gas pipeline. Furthermore, there are other natural gas pipelines within the City, including several hundred miles of gas distribution mains, the vast majority of which are located in rights of ways along streets and within close proximity to buildings and people. Overall, the risk from the proposed 1,100 feet of CECP natural gas pipelines, which would be located at least 1,300 feet from existing buildings, would be a small fraction (much less than 1 percent) of the cumulative risk from the other existing natural gas pipelines and gas distribution mains within the City. This analysis also consider the risk of a leak or rupture of the CECP natural gas pipeline as a result of a major seismic event, and determined on a quantitative basis that the worse case scenario of a rupture in the CECP natural gas pipeline has an annual probability of occurrence approximately 5 in 10 million (or approximately 0.5 in one million). Therefore, CECP's incremental risk from a potential natural gas pipeline rupture or leak is incremental and not significant on a project basis or on a cumulative basis.

This assessment also included information related to CEC staff's discussion as to how to prevent a truck or other vehicle from leaving the I-5 right-of-way in the event of an accident and entering the CECP site. Caltrans has specific, detailed design standards and specifications that dictate the type of barrier systems that are in place I-5 in the vicinity of the CECP site, and that will dictate the barrier systems that will protect the CECP site, or any other facility for that matter, as part of any eventual improvements to I-5 in the proximity of the CECP site.

Based on the analysis of fire risk and storage of on-site hazardous materials, CECP will result in a less than significant impact on fire and emergency response services, and would not contribute to an incremental impact on the overall capability of CFD to continue to provide appropriate fire protection and emergency response services throughout the City.

SECTION 7

References

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Attachment A
CEC Staff Record of Conversation with City of Carlsbad Fire Marshall – May 28, 2008

Telephone Conversation Record

To:	Fire Marshal James Weigand Carlsbad Fire Department (CFD)
From:	Shon Greenberg Risk Science Associates
Phone Number:	(760) 602-4661
Date:	May 28, 2008, 8:30am
Regarding:	Carlsbad Energy Center Project

I asked the marshal if he was familiar with the proposed project. He replied that there is no person in Carlsbad not familiar with it, since the community is greatly opposed to it and the City has voted against it. Since Encina PP is supposed to be closed down in several years, the community would rather not have any power plant at that site.

I asked the marshal to confirm the information provided in the AFC regarding station #1. He confirmed that the response time would be 6 minutes and that the location and staffing/equipment are correct. I asked him what is the next closest CFD station, and he replied that it would be station #4, located at 6885 Batiquitos Drive, about 3.7 miles away. This station is equipped with one engine and three firefighters per shift and would respond within 7-8 minutes. Overall the CFD has 6 stations spread over 48 square miles, so the stations are not very dense. All firefighters except for one are trained paramedics. All firefighters are trained as first responders to hazmat incidents, and some are trained as technicians and experts, although the CFD does not have the proper equipment to handle large spills, regardless of trained staff. In the event of a hazmat incident, they would rely on the San Diego hazmat team, which would take at least one hour to respond. Camp Pendleton team could also respond, but that is not guaranteed.

I asked the marshal whether he felt that the CFD was staffed and equipped to handle incidents at this proposed facility and if he thought this project would impact the CFD. He replied that currently the CFD is able to respond to incidents in its jurisdiction, but he cannot say for sure how well the department will do in the future. The CFD has not expanded while the City of Carlsbad has grown, and he feels that the CFD is stretched thin already. A particular concern is the likelihood of a seismic event in the region, which would require all the resources they have. If a regional event like that happened then the proposed CECP would certainly impact the department. Overall he cannot say for certain that the project would not impact the CFD. He said that any new facility has a potential impact on the CFD, and especially a facility with hazardous and flammable materials. I asked him if there is any particular mitigation that could minimize impacts on the CFD, and he responded that additional equipment is not very helpful without additional staff, so staffing would be the most beneficial mitigation.

Attachment B
CECP Fire Code Table and Access Route Figure

CARLSBAD ENERGY CENTER PROJECT (CECP) DESIGN ADHERENCE TO
CALIFORNIA STATE FIRE CODE
AND CITY OF CARLSBAD MUNICIPAL CODE REQUIREMENTS (FIRE PROTECTION)
Revised April 23, 2009

DESIGN ELEMENT	CALIFORNIA FIRE CODE (Amended 2007)	CITY MUNICIPAL CODE STANDARD	CECP DESIGN BASIS
ACCESS ROAD WIDTH	CA Fire Code IBC 2006 modified 20 ft per CA Fire Code, Section 503.2.1 and 503.2.2 as applicable	17.04.080 Section 503.2.1.1 added to City's Municipal Code to include minimum street width for public and private streets in fire hazard zones, which is not applicable to CECP	Figure 2.2-1 from the PEAR shows the access roads to CECP. The width of CECP onsite access roads shall comply with CA Fire Code and applicable City Municipal Code. Figure 2.1-1 from the PEAR has been used as the basis to show the three points of fire and emergency response access to CECP shall be provided, as follows: 1. Access from Cannon Road via Cannon Court (public access easement) to CECP via a fire access road on an existing easement across a SDG&E parcel. 2. Access from Cannon Road through the SDG&E maintenance yard entrance located immediately west of the railroad crossing. This is an existing access route to Encina Power Station. 3. Access from Carlsbad Blvd. through the main entrance to Encina Power Station.

CARLSBAD ENERGY CENTER PROJECT (CECP) DESIGN ADHERENCE TO
CALIFORNIA STATE FIRE CODE
AND CITY OF CARLSBAD MUNICIPAL CODE REQUIREMENTS (FIRE PROTECTION)
Revised April 23, 2009

DESIGN ELEMENT	CALIFORNIA FIRE CODE (Amended 2007)	CITY MUNICIPAL CODE STANDARD	CECP DESIGN BASIS
ACCESS ROAD GRADE	CA Fire Code, Section 503.2.7 – Grade The grade of the fire apparatus access road shall be within the limits established by the fire code official based on the fire department's apparatus.	17.04.120 Section 503.2.7 amended — Grade. Section 503.2.7 of the 2007 CA Fire Code is amended to read as follows: "The gradient for a fire apparatus access roadway shall not exceed 10.0% (5.7 degrees). The grade may be increased to a maximum of 15% (8.5 degrees) for approved lengths of access roadways, when all structures served by the access road are protected by automatic fire sprinkler systems. Cross slope shall not be greater than 2% for paved access roadways. Grades exceeding 10.0% (incline or decline) shall not be permitted without mitigation. Minimal mitigation shall be the installation of fire sprinkler systems and a surface of Portland cement concrete (PCC), with a deep broom finish perpendicular to the direction of travel, or equivalent, to enhance traction. The Fire Code Official may require additional mitigation measures where he deems appropriate. The angle of departure and angle of approach of a fire access roadway shall not exceed 12% (7 degrees) or as approved by the Fire Code Official."	The gradient of the CECP access roads shall comply with CA Fire Code and applicable City Municipal Code.
ACCESS VERTICAL CLEARANCE	CA Fire Code, Section 503.2.1 - Dimensions. Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (6096 mm), except for approved security gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than 13 feet 6 inches (4115 mm).	Adopted CA Fire Code	Design of CECP, including overhead clearances and transmission lines shall meet CA Fire Code and applicable City Municipal Code requirements.

CARLSBAD ENERGY CENTER PROJECT (CECP) DESIGN ADHERENCE TO
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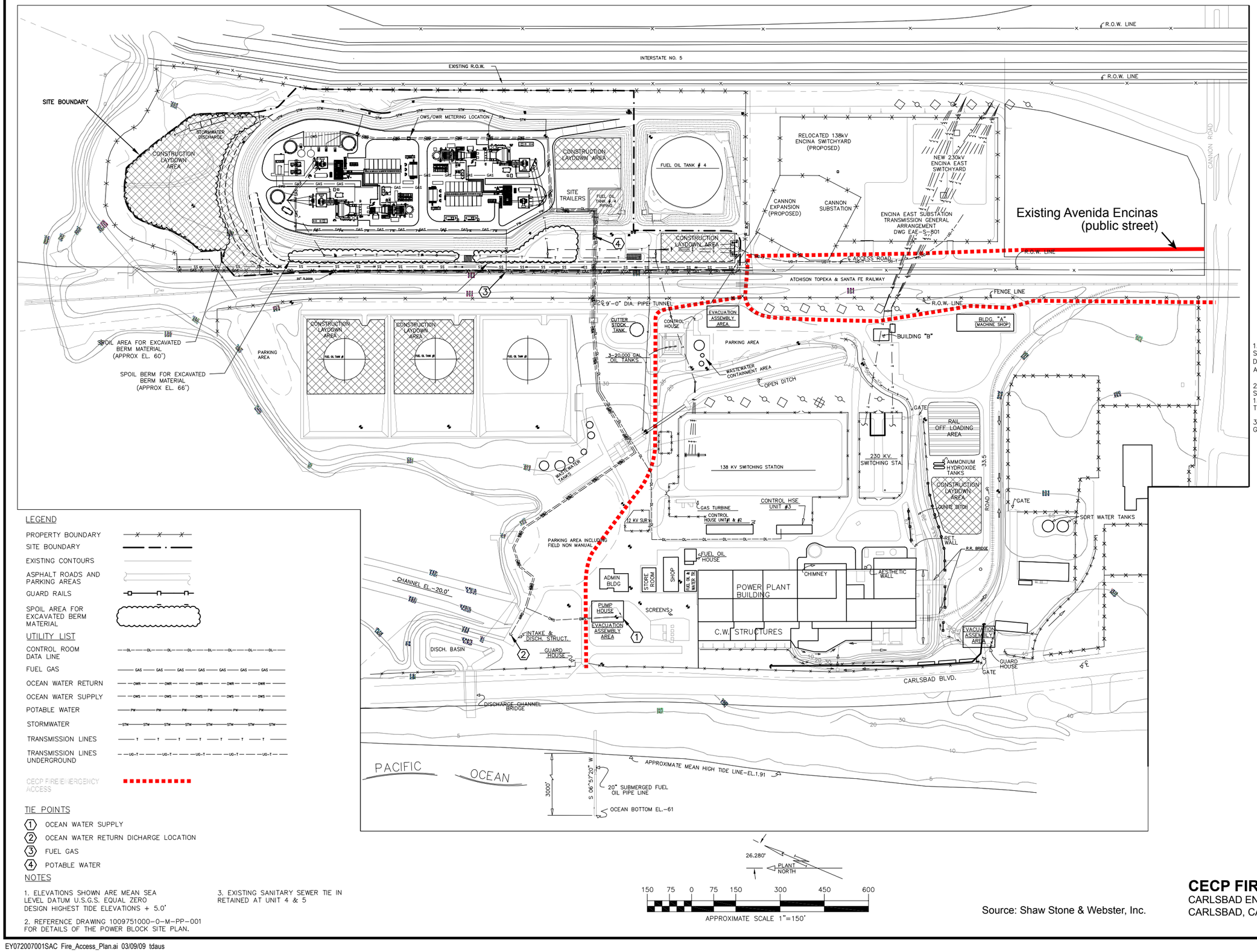
Revised April 23, 2009

DESIGN ELEMENT	CALIFORNIA FIRE CODE (Amended 2007)	CITY MUNICIPAL CODE STANDARD	CECP DESIGN BASIS
ACCESS EXTENT FROM BLDG.	CA Fire Code, Section D105.3 - Proximity to Building. At least one of the required access routes meeting this condition shall be located within a minimum of 15 ft (4572 mm) and a maximum of 30 feet (9144 mm) from the building, and shall be positioned parallel to one entire side of the building. Per Section 503.1.1, fire access road shall extend to within 150 ft of the facility. Exceptions may be authorized if the building is equipped with automatic sprinkler system.	Adopted CA Fire Code	Design of CECP, including building access from fire access roads and associated fire hydrants shall comply with CA Fire Code and applicable City Municipal Code requirements. Design of CECP, including automatic fire control systems shall meet Uniform Fire Code, CA Fire Code and applicable City Municipal Code requirements.
POINTS OF ACCESS	At least three points of access per CA Fire Code Appendix D Section D104.1. Appendix D refers to individual buildings not to the actual site.	Adopted CA Fire Code	Design of CECP shall comply with point of access requires for buildings per the CA Fire Code and applicable City Municipal Code requirements.
TURN RADIUS	Per CA Fire Code, Section 503.2.4	17.04.110 Section 503.2.4 amended — Turning Radius. Section 503.2.4 of the 2007 CA Fire Code is amended to read as follows: "The inside turning radius for an access road shall be 28 feet or greater with a 5 foot back of curb clearance for bumper overhang. The outside turning radius for an access road shall be a minimum of 46 feet. Cal-Trans 407-E template is utilized."	Design of CECP, including associated fire access road turning radii shall comply with CA Fire Code and applicable City Municipal Code requirements.

CARLSBAD ENERGY CENTER PROJECT (CECP) DESIGN ADHERENCE TO
CALIFORNIA STATE FIRE CODE
AND CITY OF CARLSBAD MUNICIPAL CODE REQUIREMENTS (FIRE PROTECTION)
Revised April 23, 2009

DESIGN ELEMENT	CALIFORNIA FIRE CODE (Amended 2007)	CITY MUNICIPAL CODE STANDARD	CECP DESIGN BASIS
DEAD END LENGTH	Per CA Fire Code, Section 503.2.4 150 ft without a turn around	Adopted CA Fire Code	Design of CECP, including lengths of associated plant grade fire access roads and berm grade perimeter roads shall comply with CA Fire Code and applicable City Municipal Code requirements.
TURN AROUND DESIGN AND LENGTH	CA Fire Code, Appendix D	Adopted CA Fire Code	Design of CECP, including turn around design/length shall comply with CA Fire Code and applicable City Municipal Code requirements.
HYDRANT SPACING	CA Fire Code, Appendix C and NFPA 850 Spacing = 300 ft	Adopted CA Fire Code	Design of CECP, including hydrant spacing shall comply with CA Fire Code and applicable City Municipal Code requirements.
FIRE FLOW REQUIREMENT	CA Fire Code, Appendix B; Section 508.3; or approved method	17.04.210 Section 508.3 amended—Fire flow. Section 508.3 of the 2007 CA Fire Code is amended to read as follows: "Fire flows shall be based on Appendix B of the 2007 California Fire Code. Consideration should be given to increasing the gallons per minute set forth in Appendix B to protect structures of extremely large square footage and for such reasons as: poor access roads; grade and canyon rims; hazardous brush; and response times greater than five minutes by a recognized fire department or fire suppression company.	The existing Encina Power Station fire protection system is tested routinely, including the portion of the system that serves the tank farm, and has adequate capacity. CECP's fire protection system shall comply with the CA Fire Code and applicable City Municipal Code requirements. Hazardous fire areas as defined in Appendix B of the 2007 California Fire Code do not

DESIGN ELEMENT	CALIFORNIA FIRE CODE (Amended 2007)	CITY MUNICIPAL CODE STANDARD	CECP DESIGN BASIS
FIRE FLOW REQUIREMENT (Continued)		In hazardous fire areas as defined in Appendix B, the main capacity for new subdivisions shall not be less than 2,500 gallons per minute, unless otherwise approved by the Fire Code Official. If fire flow increases are not feasible, the Fire Code Official may require alternative design standards such as: alternative types of construction providing a higher level of fire resistance; fuel break requirements which could include required irrigation; modified access road requirements; specified setback distances for building sites addressing canyon rim developments and hazardous brush areas; and other requirements authorized by the Carlsbad Municipal Code and as specified by the Fire Code Official."	apply as CECP is not a new subdivision and is not located in a hazardous brush area or canyon rim development.



REFERENCE DRAWINGS

1. EXISTING RECLAIM WATER PLAN SOURCE: CARLSBAD MUNICIPAL WATER DISTRICT, CMWD PROJECT NOS. (88-602) AND (92-406) SHEET 3 OF 17.

2. EXISTING CITY (POTABLE) WATER LINE SOURCE: CABRILLO POWER I LLC, PROJECT NO. 13-7292, DRAWING NO. M-661, SHEET 1 OF 1, TRACKING NO. R96B0389.DWG.

3. ENCINA EAST SUBSTATION TRANSMISSION GENERAL ARRANGEMENT DWG EXE-S-801

LEGEND

- PROPERTY BOUNDARY
- SITE BOUNDARY
- EXISTING CONTOURS
- ASPHALT ROADS AND PARKING AREAS
- GUARD RAILS
- SPOIL AREA FOR EXCAVATED BERM MATERIAL

UTILITY LIST

- CONTROL ROOM DATA LINE
- FUEL GAS
- OCEAN WATER RETURN
- OCEAN WATER SUPPLY
- POTABLE WATER
- STORMWATER
- TRANSMISSION LINES
- TRANSMISSION LINES UNDERGROUND
- CECP FIRE/EMERGENCY ACCESS

TIE POINTS

1. OCEAN WATER SUPPLY
2. OCEAN WATER RETURN DICHARGE LOCATION
3. FUEL GAS
4. POTABLE WATER

NOTES

1. ELEVATIONS SHOWN ARE MEAN SEA LEVEL DATUM U.S.G.S. EQUAL ZERO DESIGN HIGHEST TIDE ELEVATIONS + 5.0'
2. REFERENCE DRAWING 1009751000-0-M-PP-001 FOR DETAILS OF THE POWER BLOCK SITE PLAN.
3. EXISTING SANITARY SEWER TIE IN RETAINED AT UNIT 4 & 5

Source: Shaw Stone & Webster, Inc.

CECP FIRE/EMERGENCY ACCESS

CARLSBAD ENERGY CENTER PROJECT
CARLSBAD, CALIFORNIA

CH2MHILL

EY072007001SAC Fire_Access_Plan.ai 03/09/09 tdaus

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE CARLSBAD ENERGY CENTER PROJECT

Docket No. 07-AFC-6
PROOF OF SERVICE
(Revised 4/24/2009)

Carlsbad Energy Center Project (07-AFC-6)
Supplemental Fire Risk Assessment

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DECLARATION OF SERVICE

I, Judith M. Warmuth, declare that on April 24, 2009, I deposited copies of the aforementioned document in the United States mail at 980 Ninth Street, Suite 1900, Sacramento, California 95814, with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of California Code of Regulations, Title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

Judith M. Warmuth