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January 15, 2007

346558

Mr. Lorne Prescott
Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Eastshore Energy Center (06-AFC-06)
Data Response, Set 1A

Dear Lorne:

On behalf of the Eastshore Energy LLC, please find attached one original and 12 copies of Data Response, Set 1A, in response to Staff's Data Requests dated December 15, 2006.

Because the Drainage, Erosion, and Sediment Control Plan (DESCP) submitted in response to Data Request 41 is a very large document, only five hard copies are being filed with the Commission. In addition, air quality and public health modeling files referenced in the Data Response are extremely large documents and have therefore been transmitted directly to you via email. An electronic copy of these Data Responses, Set 1A and the above-referenced DESCP and air quality/public heath modeling files have also been included on CD-ROM.

Please call me or Jennifer Scholl if you have any questions.

Sincerely,

CH2M HILL

David A. Stein, PE
Program Manager

c: Project File
Proof of Service List

Eastshore Energy Center (06-AFC-06)

Data Responses, Set 1A

Submitted by:

Eastshore Energy, LLC

January 15, 2007

CH2MHILL

155 Grand Avenue, Suite 1000
Oakland, California 94612

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Eastshore Waste Management Errata

Section 1.0 Data Responses

The Applicant is providing data responses in reply to the data request received by CEC Staff on December 15, 2006. The data responses are in the same order as the data requests provided by the CEC. In addition to the data responses, an updated Table 8.13-2 is included as an attachment titled Eastshore Waste Management Errata that is located at the end of the document. The correction to the Table 8.13-2 address errors in previously reported values for chemical cleaning fluid waste and hydrotest water, both of which have been lowered to the correct anticipated volumes. All other values in Table 8.13-2 remain unchanged.

Technical Area: Air Quality
Author: Brewster Birdsall

BACKGROUND

Reduce Potential PM10 and PM2.5 Impacts

The U.S. EPA recently revised the national ambient air quality standards (NAAQS) for particulate matter less than 2.5 micrometers (PM2.5) downward to 35 micrograms per cubic meter (µg/m3) 24-hour average concentration (see Federal Register Vol. 71, No. 200, p. 61144, October 17, 2006; effective December 18, 2006). The previous standard was 65 µg/m3.

Table 8.1-34 of the AFC shows that the project would cause a maximum impact of roughly 50 µg/m3 PM2.5 over a 24-hour averaging period from direct emissions of PM2.5. Because this project impact would exceed the new NAAQS, the project appears to cause a direct violation of the standard. This would be a significant impact that may be difficult to fully mitigate. Project-related emissions of other pollutants that are precursors to PM2.5 would exacerbate the direct impact by reacting in the atmosphere to form additional, indirect PM2.5 that would add to the project's potentially significant impact.

Emissions of PM10 and PM2.5 should be limited to the lowest achievable rate. The proposed maximum hourly PM10/2.5 emission rate of 2.43 lb/hr (AFC Table 8.1-4) would be roughly equivalent to 0.095 grams-per-brake horsepower-hour (g/bhp-hr). Although the applicant proposes to achieve the level of the Best Available Control Technology (BACT) by using strictly pipeline-quality natural gas, the AFC does not propose a BACT emission level for PM10 (AFC Section 8.1.4.5). The AFC shows that the "Level 2" standards (i.e., achieved in practice) are based on the September 2001 version of California Air Resources Board's (CARB) "Guidance for the Permitting of Electrical Generation Technologies." However, the PM10 level of 0.02 g/bhp-hr from Table I-1 of the July 2002 version of the CARB guidance is not mentioned (AFC Appendix 8.1F). The current 0.02 g/bhp-hr recommendation is for natural gas-fueled reciprocating engine units under 50 megawatts (MW), such as those proposed for Eastshore, and it is considered "achieved in practice" by the San Joaquin Valley Air Pollution Control District (see also AFC Table 8.1F-1).

Good Engineering Practice (GEP) stack height for the facility is shown to be about 120 feet (AFC Section 8.1.7.1.4). Direct impacts of PM10 and PM2.5 might be reduced by increasing the design of the stacks from the proposed 70 feet to some level closer, but not in excess of 120 feet.

DATA REQUEST

1. Please describe why the air emissions are not being mitigated to achieve the more-stringent PM10 and PM2.5 emission limit of 0.02 g/bhp-hr consistent with the current BACT recommendation in CARB guidelines.

Response:

The proposed PM10 and PM2.5 emission level is based on the Bay Area Air Quality Management District's BACT guidelines that specify the use of natural gas as BACT for spark-ignited, lean burn engines. The proposed levels are therefore consistent with the vendor-provided PM10 and PM2.5 emissions guarantee based on the assumed site-specific pipeline-quality natural gas specifications and equipment performance. Eastshore believes this to be the appropriate reference for the PM10/2.5 emission level.

In a review of the basis for the CARB guidelines (dated July 2002), the 0.02 g/bhp-hr value for PM10 may have been proposed by CARB based on a then-current South Coast Air Quality Management District (SCAQMD) Part D BACT guideline (Version 10-20-2000 Rev.0) that has since been superceded. Since the issued date of the CARB guideline, SCAQMD's current guidelines (December 2004) for this category of combustion equipment provides a reference to the *"Clean Fuels Policy"* in Part C of the BACT Guidelines (reference: www.aqmd.gov/bact/part-d-final-7-14-2006-update.pdf, p.71). The Clean Fuels Policy states that a clean fuel is a fuel that produces air emissions equivalent to or lower than natural gas for NOx, SOx, ROG, and fine particulate matter (PM10). Pipeline quality natural gas fulfills the SCAQMD definition of a clean fuel. Therefore, CARB's guidelines are not reflective of the most current guidance from both SCAQMD and BAAQMD.

2. Please describe the effectiveness and feasibility of other modifications to the facility design or operation that could reduce 24-hour PM10 and PM2.5 impacts (e.g., discuss feasibility of increasing the height of the stacks).

Response:

Based on the revised modeling results (see Response 3) that the facility will not cause a new exceedance of the 24-hour PM10 or PM2.5 standards, no design changes to the facility, such as increasing stack height, are proposed. . In addition, the modeling methodology used conservative assumptions with regards to emissions, 24-hour operating profiles, and stack parameters. Therefore, during the operation of this power plant the actual 24-hour PM10 and PM2.5 concentrations are expected to be much lower than the conservative impacts estimated by the modeling.

3. Please revise the PM10/2.5 modeling assessment to show how the project would not cause a violation of new PM2.5 NAAQS.

Response:

The new PM2.5 NAAQS is 35 ug/m3. Compliance with the new standard is calculated as the 98th percentile of 24-hour PM2.5 concentrations in a year, averaged over three years. The PM2.5 modeling presented in the application used the highest 24-hour PM2.5 concentration rather than the 98th percentile as

required in 40 CFR 50, Appendix N (Interpretation of the National Ambient Air Quality Standards for PM2.5) and 40 CFR 51, Appendix W (Revision to the Guideline on Air Quality Models). The revised analysis is presented below.

To calculate the 98th percentile 24-hour PM2.5 concentration on a year by year basis, the following formula was used:

$$P_{0.98y} = X_{[i+1]}$$

where:

$P_{0.98y}$ = 98th percentile for year y
$X_{[i+1]}$ = the (i=1)th number in the ordered series of numbers
i = the integer part of the product of 0.98 and n

The three year average 24-hour 98th percentile is then calculated by averaging the annual 98th percentiles.

Solving for P on an annual basis produces:

$$0.98 \times 365 = 357.7 == i+1 = 358$$

The Industrial Source Complex Short Term Version 3 (ISCST3) model was rerun to calculate the 98th percentile 24-hour average on a year by year basis to calculate the revised 24-hour PM2.5 concentration. Based on the 98th percentile concentration for a given year, which results in 358th sample for each year, statistically the 8th highest 24-hour concentration from the ISCST3 model output was used for each year. The meteorological data set contained five years of hourly data for the years 1990-1994. A rolling three year average was used to obtain the final modeled 24-hr PM 2.5 concentration. The resulting estimated impact is 30.39 ug/m^3 of PM2.5, which is less than the federal standard of 35 ug/m^3. Thus, Eastshore impacts would not violate the PM2.5 NAAQS.

The ISCST3 modeling input/output files that list the 8th highest concentration have been submitted directly to CEC Staff via email.

4. Please describe the effect that multiple start-cycles per day could have on PM2.5 24-hour average concentrations, and discuss whether it is feasible to limit the number of start-cycles per day to minimize PM2.5 impacts.

Response:

The modeling presented in the application looked at the worst case daily emissions which assumed all fourteen engines with 24-hours of operation (i.e., each engine having one 30 minute cold start with the remaining 23.5 hours in base load operation). The warm-start emissions result in hourly emissions that are less than base load operation, thus the addition of more warm starts in a worst-case day would result in lower daily emissions and lower modeled impacts.

In addition, the inclusion of other starts, both warm or cold, on a worst-case day would mean that the plant is not running for some period of time, which, again, would reduce the total worst-case daily emissions and the resultant modeled impacts. Thus, the addition of multiple warm starts would reduce the PM 2.5 estimated 24-hour concentration. Therefore, no limits on the number of starts are necessary. In addition, the PG&E contract with Eastshore specifies that the plant must be dispatchable during each day without restriction to the number of daily starts. Thus a limitation on the number of starts does not reduce the maximum air quality impacts and is not commercially feasible.

BACKGROUND

Reduce Proposed Level of Ammonia Slip

Ammonia is a State-designated toxic air contaminant and a precursor to PM2.5 formed in the atmosphere downwind. The applicant's proposal is to limit project emissions to 20 ppmvd, a level that would result in nearly 55 tons-per-year NH3 (AFC Appendix 8.1A). Aside from health risk considerations, the project PM2.5 impacts (described above) warrant fully controlling ammonia emissions to avoid contributing to violations of the PM2.5 standards.

In the California Air Resources Board's "Guidance for the Permitting of Electrical Generation Technologies" (pg. 31 of July 2002 guidance), CARB recommends that lean-burn internal combustion engine units with individual capacities of less than 50 MW be controlled to an ammonia slip of 10 ppmvd or less. According to the guidelines, this level is achievable based for engines with Selective Catalytic Reduction (SCR) and an oxidation catalyst, as proposed by Eastshore.

DATA REQUEST

5. Please describe whether the SCR system design could be modified to achieve a level of 10 ppmvd ammonia slip at 15 percent O_2.

   Response:

   The current SCR design provides for a proposed level of 5 ppmvd NOx @ 15% O_2, which is achievable with a 20 ppmv ammonia slip at 15% O2. The Eastshore project was chosen by PG&E due to its extremely fast response to system load swings and to provide highly dispatchable load shaping for PG&E's system. Therefore, Eastshore has had to address the design of the SCR system to maintain the very low NOX level to address any compliance risk throughout the plant's operating régime. At this time, it is uncertain as to what time averaging for NOx will be imposed on the project. The SCR can be modified to achieve a level of 10 ppmvd @ 15% O_2 ammonia slip but based on current uncertainties in permit compliance it would result in a concurrent increase in the proposed level of 5 ppmvd NOx @ 15% O_2.

6. Please describe the proposed method for monitoring compliance with the ammonia slip limit.

Response:

The proposed method to monitor compliance is an ammonia slip source test conducted for initial emissions compliance testing and during subsequent emissions compliance testing, as required by the Bay Area Air Quality Management District and its specified source test method, which we anticipate to be ST-1B.

BACKGROUND

Mitigation for PM10 and PM2.5 Impacts

The applicant proposes to mitigate PM10 emissions during the fall and winter season. By estimating the magnitude of PM10 emissions likely to occur on a monthly basis (AFC Appendix 8.1A), and by using a 30-year forecast of plant operation, Eastshore proposes to offset 6.4 tons of PM10/PM2.5. This proposed level of mitigation would not be adequate to offset or reduce impacts caused by year-round PM10/PM2.5 emissions, which at 70.7 tons per year (AFC Table 8.1-10), appear to cause new violations of the PM2.5 NAAQS (as described above).

The applicant's offset calculations are based on a PM10 emission rate of 0.60 lb/hr-per-engine (AFC Appendix 8.1A), but the engines would be allowed to emit 2.43 lb/hr-per-engine (in AFC Table 8.1-4). The PM10/2.5 impacts occurring at the proposed maximum emission rate must be fully mitigated. Either a more-stringent PM10/2.5 hourly emission limit should be proposed (as described above), or the proposed mitigation should be increased to cover the impacts of the allowed emissions. SO2 impacts as a precursor to PM10/2.5 impacts must also be mitigated (AFC page 8.1-56).

The AFC shows a vendor-specified SO2 emission rate of 0.23 lb SO2/hr per engine, with 0.2 lb SO2/hr portion per engine that would be caused by "the contribution from lube oil" (Appendix 8.1A). The contribution of lube oil to SO2 emissions raises questions because staff expects SO2 emissions to generally be dictated by the contribution of sulfur in fuel combustion (shown to be 0.03 lb/hr in AFC Appendix 8.1A). For example, it is not clear whether the higher levels of SO2 emissions from lube oil would occur commonly or only occasionally, and the presence of lube oil in the combustion chamber implies that additional unburned hydrocarbon and PM10 emissions may occur. If possible, clarifying the lube oil consumption/combustions scenarios could result in a lower SO2 emission limit, which would minimize the potential SO2 and secondary PM10/2.5 impacts.

The applicant proposes to mitigate PM10 emissions occurring only during 895 hours of operation between October and April (AFC Table 8.1A-13), but the facility would be allowed to operate 4,000 hours per year. A seasonal mitigation scheme must be carefully crafted to be enforceable. Emission reductions cannot be certified on a seasonal basis in the Bay Area Air Quality Management District (AQMD) as they can be in other air districts that have seasonal accounting systems. Because the project does not include any proposed limitation on seasonal operation, there would be no way to ensure that project emissions are not unevenly biased to occur in the winter months.

Therefore, mitigation should be increased to accommodate the proposed annual capacity factor of 45.7 percent.

DATA REQUEST

7. Please identify sufficient PM10/2.5 mitigation for the proposed maximum PM10/2.5 emission rate for each engine at the proposed annual capacity factor of 45.7 percent. Staff suggests a one-to-one ratio of PM10 reductions for the proposed total of PM10 and SO2 emissions.

Response:

Eastshore project staff are in the process of identifying and obtaining mitigation based on our proposed mitigation outlined in Appendix 8.1A. The CEC will be updated on progress of identifying sufficient mitigation.

Facility PM10/2.5 emissions offsets are not required by the Bay Area AQMD's Regulation 2 Rule 2. Eastshore will mitigate PM10/PM2.5 emissions during the fall/winter period in which ambient PM concentrations may be above the ambient air quality standards, as outlined in Appendix 8.1.A, Mitigation Emission Estimates. Emissions are proposed be mitigated on a 1:1 PM10:PM10 basis, or on an interpollutant-trading ratio of 3:1 SOx:PM10 basis. The justification for the latter is discussed in detailed in Air Quality Data Response 8.

Emissions will be mitigated on an actual-to-actual basis. For the first year estimate of actual emissions, Eastshore has estimated actual operating hours on a 30-yr average basis using the Global Energy Decisions forecasting model described in Appendix 8.1.A and actual emissions estimate based on recent source test emission rates from the Barrick project, which operates the same make and model of lean burn engines that fire natural gas, solely. The estimated actual emissions of PM10/PM2.5 are 6.38 tons averaged over the October to April non-attainment period, as shown in the appendix. This level of mitigation will be provided prior to facility operations, as agreed upon through the CEC licensing process. For subsequent operating years, on a periodic basis thereafter, Eastshore will update this emissions estimate, based on Eastshore's actual operating hours and PM10 source test data; additional PM10/2.5 mitigation will be provided at that time, if necessary. Additional mitigation would be provided in the event that actual operating hours are greater than anticipated based on an annual reconciliation.

Eastshore will work with the CEC and the Bay Area AQMD to develop a mutually acceptable mitigation plan reflective of local air quality improvement goals. This plan will detail the source of mitigations. The mitigation plan may include a combination of banked emission reduction credits (ERCs) of PM10 and/or SOx, as well as projects that reduce PM10/2.5 emissions and result in actual contemporaneous offsets. Eastshore will use banked ERCs for mitigation to the extent that sufficient quantities can be identified and secured to mitigate PM10 and PM2.5 emissions. Eastshore will identify specific credits to offset the

projected 6.38 ton of actual emissions during the non-attainment season in the final mitigation plan.

Eastshore understands CEC Staff's concerns regarding mitigation and is interested in discussing the appropriate PM mitigation for this project. Eastshore would like to begin that discussion at upcoming workshops.

8. Please describe and provide supporting analysis for any inter-pollutant trading ratio that would be used to mitigate PM10/2.5 impacts with reductions of other pollutants.

Response:

The applicant proposes to use, as one mitigation option, inter-pollutant trading - sulfur oxides (SO_x) emission reduction credits to mitigate the estimated actual particulate matter (PM10 and PM2.5) emissions. The applicant proposes to use 3 pounds of SO_x emission reduction credits to mitigate every pound of the project's new PM10/2.5 emissions during the PM10/2.5 non-attainment season (fall and winter). Because SO_x is a precursor to PM10/2.5, its use for mitigation of PM10/2.5 has been accepted on many projects in California. Presented below is support for the proposed inter-pollutant trading ratio.

Inter-pollutant offset programs are not new to California or nationwide new source review programs. Since the early 1980's, air agencies, including the California Air Resources Board, have been involved in developing background data to support inter-pollutant offset schemes. A summary of chronological data is as follows:

- March 1980 – the CARB (Research Division) publishes a report entitled "Methodology for Calculation of Inter-Pollutant Trade-Off Ratios". Sample calculations for several areas were presented, including the Pittsburg, Ca., (east San Francisco Bay area). The summary table for this area estimates the appropriate offset ratio for TSP when providing SO2 emissions reductions is 2.2:1.
- May 1986 – CARB responds to the San Joaquin Valley APCD's request to develop inter-pollutant offset ratios for various pollutants. Several tables are presented in this report for the following areas; Stockton, Fresno, Visalia, Oildale, and Bakersfield. The report concludes that a reasonable offset ratio for PM10 when providing SO_2 emissions reductions or credits ranges from 0.6:1 to 3.2:1, with an overall average ratio of 1.46:1.
- March 1988 – CARB TSD staff present a memo to SSD staff concerning recommendations for PM10 inter-pollutant offset ratios. CARB states "If it is assumed that the gas emissions are fully converted to PM10, one pound of SOx or NOx emissions would form about 2.5 pounds of PM10 in the form of sulfate or nitrate salts…". This would indicate that an offset ratio on the order of 2.5:1 would be appropriate when PM10 emissions are being offset by SO_2 reduction credits.

Other documents and decisions include:

- April 1989 – The CEC grants a SPPE for the Mojave Cogeneration Project (Docket 88-SPPE-2), which proposes to use an inter-pollutant offset scheme using SO_x and NO_x emissions reductions to offset particulate matter emissions increases.
- November 2000 – CARB publishes a guidance document, which delineates a series of summaries of offset packages for licensed power plant projects. The use of SO_2 inter-pollutant offset schemes for mitigation of PM10 emissions increases include:
  - Delta Energy Center – partially offsets its PM10 emissions of 376.7 tons by using 280.4 tons of SO_2 (ratio unspecified).
  - Morro Bay Power Plant proposes an on-site inter-pollutant offset strategy which uses 99.86 tons of SO_x at a ratio of 1:1 to offset an equivalent amount of PM10 emissions increases.
- February 2001 – Bay Area AQMD staff propose a 3:1 SO_2/PM10 inter-pollutant offset ratio for the Potrero Unit 7 project. District staff indicates that the 3:1 offset ratio is consistent with their previous actions as well as the 1992 SAI report for Contra Costa County. In addition, BAAQMD staff clearly indicate that the ratio should be based on the winter PM episode data, not annual average data. Use of the winter period PM10 data is also supported by data presented in the CARB Almanac-2006, Chapter 2, which indicates for the San Francisco Bay Area, that there is "a strong seasonal variation in PM, with higher PM10 and PM2.5 concentrations in the fall and winter months. In the winter, PM10 and PM2.5 concentrations remain elevated for extended periods. These higher concentrations are caused by increased activity for some emission sources and meteorological conditions that are conducive to the build-up of PM." CARB presents data which indicates that for the Bay Area region, that the estimated secondary portion of PM2.5 (from SOx and NOx) is approximately 40%, which results in an inter-pollutant offset ratio of 2.5:1. In addition, CARB presents figures which clearly indicate that the peak PM10 and PM2.5 periods are during the winter time frame.
- August 2001 – Sierra Research prepares a technical response on the calculation of inter-pollutant ratios for the GWF Henrietta Project (southern San Joaquin Valley). The technical response proposes to offset PM10 emissions with SO_2 emissions reductions or credits. The report indicates that the appropriate ratio ranges from 1.17:1 to 1.64:1, with an average of 1.4:1.
- February 2002 – CH2M staff prepare a data response for the Cosumnes Power Plant project defending the use of an inter-pollutant offset ratio of 1.5:1 (SO_2/PM10).
- August 2002 – Bay Area AQMD staff analysis in the FDOC for the East Altamont Energy Center concludes that a ratio of 3:1 is sufficient to produce a net air quality benefit when using SO_2 emissions reductions or credits to mitigate PM10 emissions increases.
- December 2004 – CEC staff indicates that the Pastoria Energy Facility (99-AFC-7C) has agreed to an offset ratio for SO_2/PM10 of 2.9:1, and that such a

ratio would be beneficial to air quality. Condition AQ-26 contains ratio values higher than 2.9:1 based upon the proposed use of SO_2 reductions occurring within 15 miles, as well as reductions occurring at distances greater than 15 miles, i.e., 3.1:1 to 3.4:1.

Based on the above summary and prior Bay Area precedent, it is demonstrated that the proposed SO_2/PM10 offset ratio of 3:1 is more than sufficient to provide a net air quality benefit, and that no further analytical studies are warranted in order to support the use of the proposed 3:1 ratio value.

9. Please describe whether any of the proposed emission reductions would be biased to occur during winter months and whether the reductions would be biased to PM2.5 instead of PM10.

Response:

The applicant proposes to use several approaches for mitigation of PM10/2.5 emissions; it is assumed that all PM10 emissions are PM2.5 emissions. (See responses to Air Quality Data Requests 7 and 8.) To the extent feasible, potential mitigation sources (for example, fireplaces) that are biased for wintertime reductions will be identified and used as mitigation to mitigate PM10 and PM2.5 emissions. At this time, because final emission reductions have not been identified and acquired, we have not yet determined which reductions would be biased to the winter months and PM2.5.

10. Please consider and describe the feasibility of curtailing operation of the project with a limit on the number of operating hours during the winter season.

Response:

The Eastshore Energy (Eastshore) Center has a Power Purchase Agreement from PG&E. As such, PG&E will control dispatch of the facility into the grid. Operating hours will be contingent upon the energy needs of the greater Bay Area as identified by PG&E. Eastshore's operations, as with other power providers with similar contractual obligations, will be based on a variety of circumstances that are not within the direct control of Eastshore. Therefore, committing to a specific limitation on the number of hours of operation during the winter months is not commercially feasible.

11. Please describe whether the presence of lube oil would cause maximum hourly SO2 emissions of 0.23 lb/hr per engine during normal operations or whether these emissions would be limited to other conditions, such as startup and shutdown. If the contribution of lube oil is occasional, please also describe whether it would be feasible to use lower sulfur lube oil, and/or accept a lower annual SO2 emission limit.

Response:

As presented in the emission estimates (Appendix 8.1A), the SO_2 emissions estimate is based on a contribution from both natural gas combustion and lube oil used during normal operations of each engine. Based on equipment vendor information, these emissions would not be limited to other conditions such as startup and shutdown. The contribution from lube oil is therefore not occasional, and there is not a higher SO_2 mass rate during startup and shutdown. To date, no acceptable lower sulfur lube oil has been recommended from the equipment manufacturer. Therefore, a lower annual SO_2 emission limit is not feasible.

12. Please discuss whether engine lube oil consumption/combustion contributes to the emissions shown in the AFC, or would contribute emissions of unburned hydrocarbons (precursor organic compounds) or PM10/2.5 beyond those shown in the AFC.

Response:

The equipment vendor's guaranteed emissions already include any affect attributable to lube oil, to the extent that lube oil contributes to a pollutant's emission rate. Therefore, lube oil consumption/combustion would not contribute emissions of POC or PM10/2.5 beyond those shown in the AFC.

13. Please submit timely updates to staff regarding the proposed air pollutant emissions mitigation strategies including emission reduction credits held by the applicant. Confidential filings are acceptable, but the strategy will be described in the Preliminary Staff Assessment.

Response:

Timely updates will be supplied to CEC staff.

BACKGROUND

Air Quality Modeling Analysis

Regarding air quality modeling for construction, a key stated assumption is that much of the project area is disturbed during the entire construction process (AFC Appendix Section 8.1E.3). This implies that the wind-driven portion of the fugitive dust emissions would occur around the clock. A preliminary review of the modeling files on CD shows that particulate matter annual impacts from diesel exhaust (file: ESEDPM1.OUT) are determined by dividing the annual emissions into each hour and multiplying a "2.4" hour-of-day factor on each of the ten daytime hours.

However, the applicant's methods for determining particulate matter impacts from dust and other sources are handled very differently (files: ESEPGAN2 and ESEPG24). The source called PAREA1 (in file: ESEPG24) seems like it should include all diesel and fugitive dust particulate matter emissions, because the 24-hour impacts of diesel plus dust sources are not analyzed in any other file, but PAREA1 is only modeled at 2.7

lb/day [i.e., 1.348x10-6 g/s/m2 over 10 hours per day and the 6.22 acre site]. As such, this model run (file: ESEPG24) does not seem to account for all the fugitive dust expected (3.8 lb/day) or the diesel exhaust (16.0 lb/day) shown in AFC Table 8.1E-1. Because sources seem to be underestimated in the files, the impacts shown in AFC Table 8.1E-2 do not seem to be supported by the modeling files.

DATA REQUEST

14. Please provide or identify air quality modeling files that include all construction-related sources of particulate matter (total of 19.8 lb/day shown in Table 8.1E-1) and the 24-hour period maximum PM10 impact. The files should support the results shown in Table 8.1E-2, which do not seem to be supported.

Response:

Air quality modeling files that account for construction diesel particulate matter (PM10) emissions from combustion, as well as fugitive dust PM10 emissions, were provided to CEC with the AFC. As explained below, diesel PM10 impacts were run separately from fugitive dust PM10 impacts. Results were conservatively added together as a worst-case screening estimate, even though maximum impacts from diesel PM10 emissions and fugitive dust PM10 emissions occur at different locations and on different days.

A detailed table showing the final results, ES Const Impact 083106.xls, has been submitted to directly to CEC Staff via email. It shows modeling impact calculation details corresponding to modeling files provided to CEC. Updated ESEPG24.INP and ESEPG24.OUT files have been provided, since it was discovered that the files provided to CEC with the AFC were not the final version.

The CEC's background provided for Air Quality Data Request 14 is noted and the following presents additional context for the analysis:

- Diesel PM10 concentration- Diesel PM10 impacts were calculated from ISCST3 modeling with input NOx emission rates by scaling impacts based on the ratio of PM10 and NOx emissions. The purpose of this approach was to streamline work needed to calculate impacts for various pollutants and averaging times. The NOx modeling run used for 24-hour diesel PM10 impacts was ESENO1.INP. The NOx modeling runs used for annual average diesel PM10 impacts were ESENOAN1.INP to ESENOAN5.INP (five separate files). PM10 concentrations were calculated by multiplying modeled NOx concentrations by a ratio of the PM10 and NOx emission rates. The file named ESEDPM1.INP was not used for maximum 24-hour average and annual average PM10 modeling, but rather, was run to obtain a 5-year average diesel PM concentration suitable for health risk calculations.
- Diesel PM10 modeling of fugitive dust - Diesel PM10 emissions were modeled over the 10-hour construction day, because that is the only period during which PM10 project emissions would occur. The controlled fugitive dust emission factor from the MRI report accounts for PM10 emissions from various sources, including grading, unpaved road traffic,

and wind erosion. Most of the fugitive emissions will occur due to grading activities and unpaved road traffic during the 10-hour construction day. Only a relatively small amount of additional PM10 emissions might occur due to wind during the remainder of the day outside of project construction hours and during nighttime hours. Thus, potential wind-driven dust emissions were not calculated for non-construction hours.

- Revised Wind-driven dust emissions – To address the above concern, 24-hour fugitive PM10 modeling was (re) run assuming that the maximum hourly PM10 emission rates calculated for the main site and laydown areas would occur over the entire 24-hour day The original modeling file already includes this assumption for the laydown area. The maximum daily PM10 emission rates corresponding to a 24-hr day are 65.0 lb/day for the main site and 26.2 lb/day for the laydown area, as expected much higher than the values calculated in Table 8.1E-1 for construction hours. Even with this gross overestimate, the revised modeling results do not show that impacts that exceed the state or federal 24-hour annual average PM10 standards. The maximum 24-hour average PM10 impact, assuming diesel PM emissions occur 10 hours per day and fugitive dust emissions occur 24-hours per day (at the maximum 10 hour/day rate) would be 36.3 $\mu g/m^3$. Modeling files that address this scenario are provided with this response as ESEPG242.INP and ESEPG242.OUT. The updated modeling impact calculations are shown in the file ES Const Impact 010307.xls.

The following construction fugitive PM10 emission calculations and modeling assumptions are noted to underscore the overall conservative nature of the project's construction impacts analysis:

1. 95% of the main site is assumed to be disturbed on any given day during construction hours, when only a fraction of that area will actually be disturbed;
2. 50% of the laydown area is modeled to be disturbed on any given day, although the expected area generating fugitive dust emissions on any given day will be much smaller and mainly from unpaved road traffic, not the grading and earth moving activities that contribute most to fugitive dust emissions;
3. Maximum PM10 impacts from diesel combustion and fugitive are added, even though the impacts occur at separate locations and at different times;
4. Diesel combustion PM10 emission factors are greater than vendor equipment emission estimates.

BACKGROUND

The proposed natural gas-fired fuel heater (at 2 MMBtu/hr as in Data Adequacy Supplement dated October 31, 2006) is not included in the modeling analysis.

DATA REQUEST

15. Please include the natural gas-fired fuel heater in the impact assessment or conduct a sensitivity/screening analysis for this source to provide a rationale for rejecting it from facility-wide modeling.

Response:

A screening modeling assessment for the gas fired fuel heater was completed using the SCREEN3 dispersion model. The heater will be placed at the eastern end of the project site in the gas metering and conditioning area, as shown on the plot plan included with the application. The stack parameters are as follows:

- Stack height = 17.5 feet
- Stack diameter = 0.5 feet
- Stack velocity = 100 feet/sec
- Stack temperature = 1015 degrees F

The emission rates previously provided in the AFC were used in the analysis. Using the full set of SCREEN3 meteorology (a worst-case compilation of wind speed and atmospheric stability combinations), the results of the modeling are shown in Table 1.

TABLE AQ 1
Fuel Gas Heater Modeled Concentrations Using SCREEN3

Pollutant	Avg. Period	Maximum Concentration ($\mu g/m^3$)	Class II Significance Level ($\mu g/m^3$)	BAAQMD SILs ($\mu g/m^3$)	Ambient Air Quality CAAQS/NAAQS ($\mu g/m^3$)	($\mu g/m^3$)
NO_2	1-hour	38.21	-	19	470	-
	Annual	1.31	1	1	-	100
PM10[1]	24-hour	0.092	5	5	50	150
	Annual	0.012	1	1	20	50
PM2.5[1]	24-hour	0.092	5	5	-	65
	Annual	0.012	1	1	12	15
CO	1-hour	32.20	2000	2000	23,000	40,000
	8-hour	26.74	500	500	10,000	10,000
SO_2	1-hour	2.73	-	-	655	-
	3-hour	2.46	25	25	1300	1,300
	24-hour	1.09	5	5	105	365
	Annual	0.14	1	1	-	80

The results of the screening modeling indicate that for all averaging periods, the maximum concentrations are less than significance, except for 1-hour and annual NO_2. Adding the annual screening results to the annual ISCST3 results plus background produces 36 ug/m^3, which is less than the NAAQS of 100 ug/m^3.

Since the SCREEN3 results for NO2 were in excess of the SILs, a refined analysis of facility wide 1-hour NO2 impacts including fuel gas heater was conducted using the ISCST3 model. The results of the modeling show the maximum facility impact is 314 ug/m^3. Adding in the background of 143 ug/m^3 produces a total of 457ug/m^3, which represents an increase of 0.01 ug/m^3 at the point of maximum impact. Thus, the fuel gas heater is expected to cause an insignificant increase in pollutant concentrations. A copy of the modeling input/output files has been submitted via email directly to CEC staff. A refined ISCST3 analysis for annual emissions from the heater was not completed because the sum of the prior ISCST3 annual modeling results and the conservative SCREEN3 annual results is below the annual standard.

BACKGROUND

Cumulative impacts have not yet been evaluated (AFC Section 8.1.8.13), and the protocol for cumulative modeling indicates that "reasonably foreseeable projects" will be included in the analysis (AFC Appendix 8.1H). The Russell City Energy Center (01-AFC-7) is a facility that received an Energy Commission license but has not yet begun construction. Staff understands that the ultimate location and timing of the plant is now in question with the amendment filed November 7, 2006. However, it is not clear in the protocol how this potential source will be addressed in the cumulative impacts analysis. Staff recommends including this source.

DATA REQUEST

16. Please propose a strategy for including the Russell City Energy Center in the cumulative air quality impacts analysis.

    Response:

    The revised Russell City Energy Center (RCEC) will be included in the cumulative modeling analysis that will be provided at a later date (see AQ17). We have all the RCEC information with regards to stack location, stack parameters, emission rates, and operating hours. In addition, we have the modeling input files that were used for the revised amendment.

17. Please prepare a cumulative analysis that incorporates the licensed, or amended Russell City project.

    Response:

    Once the Bay Area Air Quality Management District (BAAQMD) provides a list of other permitted but not yet operational sources, besides Russell City, a cumulative modeling analysis will be prepared. The cumulative modeling analysis including the amended RCEC project will be provided at a later date.

Technical Area: Biological Resources
Author: John Mathias

BACKGROUND

The AFC states that the Applicant will undertake informal consultation with the U. S. Fish and Wildlife Service (USFWS) regarding the need for a Biological Opinion. Staff needs confirmation on whether or not formal consultation with USFWS will be needed in order to complete the project's analysis.

DATA REQUEST

18.

a. Please provide copies of any written correspondence with USFWS. If written correspondence is not available, please provide a detailed summary of any communication with the USFWS, including the names and contact information of USFWS staff whom the Applicant has contacted.

Response:

Rene Langis, Sr. Biologist CH2M HILL, spoke to Jim Browning of USFWS on September 13, 2006 regarding the subject project. Mr. Browning suggested that relevant information (special status species list and accompanying narrative) be sent to the attention of Ryan Olah, Coast Bay Delta Branch Supervisor, with a request of concurrence on a finding of no significant adverse effect to federal listed species.

Written correspondence is attached (See Attachment BR-18).

b. If formal consultation will be required, please provide an estimate of when that process will be completed.

Response:

USFWS has not yet responded to the request, therefore we can not estimate when the consultation request will be completed. We will inform the CEC of the expected timeline following USFWS initial review of the letter.

Attachment BR-18

United States Fish and Wildlife Letter, January 5, 2007

CH2M HILL
155 Grand Avenue
Oakland, CA 94612
P.O. Box 12681
Oakland, CA 94604-2681
Tel 510.251.2426
Fax 510.622.9000

January 5, 2007

Mr. Ryan Olah
Coast Bay Delta Branch Supervisor
US Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way
Sacramento, CA 95825

Subject: Request for Concurrence with the Finding that the Eastshore Energy Center Project is Not Likely to Adversely Affect Federal Listed Species

Dear Mr. Olah:

This letter is a request for concurrence with our determination that the construction and operation of the Eastshore Energy Center Project (Eastshore) will not have a significant adverse effect on federal special status species.

The Eastshore Energy Center will be a nominal 115.5-megawatt (MW) intermediate/ peaking load facility using natural gas-fired reciprocating engine technology. The Eastshore facility will be located at 25101 Clawiter Road in the City of Hayward, where industrial development is the primary land use with residential development to the east and the San Francisco Bay to the west. No vegetation, other than landscape plant species and ruderal grassland, is located within the proposed power plant site, laydown, or parking areas and no effects on sensitive biological resources will occur from site construction activities. Further, Eastshore air emissions impacts are below levels which have been determined to be of significant concern to biological resources and therefore are not likely to create any direct, indirect, or cumulative adverse effect to special status species or their habitat. The enclosed Biological Resources Section of the AFC provides the detailed analysis supporting this determination.

To assist you with this request, we are enclosing the following documents, extracted from the Application for Certification (AFC) and the Data Adequacy Supplement, both documents were submitted to the California Energy Commission (CEC) in support for the authorization to build and operate the project.

- Biological Resource Section (Section 8.2) of the AFC, including the Regional Biological Resources Map (Figure 8.2-1) and location of Special Status Species Records within the Project Impact Area (Figures 8.2-2, 8.2-2(A); 8.2-2(B); 8.2-2(C); 8.2-2(D); 8.2-2(E); 8.2-2(F)).

- US Fish and Wildlife List of Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Redwood Point, San Leandro, Hayward and Newark U.S.G.S. 7.5 Minute Quads (Updated December 1, 2006).
- List of Special Status Species potentially present in the Project area (Appendix 8.2A) compiled from the USFWS species list for Redwood Point, Hayward, Newark, Mountain View, Palo Alto, Woodside, San Mateo, Hunter's Point, and San Leandro Quads, as well as, CNDDB and CNPS database searches.

Since the finalization of the AFC, three special status species have been added to the U.S. Fish and Wildlife Service list of endangered and threatened species for Redwood Point, San Leandro, Hayward, and Newark Quads. These species include the endangered vernal pool tadpole shrimp (*Lepidurus packardi*), the endangered tide water goby (*Eucyclogobius newberryi)*, and the candidate for listing Central Valley fall/late fall-run Chinook salmon (*Oncorhynchus tshawytscha*). None of these three species would be adversely affected by the project because of lack of suitable habitat within the project footprint and lack of significant effects on the area sensitive species and their habitat from indirect effects including those associated with the stack emissions as described in further detail in the enclosed Biological Resource Section of the AFC.

We appreciate your consideration of this request and are looking forward to your reply. In the meantime, please don't hesitate to contact me at (510) 587-7774 should you have any questions regarding this request.

Sincerely,

CH2M HILL

René Langis, Ph.D.
Senior Biologist

Enclosure

Technical Area: Cultural Resources
Authors: John Dougherty, Cindy Baker, and Beverly E. Bastian

BACKGROUND

The AFC notes that the City of Hayward has a historic preservation ordinance and a Historic Property List (AFC p. 8.3-5) but does not mention that the Historic Property List was checked for any listed properties in the Eastshore project's "project area" (AFC p. 8.3-14). Additionally, the AFC states that historical societies were contacted, but the contacted societies are not named, and the results of the contacts are not discussed (AFC p. 8.3-18).

DATA REQUESTS

19. Please check the City of Hayward's Historic Property List and provide the names and locations of any listed properties located within the Eastshore project's "project area."

    Response:

    The City of Hayward maintains a List of Historically and Architecturally Significant Buildings. This list was reviewed and no such buildings are identified within or near the proposed Eastshore project facilities.

20. Please provide the names of the historical societies and archaeological organizations contacted, the dates of the contacts, and the names and locations of any cultural resources identified by these groups as being located within the Eastshore project's "project area."

    Response:

    Diane Curry, Archivist/Curator at the Hayward Area Historical Society (510-581-0223) was contacted by telephone on December 19, 2006. Ms. Curry provided information specific to the Mount Eden Station, potentially located within the Eastshore project area. CH2M HILL is conducting additional investigation to determine the physical location of this structure as it may relate to the proposed Eastshore project.

BACKGROUND

The information from the California Historical Resources Information System (CHRIS), which the applicant provided under confidential cover to staff, included:

- site forms for five known resources;
- a copy of one cultural resources survey report whose coverage included the Eastshore project site and the three transmission line route options; and
- bibliographic data for 15 additional survey reports that the CHRIS identified as having been conducted within the one-half-mile-radius literature review area for the Eastshore project, but copies of which were not provided by the applicant to staff.

The AFC states that all 16 reports (one provided to staff and 15 not provided) were reviewed for information pertinent to the Eastshore project (pp. 8.3-15), but no findings from these reports were discussed in the AFC.

The CHRIS-provided material also included a map annotated to show known cultural resources and the coverage of the 16 cultural resources surveys conducted within the project's literature review area. The original of this map appears to have been annotated in color so the various survey coverages would be distinguishable from each other. It is not possible to distinguish the coverages of the 16 surveys on the black-and-white copy of the map provided to staff.

Staff needs a color copy of the map to obtain detailed information on the coverages of the previous cultural resources surveys conducted in the area. Staff also needs copies of the 15 survey reports that were not provided by the applicant with the AFC to ensure a complete compilation of all potentially significant cultural resources on or near the proposed project.

DATA REQUESTS

21. Please provide copies of the 15 CHRIS-identified cultural resources survey reports reviewed by the applicant but not already provided to staff.

    Response:

    To clarify, CH2M HILL was provided the bibliographic data only for the 15 reports. CH2M HILL does not have copies of these fifteen technical reports, and the CHRIS information centers do not typically provide full copies as part of a standard records search request.

22. Please provide a color copy of the CHRIS-provided map annotated to show known cultural resources and the coverage of the 16 cultural resources surveys conducted within the project's literature review area.

    Response:

    A color copy of the CHRIS-annotated map has been provided as an attachment (See Attachment CR-22).

BACKGROUND

The CHRIS-provided materials include copied portions of historic maps indicating that the Union Pacific Railroad, which forms the proposed Eastshore project's northeast boundary and the eastern boundary of the proposed laydown area, is of sufficient age to be a potential historic resource. This railroad appears as the "Central Pacific Railway" on both the 1878 Thompson and West map and the 1899 USGS Hayward quadrangle map. On the U. S. Army Corps of Engineers 1942 Hayward quadrangle map, it is labeled as the "Southern Pacific Railroad." The CHRIS did not provide a Department of Parks and Recreation (DPR) 523 form for this resource. The AFC does not identify this potentially historic railroad right-of-way as a cultural resource, nor is there a discussion of the significance of this property in local and regional history.

Additionally, the 1899 USGS Hayward quadrangle shows the "Mt. Eden station" (presumably a railway station, consisting of two structures) in the northern corner of the proposed Eastshore project laydown area, next to the railroad tracks. It is possible that there are subsurface remains of this facility, including foundations and privy and/or trash pits.

The applicant's archaeologists found no surface indications of any kind of cultural resources (AFC p. 8.3-17), but weeds precluded good ground visibility. Staff needs more information on these resources in order to ensure having a complete compilation of all potentially significant cultural resources on or near the proposed project, to evaluate the significance of the railroad and the Mt. Eden historic archaeological site, and to assess the project's potential impacts on these resources.

DATA REQUESTS

23.

a. Please have a qualified architectural historian record the historic railroad on DPR 523 forms and perform historical research on the railroad to complete the Building, Structure, and Object detail form, including date of construction, operational history, impacts to local and regional economic development resulting from its construction and operation, modifications through time, and the evaluation of the railroad's significance in the Mt. Eden area.

b. Please have the architectural historian assess the potential impact of the project (including that of the overhead transmission lines) on the historic railroad.

c. Please also have the architectural historian research and write a brief history of the Mt. Eden Station.

d. Please provide the DPR forms and project impact assessment for the railroad, and the Mt. Eden history, to staff.

Response:

The Southern Pacific Railroad has been recorded on DPR 523 forms and evaluated for eligibility for nomination to the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), or qualifying as historical resources under CEQA. The potential impact to the railroad has also been assessed. A history of the Mt. Eden Station has also been prepared. Attachment CR-23A contains DPR 523 forms for the railroad and Mt Eden Station location, including an evaluation of significance. Attachment CR-23B contains the assessment of potential impacts to the railroad. Attachment CR-23C contains a brief history of the Mt. Eden Station.

24. a. Please provide details of the planned project use of the former location of the Mt. Eden Station. If the project will require continuous heavy equipment traffic over the area, removal of soils by the project, or use as soil storage with later soil removal by grading, then please have a qualified historical archaeologist involved. The archeologist will need to determine by carefully controlled mechanical grading in the area where the Mt. Eden station was located, whether any subsurface remains survive. If remains are found, please have them mapped, photographed, and recorded on DPR 523 forms, and the forms provided to staff.

    b. Staff will need the information above for completion of its Final Staff Assessment. Please provide a schedule for the archeologist grading activity.

    Response:

    The grading plan for the laydown area does not involve any cut. Surface vegetation will be removed. Then excess cut from the project site will be used as fill to raise the total elevation of the laydown area to a uniform elevation at the current high point elevation of the property. Approximately 2 inches of crushed rock will be applied to the finished grade. Since there will be no excavation that could potentially disturbed this resource, monitoring of the laydown area site preparation grading by an archaeologist is not necessary.

BACKGROUND

If the forthcoming geotechnical report recommends over-excavation and engineered filling for all or part of the proposed plant site, and removed soils may be disposed of off-site and/or new soils brought in from off-site, staff needs information on the potential for the Eastshore project to impact cultural resources in the disposal and borrow sites that could be used.

DATA REQUESTS

25. If potential disposal and borrow sites are not commercial operations and consequently have not been surveyed for cultural resources, please conduct such surveys and provide the personnel qualifications, methods, and findings to staff.

    Response:

    There will be no borrow associated with the Eastshore grading. Off-site disposal of excess cut will be taken to other active nearby construction sites within the area of to an existing professionally managed soil repository within the area.

BACKGROUND

The AFC indicates that contact with Native Americans up to the date of filing the AFC consists of one letter providing information about the proposed Eastshore project to a group of Native Americans identified by the Native American Heritage Commission (NAHC) as having traditional ties to Alameda County (p. 8.3-18). The AFC does not

indicate that any telephone contacts have been made to these Native Americans. The NAHC requests that, in addition to a letter, follow-up telephone calls be made about a project to the Native Americans who were contacted.

DATA REQUESTS

26. Please provide copies of any communications from, or records of any communications with, Native Americans received since September 15, 2006, regarding the proposed Eastshore project.

    Response:

    Three responses have been received as of January 5, 2006 regarding the proposed Eastshore project; the Ohlone Indian Tribe, the Amah/Mutsun Tribal Band, and the Trina Marine Ruano Family. All of these groups communicated that they have no knowledge of traditional cultural properties or values associated with the site.

27. Please make the follow-up telephone calls requested by the NAHC and provide copies of telephone logs of the calls, showing that the letters were received and documenting any verbal information (or lack of information) provided by Native Americans about the proposed project.

    Response:

    A summary table titled “Consultation Letters to Native American Contacts Provided by NAHC” has been attached (See Attachment CR-27). The table documents consultation with Native American individuals or groups recommended by the Native American Heritage Commission, including at least one follow up phone call made to each contact.

Attachment CR-22

CHRIS-annotated map

Attachment CR-22

CHRIS - annotated map

Attachment CR-22, CHRIS-annotated map, was submitted separately under a request for confidentiality.

Attachment CR-23A

Linear Feature Records

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # _____
HRI # _____
Trinomial _____
NRHP Status Code 6Z

Other Listings _____

 *Resource Name or # (Assigned by recorder) South Pacific Coast Railroad/SP at Mt. Eden Station Site

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted *a. County Alameda
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

*b. USGS 7.5' Quad Hayward Date 1959 (photo revised 1980) T___; R ___; __ ¼ of Sec ___; _____ B.M.

c. Address Clawiter Road at railroad crossing City Hayward Zip 94541

d. UTM: (give more than one for large and/or linear resources) Zone _____; _____mE/ _____mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Assessor Parcel Number: 439-80-6-2 (at project site)

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
The following description is based on fieldwork performed from outside of the right of way and on public streets and sidewalks. The fieldwork recorded the site immediately south of the intersection of Clawiter Road and the railroad, a site along the line north of this intersection and a site along the line south of the intersection. The project site and the two additional comparison sites give the appearance of a modern, heavy duty railroad. The rails are standard gauge and date from 1956 through 1997 and are wielded together. There is no evidence of rail connector plates. A substantial number of ties appear to have been replaced with pressure treated ties and the ballast appears to have been relatively recently renewed. At the time the line was originally constructed, it was a narrow gauge line that ran through an agricultural area. The line is in its original location, but the surrounding area has transformed into a modern commercial and industrial area. A small number of remnant residential buildings are located along the line north of the project site. The crossing point of Clawiter Road and the railroad is composed of modern steel and concrete road surfacing at grade with the rails. A modern signal with crossing arms is located at the intersection.

*P3b. Resource Attributes: (List attributes and codes) (HP 17) Railroad Depot/(HP 18) Train

*P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) tracks at Clawiter Rd., camera facing southeast, December 27, 2006

*P6. Date Constructed/Age and Sources:
☒ Historic ☐ Prehistoric ☐ Both
1877/ MacGregor and Truesdale, *South Pacific Coast: A Centennial*/modified 1906/ John S. Sandoval, *Mt. Eden: Cradle of the Salt Industry in California*

*P7. Owner and Address:
Union Pacific Railroad

*P8. Recorded by: (Name, affiliation, address)
Rand Herbert/Shawn Riem
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

*P9. Date Recorded: December 27, 2006

*P10. Survey Type: (Describe)
Single Site

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") none

*Attachments: NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) _____

***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder) South Pacific Coast Railroad/SP at Mt. Eden

B1. Historic Name: _____
B2. Common Name: _____
B3. Original Use: Narrow Gauge Railroad B4. Present Use: Standard Gauge Railroad
***B5. Architectural Style:** none
***B6. Construction History:** (Construction date, alteration, and date of alterations) Built ca. 1877, modified 1906
***B7. Moved?** ☒ No ☐ Yes ☐ Unknown **Date:** _____ **Original Location:** _____
***B8. Related Features:** _____
B9. Architect: unknown b. Builder: unknown
***B10. Significance: Theme** n/a **Area** n/a
Period of Significance n/a **Property Type** n/a **Applicable Criteria** n/a
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The railroad at Clawiter Road does not appear to meet the criteria for listing in the California Register of Historic Resources. This property has been evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code, and the property does not appear to meet the significance criteria as outlined in these guidelines. Therefore, it does not appear to be a historical resource for the purposes of CEQA. (See continuation sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

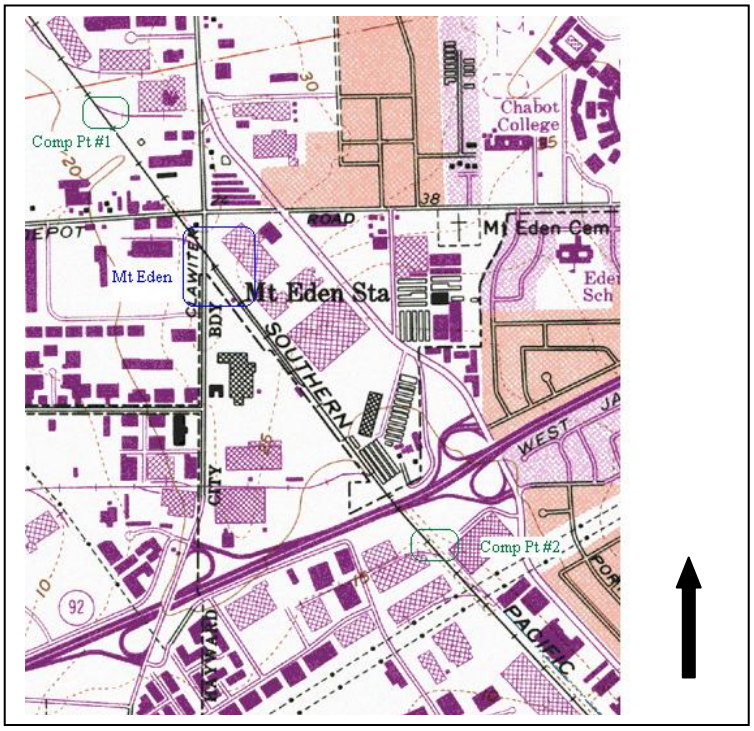
***B12. References:** see footnotes

B13. Remarks:

***B14. Evaluator:** Rand Herbert

***Date of Evaluation:** December 2006

(This space reserved for official comments.)



B10. Significance (continued):

The old stage road connecting Oakland to San Jose ran through San Lorenzo, Alvarado and Mt. Eden. This route was augmented by bay landings at Barron's, Johnson's, and Robert's in Mt. Eden. From 1850-1875, the salt producers and farmers of Mt. Eden and the surrounding area utilized these two routes as the main transportation systems for their crops. In 1877, James Fair and Alfred "Hog" Davis, two Comstock silver speculators, invested $8 million in the construction of the railroad and a series of tunnels through the Santa Cruz Mountains, and opened the South Pacific Coast Railway (South Pacific). The railway was planned to run across a marsh north of Newark, through Alvarado, then Newark and Mt. Eden and through San Leandro. A mile long trestle was planned at the edge of San Leandro Bay to join San Leandro with the Alameda peninsula. Passengers went from Alameda to San Francisco ferry.[1] The Bay and Coast Railroad was incorporated on May 1, 1877 as an extension of its parent company, the South Pacific. Construction began in July of 1877.[2]

This narrow gauge railway offered a shorter, faster, and more scenic route between San Francisco and Santa Cruz than the existing Southern Pacific Railroad (SP) route. The SP traveled from San Francisco through Watsonville and into Santa Cruz in five hours. The South Pacific, on the other hand, combined a ferry from San Francisco to Alameda with a long stretch through tidal marsh and a final climb through long tunnels in the Santa Cruz Mountains to form an 80 mile route that took only three hours and 20 minutes to complete. Passengers were willing to pay a higher round trip fare ($6.00 compared to SP's $3.50) for the shorter and more scenic trip offered by the South Pacific.[3]

Settlers in the area were happy to hear that the South Pacific planned to run their line through the Mt. Eden community, however, construction of the railroad was slowed considerably by the efforts of larger railroad corporations. The Central Pacific Railroad hindered construction of competing lines in Alameda County to the port at Alameda by bringing suits against the South Pacific relating to in-town rail construction issues, encouraging property owners contest right of way land sales, and even resorting to physical violence towards South Pacific crews. The South Pacific was able to overcome these obstacles and continue construction of its line from Alameda to Los Gatos.[4]

In 1877, the South Pacific bought a small parcel of land from Joel Russell for use as a flag stop and side track facility. A small station and loading siding were also built there, and named Mt. Eden Station. The rail company also purchased a small plot of land from John Johnson and built an access road called Depot Road.[5] The Mt. Eden Station quickly became a fixture in the Mt. Eden community. It was a focal point for village children who watched the trains pass several times daily, the postal agent picked up mail daily from the 11:00 "mailtrain," and commuters from the area used it to board trains for work in Oakland or San Francisco or school in Berkeley.[6]

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[1] John S. Sandoval, *Mt. Eden: Cradle of the Salt Industry in California*, (Hayward, CA: Mt. Eden Historical Publishers, 1988), 121.
[2] Sandoval, *Mt. Eden*, 121.
[3] Bruce A. MacGregor and Richard Truesdale, *South Pacific Coast: A Centennial*, (Boulder, CO.: Pruett Publishing Co., 1982), xii-1.
[4] MacGregor and Truesdale, *South Pacific Coast*, 14.
[5] Sandoval, *Mt. Eden*, 122.
[6] Sandoval, *Mt. Eden*, 122.

The South Pacific, along with at least seven other narrow gauge railroads engaged in construction in the late 1800s used the Carter Brothers as their general contractors. Martin and Thomas Carter used their background in general carpentry, and developed new skills while they built stations, shop buildings, water tanks, roundhouses and bridges. According to railroad historians Bruce MacGregor and Richard Truesdale, they "designed and contracted for custom iron fittings, ranging from switch stands to turntable rollers, offered a complete line of car fittings, built to customer specification, freight, passenger, hand, street, and special purpose cars, modified existing cars, subcontracted for grading work and track laying, laid out special purpose facilities like car shops and filled roles in railroad management ranging from shop foreman to general superintendent of all operations. They were skilled; they were available to go where the work was, and most important, especially to the have-not railroads, they were inexpensive."[7] Their practice of augmenting a small staff of skilled craftsmen by hiring local foremen and carpenters, using local materials and shipping in only a limited supply of hardware kept their costs down. The Carter Brothers passed the savings on to their customers.[8]

The South Pacific remained independent for seven years, after which it was bought by the SP in late 1886. The line remained unchanged and was advertised as one of SP's Four Great Routes, promoted for its scenery, trackside amenities and picturesque neighborhoods.[9]

In 1900, the SP announced its plans to convert the line from San Jose to Oakland via Alvarado, Newark, Mt. Eden and San Lorenzo from a narrow gauge line to a standard gauge line.[10] The route was to serve as a bypass for standard gauge freight trains from Oakland to San Jose. Additionally, the alternative route was at least six miles shorter than the original Central Pacific route through Hayward, Niles and Milpitas to San Jose.[11] The narrow gauge line through Mt. Eden was not converted to standard gauge until 1906 as part of the conversion from West San Leandro to Newark. The delay was caused by the 1906 San Francisco earthquake, as assembled crews were reassigned to repair lines damaged by the earthquake, especially those along the Peninsula and in San Francisco.[12]

The line is used today primarily as a freight line. The passage of the 1970 National Rail Passenger Service Act, and the subsequent creation of Amtrak on May 1, 1971, led to the end of regular passenger service on all Southern Pacific lines by that company.[13] The current Capitol Corridor (Amtrak) trains use the old SP main line located east of the old South Pacific route.

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[7] MacGregor and Truesdale, *South Pacific Coast*, 70.
[8] MacGregor and Truesdale, *South Pacific Coast*, 70-71.
[9] MacGregor and Truesdale, *South Pacific Coast*, 1.
[10] John S. Sandoval, *Mt. Eden: Cradle of the Salt Industry in California*, (Hayward, CA: Mt. Eden Historical Publishers, 1988), 122-123.
[11] Sandoval, *Mt. Eden*, 123.
[12] Sandoval, *Mt. Eden*, 124.
[13] <http://www.amtrak.com/servlet/ContentServer?pagename=Amtrak/am2Copy/Title_Image_Copy_Page&c=am2Copy&cid=1081442674300&ssid=542> (accessed 2 January 2007)

Photographs (continued)

Clawiter Road and tracks, camera facing south.

Clawiter Road and tracks, camera facing east.

Clawiter Road and tracks, camera facing northwest. The modern steel-and-concrete grade crossing on Clawiter Road is visible in this image.

Debris and tracks at Mt. Eden Station site, camera facing southeast.

Debris and tracks at Mt. Eden Station property, camera facing northeast; hedge marks the eastern side of the railroad right of way, with modern tilt-up structure in distance.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LINEAR FEATURE RECORD

Primary # _____
HRI # _____
Trinomial _____

***Resource Name or #** (Assigned by recorder) Comparison Point 1

L1. Historic and/or Common Name: Southern Pacific Railroad

L2a. Portion Described: ☐ Entire Resource Segment ☒ Point Observation **Designation:**

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

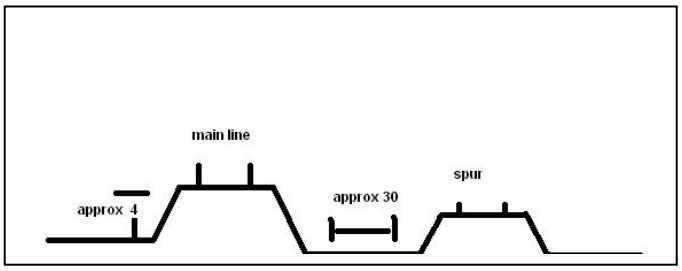
The Southern Pacific Railroad at McCone Avenue, north of Clawiter Road crossing, Hayward, California

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

The following description is based on fieldwork performed from outside of the right of way and on public streets and sidewalks. The site, located north of the Clawiter Road crossing, gave the appearance of a modern heavy duty railroad. The rails are standard gauge and date from 1956 through 1997. The rails are wielded together. There is no evidence of rail connector plates. A substantial number of rail ties appear to have been replaced with pressure treated ties and the ballast appears to have been recently renewed. At the time the line was originally constructed, it ran through an agricultural area. The line has not been relocated, but the surrounding area has transformed into a modern commercial and industrial area. A small number of remnant residential buildings are located along the line north.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** standard gauge single track with spur
- **b. Bottom Width** unknown
- **c. Height or Depth** approx 4 feet
- **d. Length of Segment** approx 1 ½ miles



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

The comparison point is located in a light industrial area. The area is primarily unpaved with sparse grass. Mature trees line the west side of the track.

L8a. Photograph, Map, or Drawing.

L7. Integrity Considerations:

L8b. Description of Photo, Map, or Drawing: Tracks north of Clawiter Road crossing, near eastern end of McCone Avenue; camera facing northeast, December 27, 2006

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address) Rand Herbert/Shawn Riem, JRP Historical Consulting Services, LLC
1490 Drew Ave, Suite 110,
Davis, CA 95618

L11. Date: December, 2006

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LINEAR FEATURE RECORD

Primary # _____
HRI # _____
Trinomial _____

***Resource Name or #** (Assigned by recorder) Comparison Point #2

L1. Historic and/or Common Name: Southern Pacific Railroad

L2a. Portion Described: ☐ Entire Resource Segment ☒ Point Observation **Designation:**

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

The Southern Pacific Railroad, paralleling Industrial Boulevard, south of the Clawiter Road crossing, Hayward, California.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

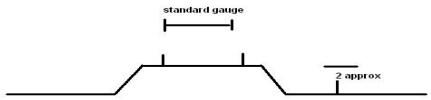
The following description is based on fieldwork performed from outside of the right of way and on public streets and sidewalks. The site, located south of the Clawiter Road crossing, gave the appearance of a modern heavy duty railroad. The rails are standard gauge and date from 1956 through 1997 and the rails are wielded together. There is no evidence of rail connector plates. A substantial number of rail ties appear to have been replaced with pressure treated ties and the ballast appears to have been recently renewed. At the time the line was originally constructed, it ran through an agricultural area. The line has not been relocated, but the surrounding area has transformed into a modern commercial and industrial area.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** standard gauge single track
- **b. Bottom Width** unknown
- **c. Height or Depth** approx 2 feet
- **d. Length of Segment** approx 1 ½ miles

L5. Associated Resources:

L4e. Sketch of



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

The comparison point is located in a modern light industrial area. The area is unpaved and surrounded by native vegetation.

L7. Integrity Considerations:

L8a. Photograph, Map, or Drawing.

L8b. Description of Photo, Map, or Drawing: Tracks south of Clawiter Road crossing, camera facing east, December 27, 2006

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address) Rand Herbert/Shawn Riem, JRP Historical Consulting Services, LLC
1490 Drew Ave, Suite 110,
Davis, CA 95616

L11. Date: December, 2006

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LINEAR FEATURE RECORD

Primary # _____
HRI # _____
Trinomial _____

***Resource Name or #** (Assigned by recorder) Mt. Eden Station Site

L1. Historic and/or Common Name: Mt. Eden Station

L2a. Portion Described: ☐ Entire Resource Segment ☒ Point Observation **Designation:**

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

The Southern Pacific Railroad crossing at Clawiter Road, Hayward, California.

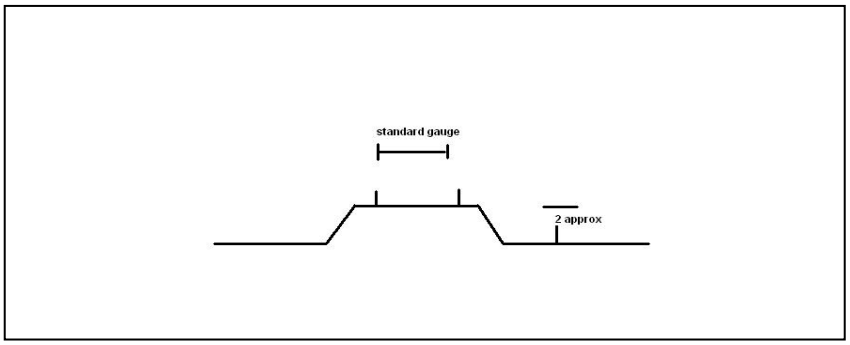
L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

The following description is based on fieldwork performed from outside of the right of way and on public streets and sidewalks. The intersection gives the appearance of a modern heavy duty railroad. The rails are standard gauge and date from 1956 through 1997 and the rails are wielded together. There is no evidence of rail connector plates. A substantial number of rail ties appear to have been replaced with pressure treated ties and the ballast appears to have been recently renewed. At the time the line was originally constructed, it ran through an agricultural area. The line has not been relocated, but the surrounding area has transformed into a modern commercial and industrial area. The crossing point of Clawiter Road and the railroad is composed of modern steel and concrete road surfacing at grade with the rails. A modern signal with crossing arms is located at the intersection.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** standard gauge single track
- **b. Bottom Width** unknown
- **c. Height or Depth** approx 2 feet
- **d. Length of Segment** approx 1 ½ miles

L5. Associated Resources:



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

The site is located in a modern light industrial area. The area is primarily unpaved with areas of native vegetation. Mature shrubs line the east side of the site.

, Map, or Drawing.

L7. Integrity Considerations:

L8b. Description of Photo, Map, or Drawing: Tracks at Mt. Eden Station Site on Clawiter Road, camera facing southeast, December 27, 2006

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address) Rand Herbert/Shawn Riem, JRP Historical Consulting Services, LLC
1490 Drew Ave, Suite 110,
Davis, CA 95618

L11. Date: December 2006

Attachment CR-23B

JRP Historical Consulting, Inc. Response

Data Request 1b.

JRP Historical Consulting, LLC conducted fieldwork and completed a DPR 523 Form on the railroad at the site of the Mt. Eden Station in the project area in response to the Data Request 1a. JRP found the railroad ineligible for the California Register of Historic Resources because it lacked integrity to any relevant period of significance.

However, even if it were eligible, the inclusion of overhead transmission lines would not have a substantial adverse impact on the railroad as a resource. PRC Section 5020.1(q) of the California Environmental Quality Act states that a substantial adverse change "includes demolition, destruction, relocation, or alteration such that the significance of an historical resource would be impaired." The rails in the project area have been replaced with rails dating from 1959 through 1997, the rails are wielded with no remaining rail connector plates, and a large number of ties have been replaced with pressure treated ties. In all, the railroad and surroundings are distinctly modern in appearance. At the time of standardization, the railroad ran though a largely agricultural area. The current surroundings are commercial and light industrial buildings. In addition, transmission lines currently run down the track, as seen in photographs included in the DPR 523 Form.

Attachment CR-23C

Mt. Eden Station Location History

Data request 1c.

Mt. Eden Station Location History

Mt. Eden and the Railroad

The old stage road connecting Oakland to San Jose ran through San Lorenzo, Alvarado and Mt. Eden. This route was augmented by bay landings at Barron's, Johnson's, and Robert's in the Mt. Eden area. From 1850-1875, the salt producers and farmers of Mt. Eden and the surrounding area utilized these two routes as the main transportation systems for their crops. Settlers in the area were happy to hear that the South Pacific Coast Railroad (South Pacific) planned to run their line through the Mt. Eden community. The railway was to run across a marsh north of Newark, through Alvarado, then Newark and Mt. Eden and through San Leandro, and a mile long trestle was planned at the edge of San Leandro Bay to join San Leandro with the Alameda peninsula. Passengers from Alameda to San Francisco were to travel by ferry.[1] The Bay and Coast Railroad was incorporated on May 1, 1877 as an extension of its parent company, the South Pacific. Construction began in July of 1877.[2]

In 1877, the South Pacific bought a small parcel of land from Joel Russell for use as a flag stop and side track facility. A small station and loading siding, located on the east side of the line, were also built here and was named Mt. Eden Station. The rail company also purchased a small plot of land from John Johnson and built an access road called Depot Road.[3] The station quickly became a fixture in the Mt. Eden community. It was a spot for village children to watch the trains pass several times daily, the postal agent picked up mail daily from the 11:00 "mailtrain," and commuters from the area used it to board trains for work in Oakland or San Francisco or school in Berkeley.[4]

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[1] John S. Sandoval, *Mt. Eden: Cradle of the Salt Industry in California*, (Hayward, CA: Mt. Eden Historical Publishers, 1988), 121.
[2] Sandoval, *Mt. Eden*, 121.
[3] Sandoval, *Mt. Eden*, 122.
[4] Sandoval, *Mt. Eden*, 122.

The Mt. Eden portion of the South Pacific was purchased by the Central Pacific (later Southern Pacific, hereafter SP) in late 1886. In 1900, the SP announced its plans to convert the line from San Jose to Oakland via Alvarado, Newark, Mt. Eden and San Lorenzo from a narrow gauge line to a standard gauge line.[5] The route was to serve as a bypass for standard gauge freight trains from Oakland to San Jose. Additionally, it was at least six miles shorter than the original CP route through Hayward, Niles and Milpitas to San Jose.[6] The narrow gauge line through Mt. Eden was not converted to standard gauge until 1906, as part of the conversion of the sections from West San Leandro to Newark. The delay was caused by the 1906 San Francisco earthquake, as assembled crews were reassigned to repair lines damaged by the temblor, especially those along the Peninsula and in San Francisco.[7]

Mt. Eden Station

The depot at the time the railroad was owned by the South Pacific, and in the early years of ownership by the SP, was located on the east side of the railroad line near the intersection of Depot Road and the railroad line, just south of Depot Road. The structure is no longer there; the site is an asphalt-covered parking lot and is located outside of the project area. Sometime between 1896 and the SP modernization from narrow gauge to standard gauge in 1906, a new depot was built on the west side of the railroad line near the intersection of Clawiter Road and the railroad tracks. Its location is shown on the Railroad Commission Station Plat for Mt. Eden and on maps after 1906; these maps and plats are attached to this report. The structure built was of a standard SP station design, as seen in historic photographs of the station, and was located within the project area.

Most major railroads, and many smaller lines, used standard designs for their fixed facilities—stations, depots, tank houses, outhouses, block signal layouts, station signs, etc. Standard designs were a practical and low cost alternative to hiring an architect/builder to design individual buildings each time a line was extended or a new

[5] Sandoval, *Mt. Eden*, 122-123.
[6] Sandoval, *Mt. Eden*, 123.
[7] Sandoval, *Mt. Eden*, 124.

station needed. Most commonly, one-story depots were used when housing for the ticket agent was readily available nearby, and two-story depots were used when it was not. The amount of freight transfers expected also affected the depot design selected, with more capacious freight rooms built where large shipments of freight were expected. If business increased, a small freight room could be expanded. Likewise, if business decreased, the station's structure might be shortened.[8] Railroad historian Henry Bender explained,

> After the early construction days, when one-story board and batten depots were erected in a few standard rectangular sizes, the Big Four's lines (Central Pacific, Southern Pacific, and other smaller railroads) developed, between 1877 and 1894, a series of 26 standard depot plans. The plans for combination depots [passenger and freight] numbered from No. 1 through No. 26 were used for a few years each. Arthur Brown (1830-1917), a respected architect was the railroad's Superintendent of Buildings and Bridges from about 1873 until about 1893 and oversaw the design of the first standard depots in the numbered series.[9] Starting in 1891, Southern Pacific lines installed a train-order semaphore signal at most agency stations and added a bay to each existing depot without one. A bay with a view of the track in both directions made the agent's job of reporting train movements and handing up train orders easier – and less likely to delay a train by forcing it to stop for orders.[10]

The Depot No. 7 design called for a baggage room to be located behind the office and not at trackside, and to be approximately 19 feet wide. It featured Stick-style architecture with a side gable roof and two adjacent windows centered in the end of the waiting room and horizontal board siding with vertical siding and battens above the windows in either end gable. The design called for the typical SP agent's bay with three windows on the track side.[11] The structure at the Mt. Eden Station, as seen in historic photographs, featured these design elements.

There is no mention of a privy in Bender's descriptions of SP Standard Depot designs. Examination of Sanborn Fire Insurance maps of the station, a Mt. Eden Station plat map

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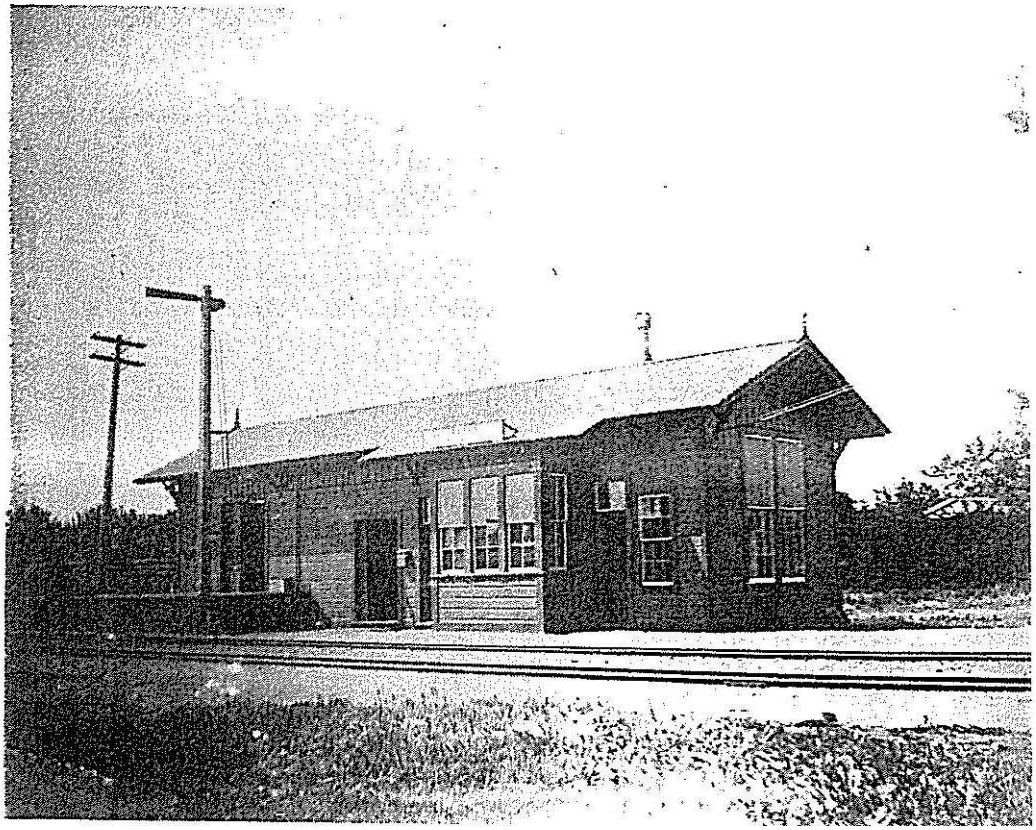
[8] Henry E. Bender Jr., "Southern Pacific Lines: Standard Design Depots, Parts 1 and 2," *SP Trainline*, (Fall/Winter 1998), 11.
[9] Bender Jr., "Standard Design Depots," *SP Trainline*, 12.
[10] Bender Jr., "Standard Design Depots," *SP Trainline*, 12.
[11] Bender Jr., "Standard Design Depots," *SP Trainline*, 17.

prepared for the Railroad Commission, and historic photographs of the station do not indicate the location or existence of a privy. Moreover, an examination of the fire insurance maps, historic quads, station plat, and historic photographs indicates that there was only one building at the Mt. Eden Station site west of the railroad. Copies of these maps, plats, and photographs are attached.

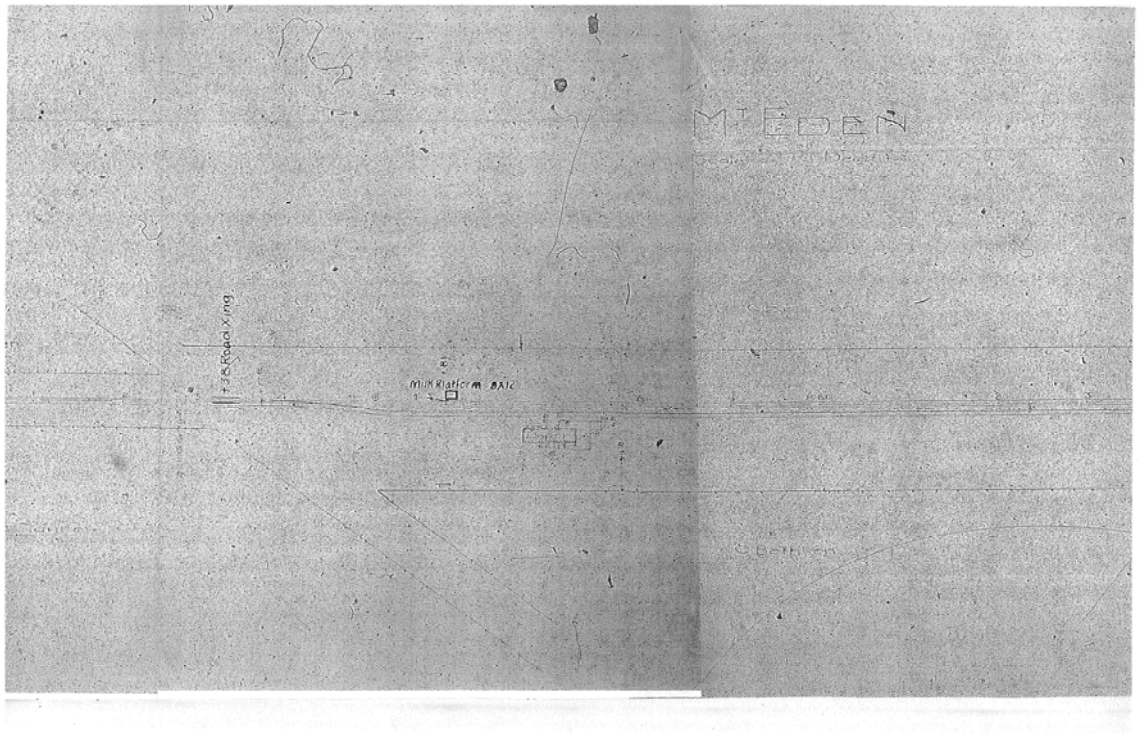


Mt. Eden Station, circa 1930.[12]

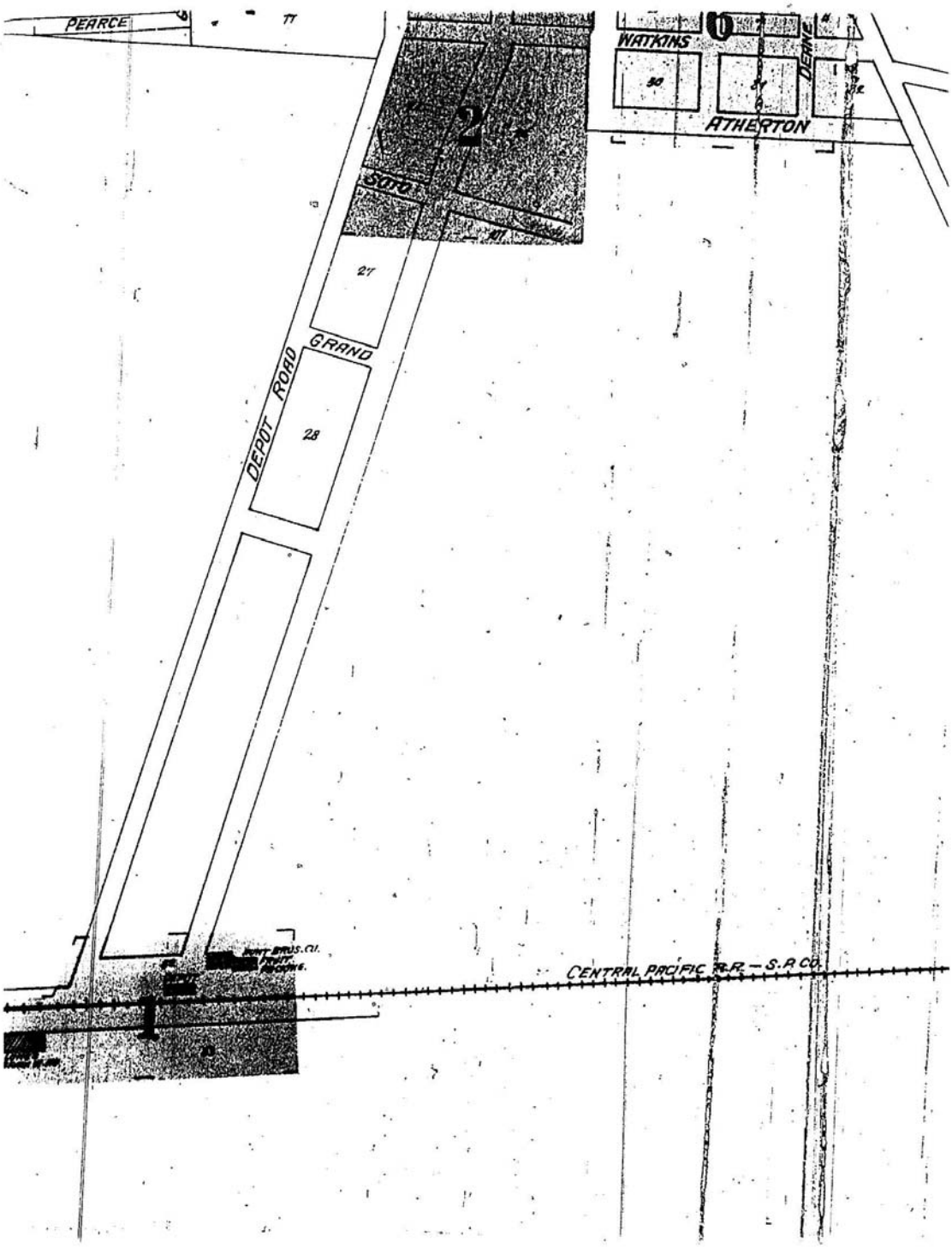
[12] Sandoval, *Mt Eden*, 120.

Mt. Eden Station, circa 1940 (Hayward Historical Society).

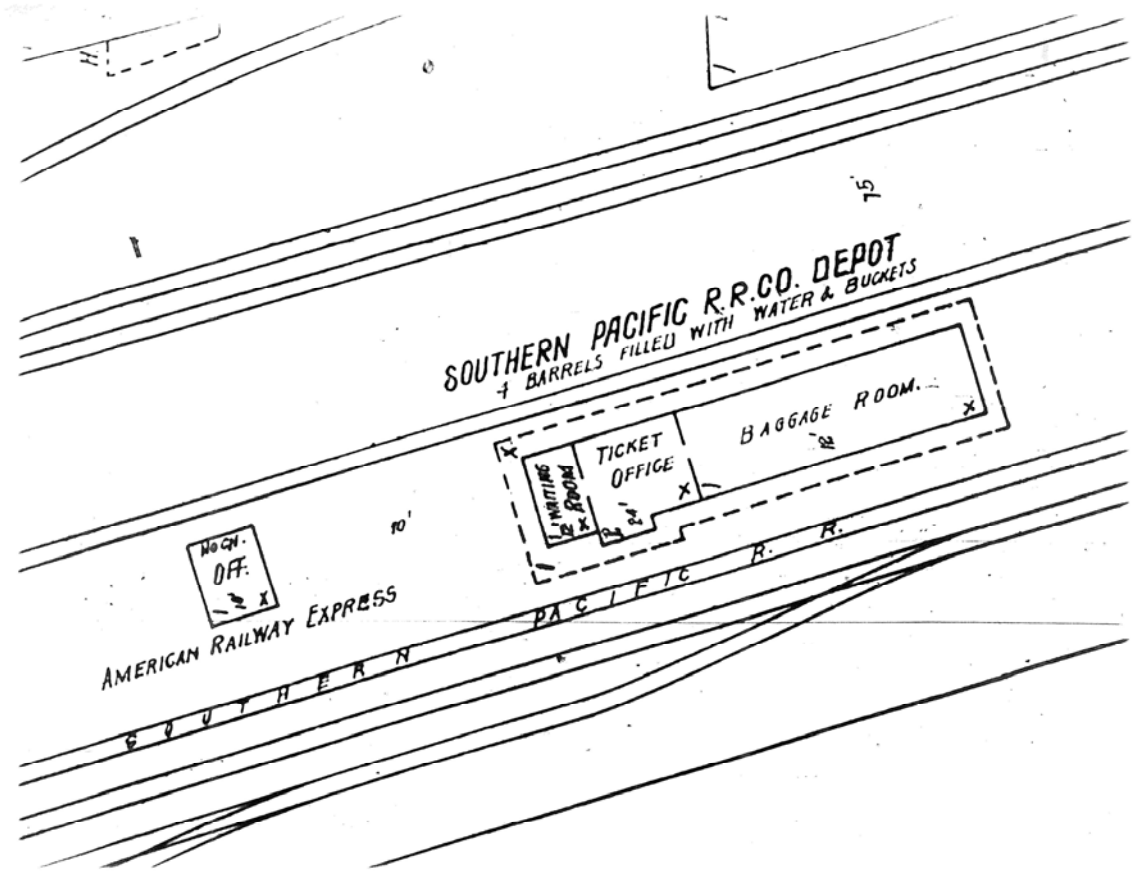
Hesperian and Depot Streets, circa 1945; arrow points to location of Mt. Eden Station in upper left corner. (Hayward Historical Society)



Mt. Eden Station Plat Map, December 27, 1906; the station's faint outlines can be seen below and to the right of the "milk platform," on the west side of the tracks. (California State Railroad Commission Station Plats, Mt. Eden)



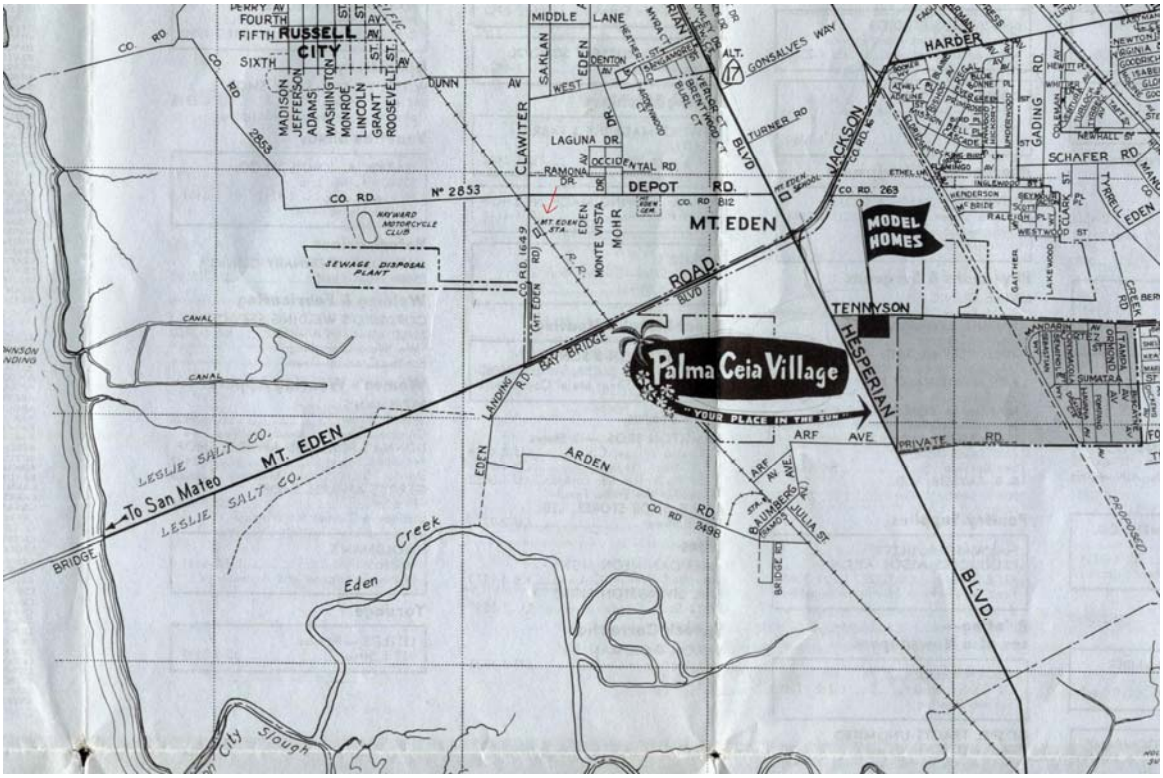
Mt. Eden Station, Sanborn Fire Insurance map, 1896, showing location of station on east side of tracks (in shaded area at lower left of image).



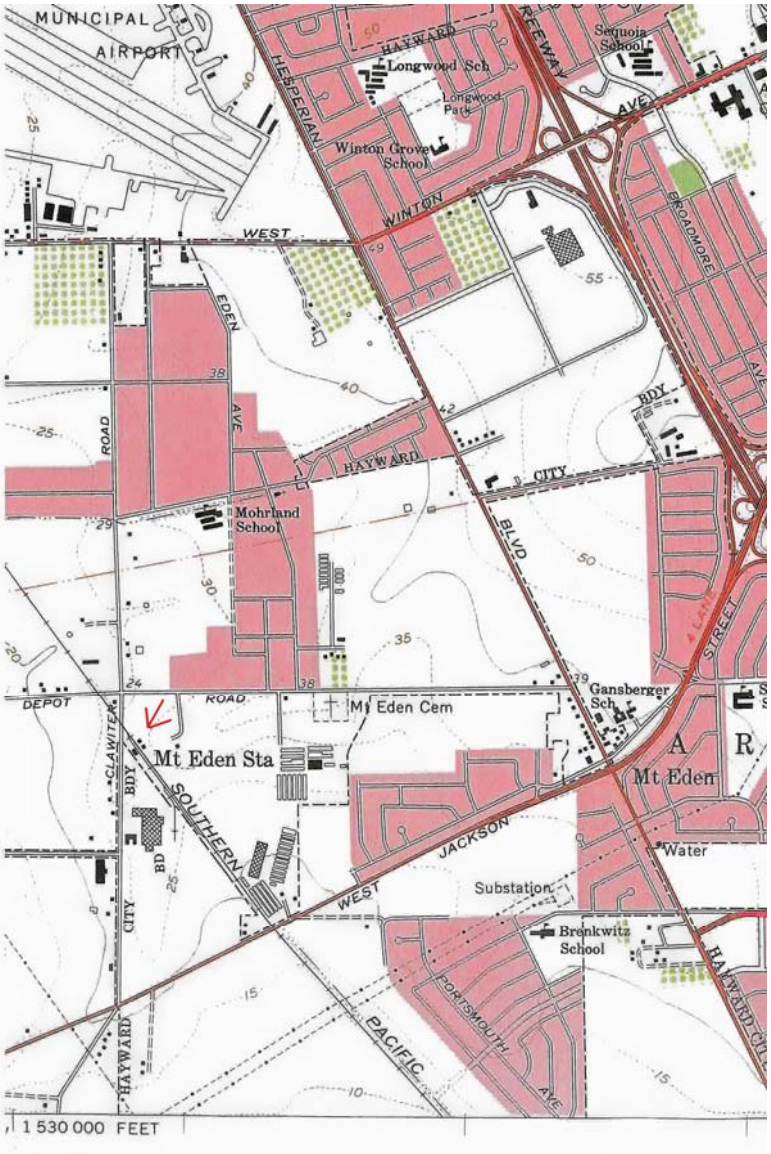
Mt. Eden Station, Sanborn Fire Insurance map, 1923, showing location west of tracks.

Mt. Eden area, USGS *Hayward* Quadrangle, circa 1899.

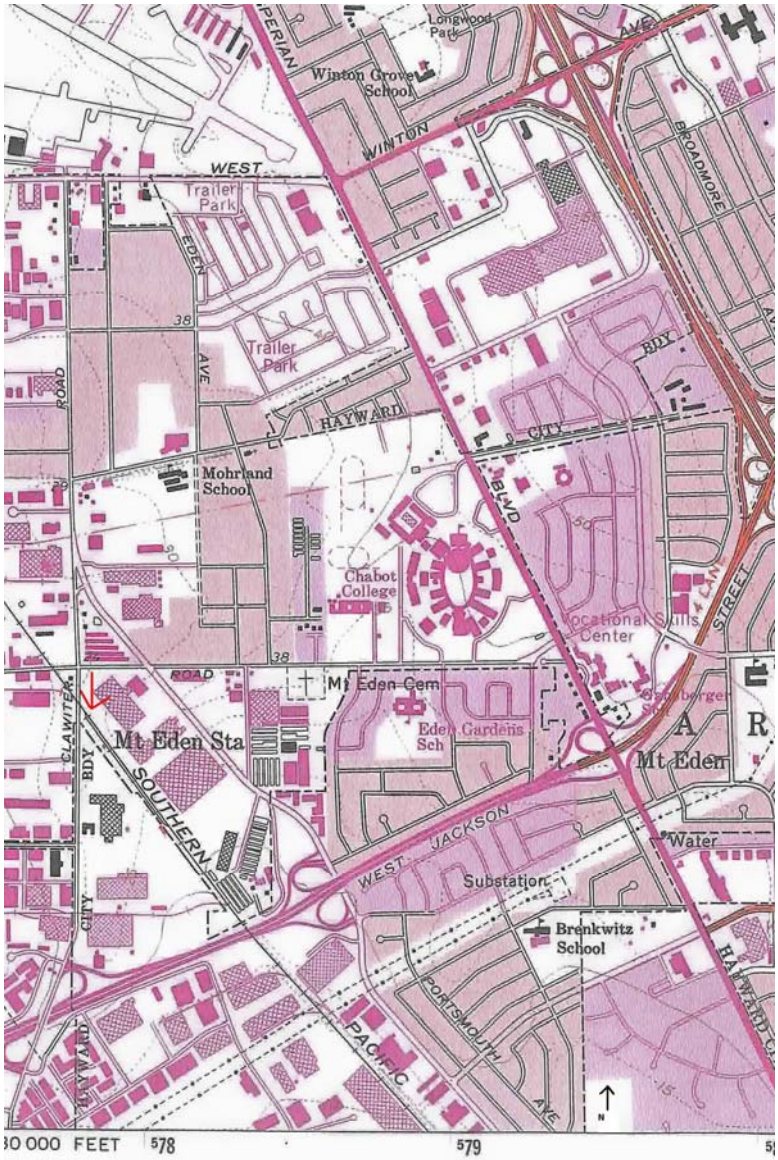
Mt. Eden area, USGS *Hayward* Quadrangle, circa 1942.



Mt. Eden Area map, circa 1955; small red arrow indicates station location west of tracks.



Mt. Eden area, USGS *Hayward* Quadrangle, 1959.



Mt. Eden area, USGS *Hayward* Quadrangle, 1959, photorevised 1980.

Attachment CR-27

Consultation Letters to Native American Contacts Provided by NAHC

EASTSHORE ENERGY CENTER CONSULTATION LETTERS TO NATIVE AMERICAN CONTACTS PROVIDED BY NAHC							
RECIPIENT	***DATE SENT***	***LETTER MAILED***	***FAXED***	***E-MAILED***	***COMMENTS RECEIVED (from letter)***	***FOLLOW UP PHONE CALL (date/time/person contacted)***	***COMMENTS SUMMARY (from Phone)***
Rosemary Cambra, Chairperson Muwekma Ohlone Indian Tribe of the SF Bay Area Chairperson PO Box 360791 Milpitas, CA 95036 muwekma@muwekma.org 408-434-1668 408-434-1673	**8/15/06**	**X**			**Received letter dated 9/8/06 from Rosemary Cambra. Letter states: "As far as we know, there are no specific cultural resources that are known to exist on the two parcels of land identified on the map that you enclosed"**	**Called 408-434-1668 at 3:15 pm on 1/3/2007. Left voice message.** **Called 408-434-1673 at 3:17 pm on 1/3/2007. No answer.** **Called 408-434-1668 @1:10 pm on 1/4/2007. Left voice message** **Called 408-434-1668 at 1:12 pm on 1/4/2007. No answer.**	
Andrew Galvan The Ohlone Indian Tribe PO Box 3152 Mission San Jose, CA 94539	**8/15/06**	**X**				**Contacted Andrew Galvan at 3:20 pm on 1/3/2007.**	**Andrew was familiar with the general project location. No knowledge of traditional cultural properties or**

chochenyo@aol.com 510-656-0787 Voice 510-882-0527 Cell Fax 510-687-9393							**values associated with the site.**
Ramona Garibay Trina Marine Ruano Family 5816 Thornton Ave Newark, CA 94560 510-300-5971 Cell	**8/15/06**	**X**				**Contacted Romona's cell phone at 3:35 pm on 1/3/2007 - lost connection. Redialed and left voice message.** **Called again at 1:05 pm on 1/4/200707. Left voice message.**	**Ramona Garibay returned call at 2:12 on 1/4/2007. She is familiar with the project area and is not aware of any traditional cultural properties or values associated with the site.**
Jakki Kehl Ohlone/Costanoan 720 North 2nd Street Patterson, CA 95363 jakki@bigvalley.net 209-892-2436 Fax 209-892-2435	**8/15/06**	**X**				**Called 209-892-2436 at 3:39 pm on 1/3/2007. Left voice message.** **Called @ 1:20 pm on 1/4/2007. Left voice message.**	
Katherine Perez Ohlone/Costanoan North Valley Yokuts Bay Miwok PO Box 717 Linden, CA 95236 canutes@comcast.net 209-474-2602	**8/15/06**	**X**				**Called 209-474-2602 at 3:41 pm on 1/3/2007. Number has been disconnected.**	

Ann Marie Sayers Ohlone/Costanoan Chairperson PO Box 28 Hollister, CA 95024	**8/15/06**	**X**				**No telephone number.**	
Michelle Zimmer Cultural Resources Coordinator Amah/Mutsun Tribal Band Ohlone/Costanoan PO Box 62-558 Woodside, CA 94062 408-810-2024	**8/15/06**	**X**				**Called 408-810-2024 at 3:43 pm on 1/3/2007. Automated message – not a working number.** **Called 408-375-4281 at 3:57 pm on 1/3/2007. Left voice message.** **Called again at 1:25 pm on 1/4/2007. Left voice message.**	
Irene Zwierlein Chairperson Amah/Mutsun Tribal Band Ohlone/Costanoan 789 Canada Road Woodside, CA 94062 Amah_mutsun@yahoo.com 650-851-7747 Fax 650-851-7489	**8/15/06**	**X**				**Contacted Irene Zwierlein at 3:47 pm on 1/3/2007.**	**Irene has no knowledge of traditional cultural properties or values associated with the site. Asked if we had contacted Andrew Galvan. Irene stated that "Andrew is the expert" and "if he doesn't know of anything there**

							then there isn't anything." **Irene also asked if we had contacted Michelle Zimmer. Provided new contact information for Michelle.** **Michelle Zimmer** **1685 First Street** **Apt. 88** **Lincoln, CA 95648** **408-375-4281**

Technical Area: Geology
Author: Patrick Pilling, Ph.D., P.E., G.E.

BACKGROUND

Existing subsurface information is essential to completely evaluate a site with respect to potential geologic hazards and how the existing materials may impact design, construction, and operation of the facility. Appendix 10G.1 references a geotechnical investigation for this site that was performed on August 24, 2006, as being contained in Appendix 8.14A; however, a copy of the geotechnical investigation is not included in Appendix 8.14A.

DATA REQUEST

28. Please provide a copy of the geotechnical investigation that has been performed at the project site.

    Response:

    A complete copy of the geotechnical investigation is attached (See Attachment GR-28).

Attachment GR-28

Geotechnical Investigation

GEOTECHNICAL INVESTIGATION

EASTSHORE ENERGY CENTER
25101 CLAWITER ROAD
HAYWARD, CALIFORNIA

Project No. 653.01
August 24, 2006

Prepared by

Hultgren – Tillis Engineers

GEOTECHNICAL INVESTIGATION

EASTSHORE ENERGY CENTER
25101 CLAWITER ROAD
HAYWARD, CALIFORNIA

Project No. 653.01
August 24, 2006

A California Corporation
Specializing in Geotechnical Engineering

Hultgren-Tillis Engineers

August 24, 2006
Project 653.01

Stantec Consulting, Inc.
370 N. Wiget Lane, Suite 210
Walnut Creek, California 94598-2452

Attention: Mr. Colin Shaw

Geotechnical Investigation
Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Gentlemen:

We performed a geotechnical investigation for the proposed Eastshore Energy Center at 25101 Clawiter Road in Hayward, California. Our work was performed in accordance with our Proposal dated June 20, 2006, and Subconsultant Agreement dated June 26, 2006. The results of the investigation are presented in the attached report. If you have any questions, please call.

It was a pleasure working with you on this project, and we look forward to working with you during final design and construction.

Sincerely,

Hultgren – Tillis Engineers

Hugh D. Davis
Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
HUGH DUNCAN DAVIS
No. GE2716
Expires 9/30/07
GEOTECHNICAL
STATE OF CALIFORNIA

Edwin M. Hultgren
Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
EDWIN M. HULTGREN
No. 426
Exp: 12/31/07
GEOTECHNICAL
STATE OF CALIFORNIA

HDD:EMH:la

6 copies submitted

Filename:65301R01

2221 Commerce Avenue, Suite A-1 • Concord, California 94520-4987
Phone (925) 685-6300 • Fax (925) 685-6768

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Plate	22	Corrosion Testing

I. INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed Eastshore Energy Center located at 25101 Clawiter Road in Hayward, California. A Vicinity Map showing the approximate location of the site is shown on Plate 1. A metal building stands at the site and is currently vacant. The site was previously occupied by Cowden Metals. The building was constructed in two adjoining sections with the west section being an addition to the original structure to the east. The concrete slab-on-grade sits about four feet higher than the surrounding grade.

A power plant is proposed at the site. We understand that the existing building will be demolished and the dock high fill removed. The power plant will include engine generator sets housed in two Power Houses. The engine generator set units weigh approximately 312 kips each on an equipment base with a footprint of about 41 feet by 11 feet. The facility will also include auxiliary equipment and tanks. The approximate locations of the existing and proposed buildings and equipment are shown on the Site Plan, Plate 2.

Our scope of services was outlined in our proposal dated June 20, 2006. The investigation included assessing foundation conditions by pushing Cone Penetration Tests (CPT's) and drilling borings, performing laboratory tests on selected samples and developing foundation conclusions and recommendations. This report addresses suitable types and depths of foundations, geotechnical criteria for foundation design, estimates of foundation settlement, methods for controlling impacts of settlement and site preparation and grading.

II. FIELD EXPLORATION AND LABORATORY TESTING

Subsurface conditions were explored at nine locations by pushing seven Cone Penetrometer Tests (CPT's) and drilling two borings. The locations of the borings and CPT's are shown on the Site Plan, Plate 2.

Seven CPT tests were advanced on July 11 and 12, 2006 at locations C1 through C7 outside of the existing building to depths of about 50 to 80 feet below grade. Initial attempts to push the cone at two locations about 10 feet apart near the northwest corner of the building hit refusal at a depth of about 1 foot. The two locations are shown as "Probe" on the Site Plan. The exploration location was moved to the west of the building. The CPT holes were backfilled with cement grout upon completion of each test. The CPT results are presented on Plates 3 through 9.

The borings were both located inside the building and were drilled on July 13, 19 and 20, 2006 to depths about 50 feet below the top of slab. The concrete slab was cored prior to drilling. The borings were drilled with a track mounted SIMCO 2400 drill rig using rotary wash techniques. Our engineer logged the borings as they were drilled and collected samples for further examination and selected testing. Upon completion of drilling, the borings were backfilled with cement grout.

Samples in the fill and in the stiff soils were recovered using a 2.5-inch outside diameter (O.D.) / 1.9-inch inside diameter (I.D.) split barrel sampler or a 2.0-inch O.D., 1.4-inch I.D. Standard Penetration Test (SPT) sampler. The samplers were driven with a 140-pound hammer falling approximately 30 inches for a penetration depth of 18 inches. The hammer utilized a rope-and-pulley system. Field blow counts measured when advancing the 2.5-inch O.D. sampler were converted to equivalent SPT values by multiplying by 0.81 to account for sampler size. These SPT equivalent blow counts are shown on the Logs of Borings. Samples within the medium stiff clay layers were recovered using a Shelby head sampler equipped with 3-inch O.D. thin wall sample tubes.

Laboratory testing consisted of consolidation tests, unconsolidated/undrained triaxial strength tests, Atterberg limits, sieve analyses, corrosion testing, R-value testing and moisture density measurements. Results of the strength, Atterberg limits, and moisture and density

measurements are summarized on the Logs of Borings, Plates 10 through 13. The soil descriptions are presented in general accordance with the Soil Classification System presented on Plate 14. Stress-strain plots for the unconsolidated/undrained triaxial strength tests and the load-deformation plots for the consolidation tests are presented on Plates 15 through 19. The results of sieve analyses, Atterberg Limits test, and corrosion testing are shown on Plates 20 through 22.

III. SITE CONDITIONS

A. Surface Conditions

The site is relatively flat and even. The ground slopes down gradually from east to west from about Elevation 26 feet to 20 feet (NGVD 1929). An existing building stands at the northwest part of the site and the slab grade is at about Elevation 28 feet. The building has roll-up doors and loading docks along the north and south perimeter. The building is bordered by an asphalt concrete paved loading/unloading area to the south and a railroad spur to the north. East of the building lies a gravel parking area and landscaping with trees.

B. Subsurface Conditions

The borings were drilled inside the existing building. We cored through 6 to 8 inches of reinforced concrete slab which is underlain by medium dense to very dense clayey gravel fill to a depth of 5 to 6.5 feet (Elevation 23 to 22 feet).

Beneath the fill, the surface native soil layer is a fat clay that is stiff to very stiff in shear strength and ranges in thickness from about 5 feet to 10 feet. Beginning at about Elevations +15 to +9, we observed a predominantly medium stiff lean clay layer that was about 5 to 9 feet thick. The clay structure contains numerous root holes. This layer is underlain by a stiff to very stiff lean clay to the bottom of the explorations. The borings and CPT's show that the clay layers are interspersed with sand lenses and layers that vary from loose to very dense.

Groundwater was observed at about Elevation 12 feet in Boring 1. This measurement was taken before the drilling method was switched from solid flight auger to rotary wash and may not present stabilized conditions.

The above descriptions of soil and groundwater conditions summarize observations at the time of our investigation. Conditions are expected to vary across the site and with time and depend on several factors including changes in moisture content resulting from seasonal precipitation and land use changes.

IV. DISCUSSION AND CONCLUSIONS

A. General

The more significant geotechnical issues for the project are the presence of compressible soil and potentially expansive soil at the site. These issues and other considerations are addressed in the following paragraphs.

B. Compressible Soil

The main geotechnical issue for this site is the performance of the medium stiff clay layer. Consolidation of the clay will occur when new loads are added. The magnitude and rate of consolidation are a function of several factors that include the thickness of the clay layer, compressibility and permeability of the clay, the load placed over the clay and time that the load has been in-place.

We performed consolidation testing on two samples of the clay layers. We judge that the shallow medium stiff clay layer is normally consolidated and potentially compressible when loaded. The consolidation test of the stiff clay layer beneath the medium stiff clay indicates that this clay is overconsolidated and not subject to significant compression for the loads being proposed by the project.

An important factor in the settlement estimates is the location of the proposed engine generator sets in relation to the dock high fill beneath the existing building. The ground below the building is preloaded from the dock high fill below the building slab and has already undergone settlement in response to those loads. The settlement also results in the compressible clay layer becoming stiffer. The ground surrounding the building has not been precompressed by the fill loading and is subject to greater future settlement when loaded.

Our analysis indicates that about 2 inches of total settlement may occur if the native ground outside the existing building footprint is loaded with the proposed engine generator sets on shallow foundations. If the engine generator sets are placed partially within and partially outside the existing building footprint, we estimate that the differential settlement could also be about 2 inches.

We judge that settlement may occur due to the loading of the fire water tank; about 2.5-inches beneath the center and 1.5- to 2-inches at the perimeter of the tank.

C. Engine Generator Set Foundations

We assume that 2 inches of settlement is not acceptable for the engine generation equipment and we offer the following foundation alternatives:

1) Relocation of Engine Generator Sets

If the engine generator sets are relocated so they lie completely within the footprint of the existing building and the 4 feet dock high fill is removed (as planned), then we estimate about ¾-inch of settlement may occur with differential settlement of about half this amount. The total settlement under the new loads will be reduced by the amount of pre-compression that previously occurred under the weight of the dock high fill. Further, with the engine generator sets lying completely within the footprint of the dock high fill, settlement will be fairly consistent across the foundation limits in this scenario, reducing differential settlement across the foundation. The project is not currently considering relocation of the engine generator sets at the site.

2) Pre-load Engine Generator Set Pads

The ground at the proposed engine generator sets can be pre-loaded by placing an 8 feet high temporary fill over the footprint of the engine generator set foundation. Fill removed from other portions of the existing dock high fill would be the logical source of the temporary fill surcharge. The fill should remain in place until about 90 percent of the settlement has occurred. Settlement should be monitored during and after the fill placement. We estimate that the surcharge period would need to be about 6 months, but due to the nature of settlement, this may vary significantly. Upon completion of the surcharge period, the fill should be removed and the engine generator set foundations constructed. We assume that the project schedule will not allow pre-loading and waiting for the consolidation to occur.

3) Remove and Recompact Compressible Soil

This option consists of excavating of the compressible clay layer beneath the engine generator sets down to firm ground. The average depth of the excavation may be about 16 feet. The removed soil would be moisture conditioned, replaced and recompacted. The bottom of the excavation will be below the water table and dewatering will be needed. We

consider the use of Geopiers (as described in the following paragraph) to be a more viable option than removal and replacement.

4) Geopier Foundations

Geopiers is a patented method of ground improvement involving drilling 30-inch diameter pier holes and backfilling with rammed aggregate to improve the strength of surrounding soils. The Geopier stiffened subgrade can support added loads with reduced settlement. Geopiers would be spaced evenly under the engine generator set foundations and would be up to 20 feet deep. Shallow foundations can be constructed on the top of the Geopier reinforced soil. We presented the geotechnical site data to the Geopier contractor and he estimates the total settlement of a Geopier stiffened subgrade would be about ¾-inch, with the differential settlement being less half this amount. The Geopier installation can be accomplished in about two weeks.

5) Mat Foundations

A rigid mat foundation beneath each group of seven engine generator sets would reduce the differential settlement by spanning across a wide area. This would tie together the individual equipment sets and may affect vibration damping. The mat foundation may still settle a total of 2-inches, but the differential settlement would be reduced. This method involves increased material and construction costs due to the increased area of the foundation. We do not recommend this foundation scheme for the current site layout.

6) Drilled Piers

Cast-in-drilled-hole reinforced concrete (drilled piers) can be used to support the engine generator sets. Side friction against the pier shafts would be used to carry the foundation loads. We judge that piers would extend at least 10 feet below the bottom of the medium stiff clay layer. This will be below the water table and may require the use of steel casing to keep the pier holes from caving. Due to constructability issues, driven pile foundations may offer a more cost-effective deep foundation alternative.

7) Pile Foundations

Prestressed concrete piles may be used to support the engine generator sets. No end bearing layers were found at the site. Pile capacity would develop by skin friction between the pile perimeter and the surrounding soil.

After assessing the foundation alternatives, we conclude that the use of footings bearing on Geopier reinforced soil will provide an economical and effective foundation for the proposed engine generator sets.

D. Fire Water Tank Foundation

We estimate that settlement from the loading of the fire water tank will be about 2.5 inches at the center of the tank and about 1.5 to 2 inches at the perimeter of the tank. This assumes that the tank is 22 feet in diameter and has a contact pressure of about 1400 psf. If the tank can tolerate this magnitude of settlement, the structure may be founded on a shallow foundation. If the tank cannot tolerate the settlement, Geopiers may be installed under the foundation.

E. Lightly Loaded Foundations

We judge that lightly loaded structures including buildings may be founded on shallow strip or rectangular footings. For this report, we consider foundations supporting weights of less than 50 kips or continuous footings supporting weights of less than 3 kips per foot as “Lightly Loaded Foundations”. The stresses from these footing loads will be reduced at the depth of the compressible layer and will not result in the settlements experienced at the heavily loaded foundations. Foundation movement (settlement of heave) may still occur from compression of the soil under building loads or from movement of the expansive soil. We estimate that differential vertical movement between adjacent columns on lightly loaded foundation will not exceed ¾-inch assuming the recommendations presented in this report are used for design.

F. Expansive Soils

Atterberg limits tests indicate that the near surface native soil has a high expansion potential. Expansive soils change volume with changes in their moisture content. As the moisture content is increased, expansive soil swells, as expansive soil dries, it shrinks. Structures located directly on expansive soils will heave and settle in response to these movements. Placing a slab over expansive soil will cut down evapo-transpiration losses during dry months, tending to retain moisture content beneath the center portion of the slab. The moisture content near the edges of the slab tends to vary with the season and with irrigation

practices. Differential heave or settlement between the perimeter and interior of a slab can cause cracking, uneven surfaces and tripping hazards.

The impact of expansive soil on slabs-on-grade can be partly offset by moisture conditioning the subgrade prior to casting the slab. Further reduction in vertical movements can be achieved by placing select fill of low expansion potential below the slabs. The purpose of the select fill is to provide a buffer zone between the expansive materials and concrete slabs. Even with these mitigating measures some movement and minor cracking of the slab may occur.

We judge that a well-compacted select fill layer at least 18 inches thick beneath the building slab will provide a level of performance generally acceptable to most persons.

G. Seismicity

The predominant seismic hazard for this site is strong groundshaking resulting from earthquakes. The structures should be designed to accommodate such groundshaking in accordance with existing codes. No known active faults pass through the site and the risk of fault rupture is low. For use with the 2001 California Building Code (CBC), the site can be classified as S_D, a stiff soil profile. The faults nearest the project site which may affect groundshaking are listed in the following table. The Hayward Fault will control the near-source seismic factors. CBC code factors of 1.2 for N_a and 1.6 for N_v apply to this site.

FAULT	TYPE	DISTANCE	DIRECTION
Hayward	A	5 km	Northeast of site
Calaveras	B	18 km	Northeast of site
San Andreas	A	24 km	Southwest of site
Monte Vista- Shannon	B	25 km	Southwest of site
Concord-Green Valley	B	31 km	Northwest of site
Greenville	B	35 km	Northwest of site
San Gregorio	A	36 km	Southwest of site
Rodgers Creek	A	54 km	North of site

Soil liquefaction is a phenomenon in which a loose- to medium-dense saturated granular soil undergoes reduction of internal strength as a result of increased pore water pressure generated by shear strains within the soil mass. This behavior is most commonly

induced by strong groundshaking associated with earthquakes. Soil conditions include a 3 feet thick layer of loose to medium dense clayey sand below the water table. Based on the blow counts, we judge that liquefaction within this sand layer may occur during a large earthquake. We judge that seismically induced settlement would be minimal, that is on the order of one inch or less. Deeper sand layers are also present that we judge are not susceptible to liquefaction. Due to the depth of the potentially liquefiable layer and the stiffness of the clay overlaying the sand, we judge that there will be a margin of safety against a bearing failure of the foundation, even during an earthquake event.

V. RECOMMENDATIONS

A. General

We recommend using shallow spread footings for most foundations. We recommend the use of shallow footings bearing on Geopiers at the engine generator sets. We recommend shallow foundations on existing ground for the water tank, provided the tank can tolerate the estimated settlement. We have included design recommendations for alternative deep foundation support for the engine generator sets, including driven piles. If other alternative options for foundation type are chosen, our office will provide recommendations as needed.

B. Earthwork

1. Site Preparation

The existing building will be demolished. The site should be cleared of all demolition debris. The asphalt concrete should be pulverized and mixed with the underlying aggregate base. This material should be stockpiled for reuse as subbase beneath pavement areas. The dock high fill beneath the existing slab should be stockpiled and used at the site as select fill.

2. Fill Materials

Common fill placed at the site should be a soil or soil/rock mixture free of deleterious matter and contain no rocks or hard fragments larger than 4 inches in maximum dimension and less than 15 percent larger than 1-inch in maximum dimension. On-site native soil and existing fills free of debris will satisfy the requirements for common fill.

In addition to meeting the requirements for common fill, *select fill* should have a low expansion potential, which for this site should be defined as having a Liquid Limit (LL) less than 40 and Plasticity Index (PI) less than 15. Select fill should be predominately granular with 100 percent passing a two-inch sieve and less than 30 percent passing the Number 200 sieve. Select fill may be derived from mixtures of on-site recycled asphalt concrete grindings and aggregate base materials. Though it may not meet the specific criteria for the select fill given above, we judge that the existing dock-high fill beneath the existing building is suitable for reuse as select fill. Samples of fill material should be submitted to us for approval

prior to importing to the site. Eighteen-four inches of select fill is recommended below concrete slabs.

3. Compaction

Surfaces exposed by stripping and excavation of fill material should be scarified to a depth of at least 8 inches or the full depth of shrinkage cracks, whichever is deeper. The scarified soil should be moisture conditioned to at least 3 percent over optimum moisture content and compacted to at least 90 percent relative compaction. ASTM test D-1557 should be used to establish the reference values for computing optimum moisture content and relative compaction. Although not anticipated, if shrinkage cracks extend below 12 inches, some excavation in addition to scarifying will be required to adequately moisture condition and compact soils. If soft or yielding soils are present during subgrade preparation or fill compaction, they should be scarified, moisture-conditioned and compacted or removed by excavating to expose firm soil.

4. Utility Trenches

In the absence of local agency or utility company requirements, the following criteria for bedding and backfilling utility lines may be used. For terra cotta, plastic and/or metal pipes, a bedding layer consisting of clean sand or fine gravel should be placed below and around pipes and extend at least six inches above their tops. The bedding thickness below the bottom of the pipe should be at least three inches. For concrete storm drains, the above bedding criteria may be modified by extending the sand or fine gravel bedding material only up to the spring line of the pipe provided care is taken during placement and compaction of the fill around and above the pipe. Jetting should not be allowed for compacting backfill.

C. Footings

Footings bearing on native soil may be used to support lightly loaded structures. Shallow foundations bearing on Geopiers may be used to support the engine generator sets.

For the purpose of this report, lightly loaded footings will support a weight of less than 50 kips for a square or rectangular footing and 3 kips per foot for a continuous footing. Footings used to support lightly loaded structures should be designed using the allowable bearing pressures in Table 1.

Table 1 – Allowable Net Bearing Pressures for Lightly Loaded Footings

Foundation Type	Embedment Depth (feet)	Dead Load (psf)	Dead plus Sustained Live Load (psf)	Total Loads including Wind/ Seismic (psf)
Square	2	1500	1800	2400
Continuous/ Rectangular	2	1000	1200	1600
Square	5	750	900	1200
Rectangular	5	500	600	800

Linear interpolation may be used to determine allowable bearing pressures between 2 and 5 feet embedment depth.

Footings on Geopiers should be designed using allowable net bearing pressures of 2,500 pounds per square foot (psf) for dead loads, 3,500 psf for dead plus live loads and 4,500 psf for total loads including wind or seismic forces.

A circular mat foundation may support the fire water tank if the structure can tolerate the previously estimated deformations. The foundation should be designed using an allowable bearing pressure of 2,000 psf for dead loads, 2,500 psf for dead plus live loads and 3,500 psf for total loads including wind or seismic forces.

For both heavily and lightly loaded footings, resistance to lateral loads can be developed by friction at the base of footings and passive pressures acting against the vertical faces of below grade foundation elements. Frictional resistance on the base of footings can be calculated using a frictional coefficient of 0.35 multiplied by the vertical dead load for footings cast on native soil. A friction coefficient of 0.40 should be used for Geopier improved subgrades. An equivalent fluid weight of 350 pounds per cubic foot (pcf) may be used to calculate sustained passive resistance against the vertical face of footings. An added 1000 psf uniform lateral passive resistance may be used for evaluating resistance to transient lateral loads including wind and seismic forces. Passive pressure should be neglected in the upper one foot of soil unless the adjacent surface is confined by concrete slabs or pavements. These lateral resistance values do not include a factor of safety.

We recommend using shallow footings bearing on Geopiers to support the heavily loaded structures, such as the engine generator sets. The final design of the Geopiers is commonly performed by the specialty contractor used to perform this work. The Geopiers should be drilled to a depth of about 20 feet depth and have a diameter of 30-inches. The preliminary analysis indicates 8 geopiers would be needed at each engine generator set pad. A "bulb" of clean crushed stone should be installed at the bottom of the drilled hole and tamped with approved equipment. Above the "bulb", material should be placed in a maximum of 12-inch lifts and tamped to form the shaft of the Geopier. The material used for the shaft should be clean crushed aggregate below the water table and aggregate base above the water level. The aggregate base should be Caltrans ¾- inch Class 2 Aggregate Base.

These are preliminary recommendations for the Geopier reinforced soil. The final design will be performed by the Geopier design-build contractor hired to perform the work. The contractor licensed to perform this work in this area is Geopier Foundation Company-Northern California. The final design and installment procedure of the Geopiers should be submitted to Hultgren-Tillis Engineers prior to construction for review and approval. The design should be performed with the intent of reducing the settlement of the structure to within tolerable levels. The preliminary design limits the total settlement to ¾-inch and differential settlements to half this amount.

Continuous footings should be at least 12 inches wide, and individual footings should be at least 18 inches wide. Footings should be founded at least 24 inches below lowest adjacent finished grade and mats should be founded at least 12 inches below adjacent grade. Footings and mats should be well-reinforced. The faces of foundation excavations should be cut vertical. The bottom of excavations should be firm and free of water, debris, and loose or soft soils. Excavations should be kept moist until concrete is placed.

D. Driven Piles

As an alternative to Geopiers, heavily loaded equipment and structures may be supported on pile foundations. We judge that precast, prestressed concrete piles will be most suitable for this site. An allowable skin friction of 550 psf may be used to estimate the capacity of piles. Piles should be a minimum of 40 feet in length. To access the lateral capacity of piles, the parameters shown in Table 2 may be used with LPILE, APILE or COM624 computer

programs for assessing lateral loads and deflections of piles.

Table 2 - Soil Parameters for Lateral Pile Analyses

Soil Type	S_u (psf)	Angle of Internal Friction (degrees)	Unit Weight (pcf)	Initial Modulus (pci)	Strain at 50% of Su (E_{50})
Stiff Clay Above Water Table	1500	0	120	500	0.007

E. Slabs-On-Grade

Slabs-on-grade should be underlain by a minimum of 18 inches of select fill. Prior to placing select fill, the site subgrade should be prepared as described in the Earthwork section above. Particular attention should be given to achieving the recommended moisture content. After select fill is placed, it should be kept moist until the slab is cast to minimize moisture loss in the soil.

Concrete slabs-on-grade should be underlain by 6 inches of aggregate base where forklift traffic is planned.

If areas are sensitive to moisture transmission through the slab, the concrete slabs-on-grade should be underlain by at least 4 inches of capillary gravel. Capillary gravel used to create a moisture break beneath slabs-on-grade should be a clean, uniform graded aggregate such as ½- or ¾-inch crushed aggregate. A vapor barrier consisting of a 15-mil plastic membrane should be installed between the slab and capillary gravel. As an option, the vapor barrier may be overlain by a 2-inch-thick sand blanket to aid in protecting the barrier against puncture and to improve concrete curing. Even with these measures, some minor moisture transmission should be expected. The aggregate base or capillary gravel may be considered as part of the select fill layer.

During foundation and underground utility installation, previously compacted subgrade may become disturbed. Disturbed areas should be uniformly moisture conditioned

and recompacted.

F. Pavement

The recommendations presented in Table 2 below are based on assumed traffic loading. We collected a soil sample within the top 6 inches of the surface near the east border of the site and performed an R-value on the sample. It was noticed that the sample contained some gravel pieces, which is inconsistent with the surface native soils observed in the borings. The R-value was 29, which is higher than reasonably expected for the native clay soils. The sample may have been imported fill. We have not included the detailed R-value results in this report as we do not believe it is representative of the native soils. The recommendations presented in Table 3, for thickness of asphalt concrete pavement sections, are based on an assumed subgrade R-Value of 5.

Table 3 - Pavement Design Sections for Native Soil Subgrade

Location	Traffic Index (TI)	Asphalt Concrete (inches)	Aggregate Base (inches)
Auto Parking	4.5	2.5	9.0
Truck Lanes	5.0	2.5	11.0
	5.5	3.0	12.0
	6.0	3.5	12.5

If the pavement section is underlain by at least 12 inches of select fill, including material from the dock high fill, we recommend using pavement sections for asphalt concrete pavement in Table 4.

Table 4 - Pavement Design Sections above 12 inches of Select Fill

Location	Traffic Index (TI)	Asphalt Concrete (inches)	Aggregate Base (inches)
Auto Parking	4.5	2.5	7.0
Truck Lanes	5.0	2.5	8.5
	5.5	3.0	9.0
	6.0	3.5	9.5

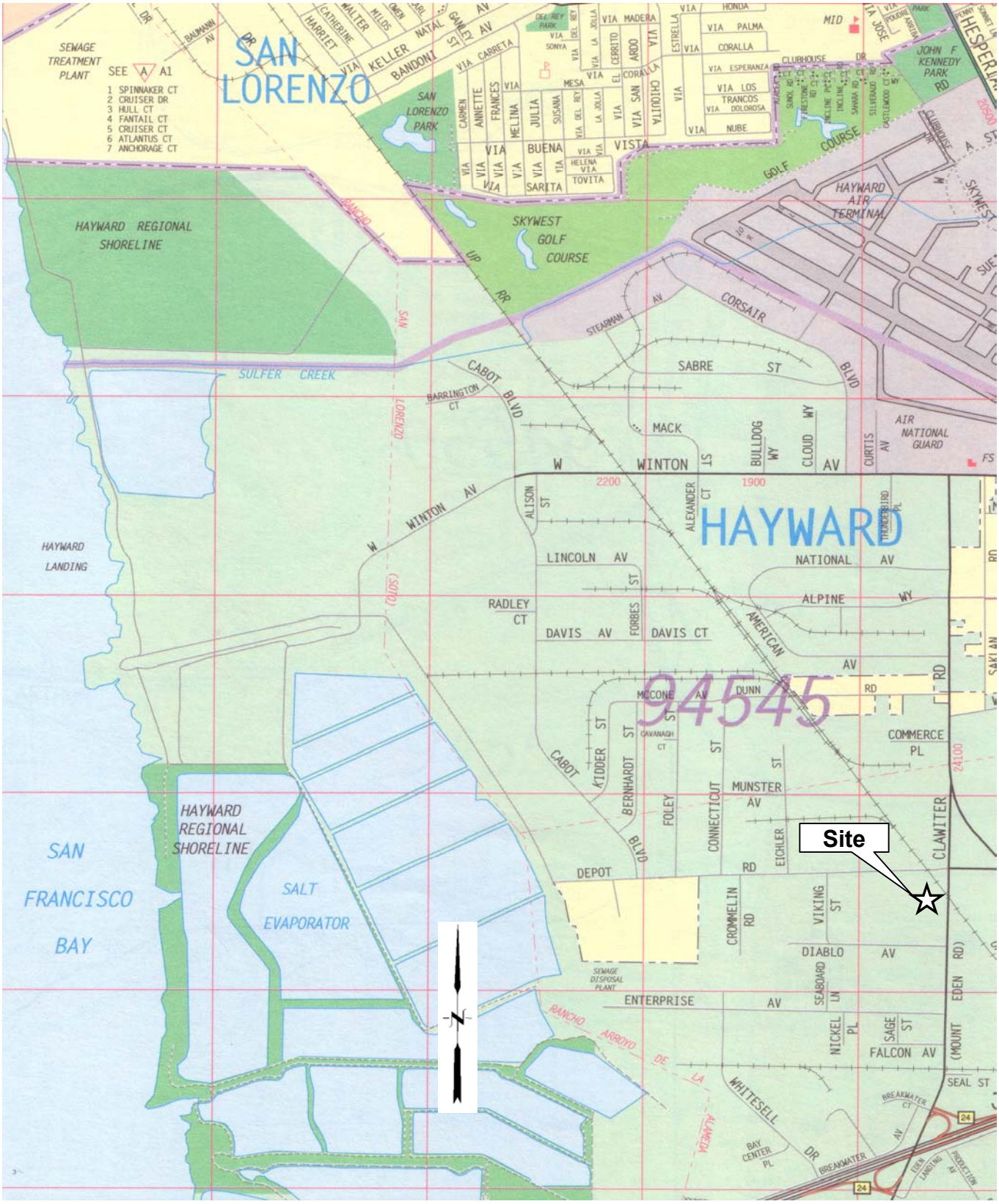
G. Surface Drainage

Ground surfaces in the vicinity of the structure and flatwork should slope away from the structure and flatwork; no ponding of surface water should be allowed.

H. Services During Construction

Prior to construction, we should be contacted to review project foundation plans and specifications to check for conformance with the intent of our recommendations. Once the Geopier design and equipment is known, we should review the design and proposed construction procedures. During construction, we should observe ground improvement (Geopiers), fill placement and compaction and footing excavations. If conditions are encountered during construction that are not consistent with those described herein, we should be contacted to review our recommendations and provide alternatives, if appropriate.

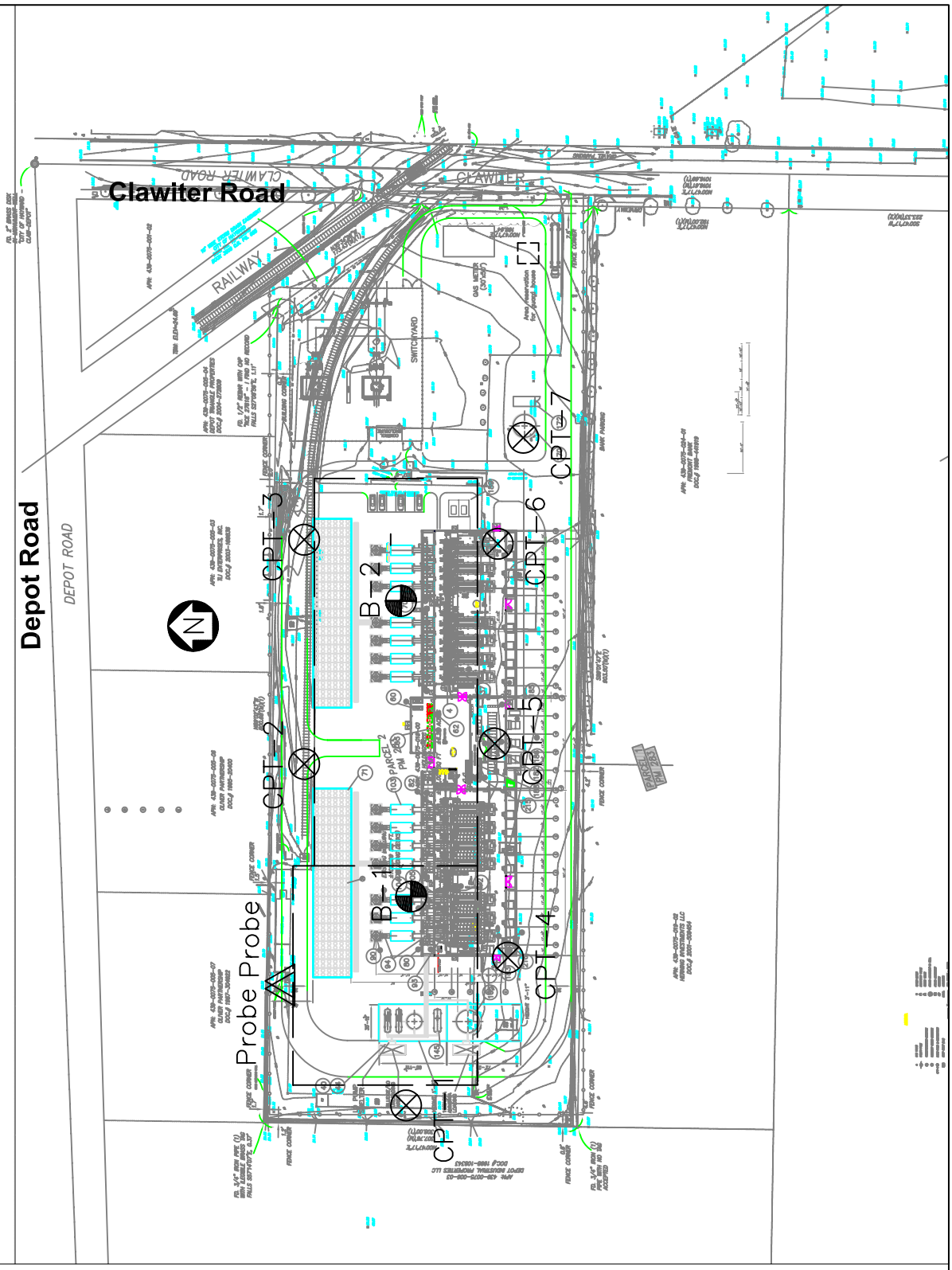
PLATES



Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Vicinity Map

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 1



Approximate Location of CPT

Approximate Location of Boring

Approximate Location of Probe

SCALE

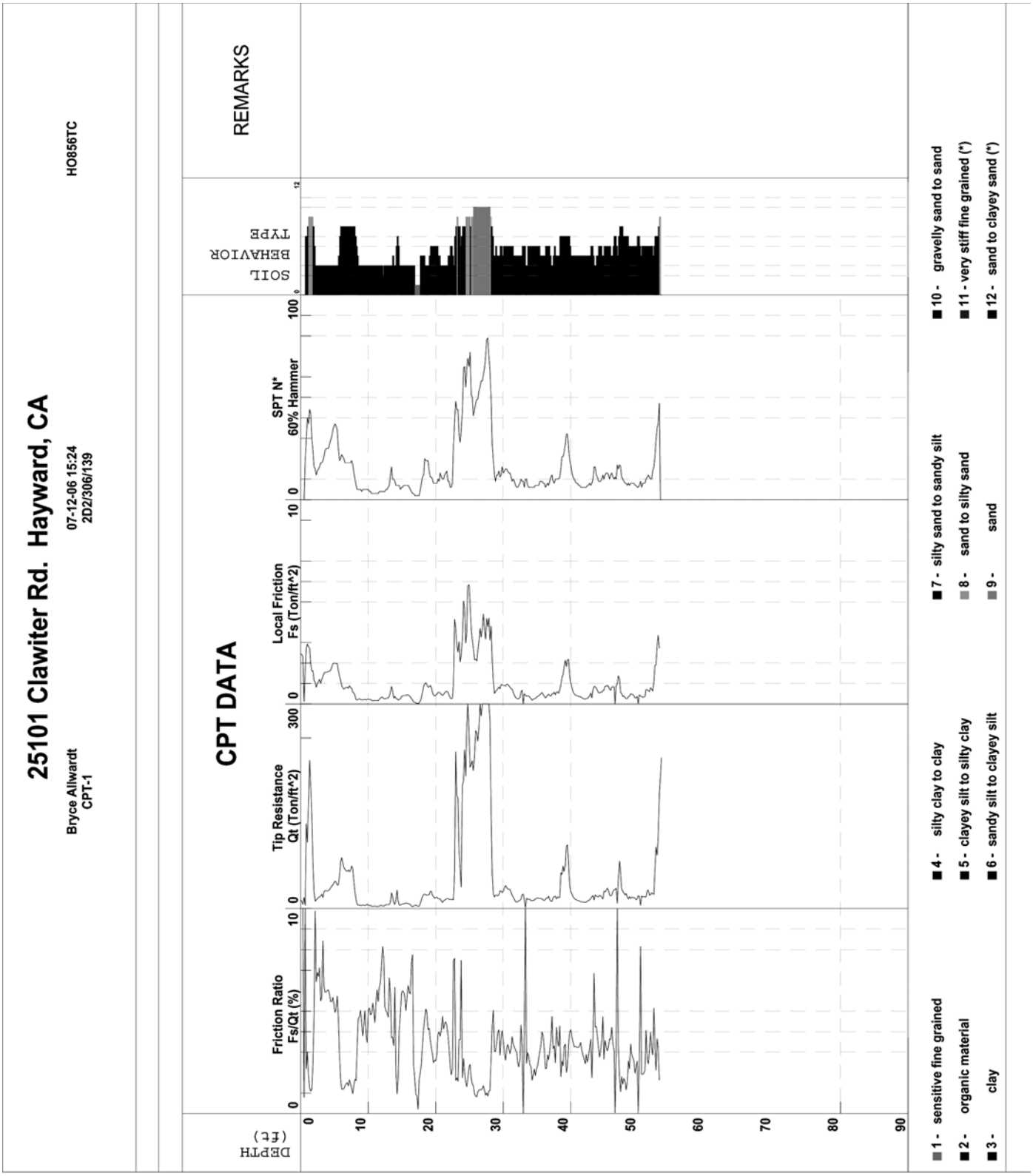
0 150 feet

1 inch = 150 feet

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Site Plan

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 2

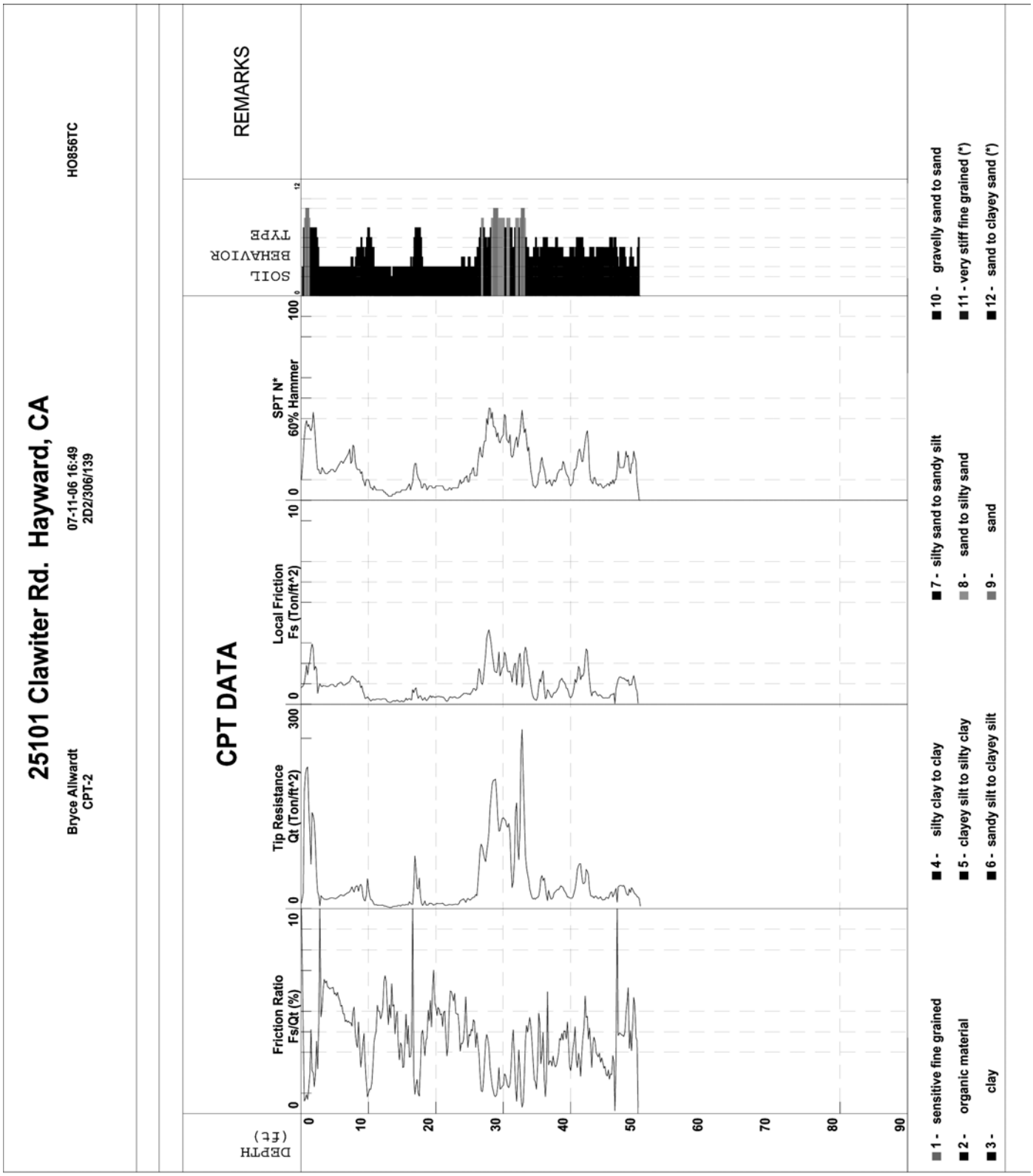


Elevation: 21 feet

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Log of CPT-1

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 3

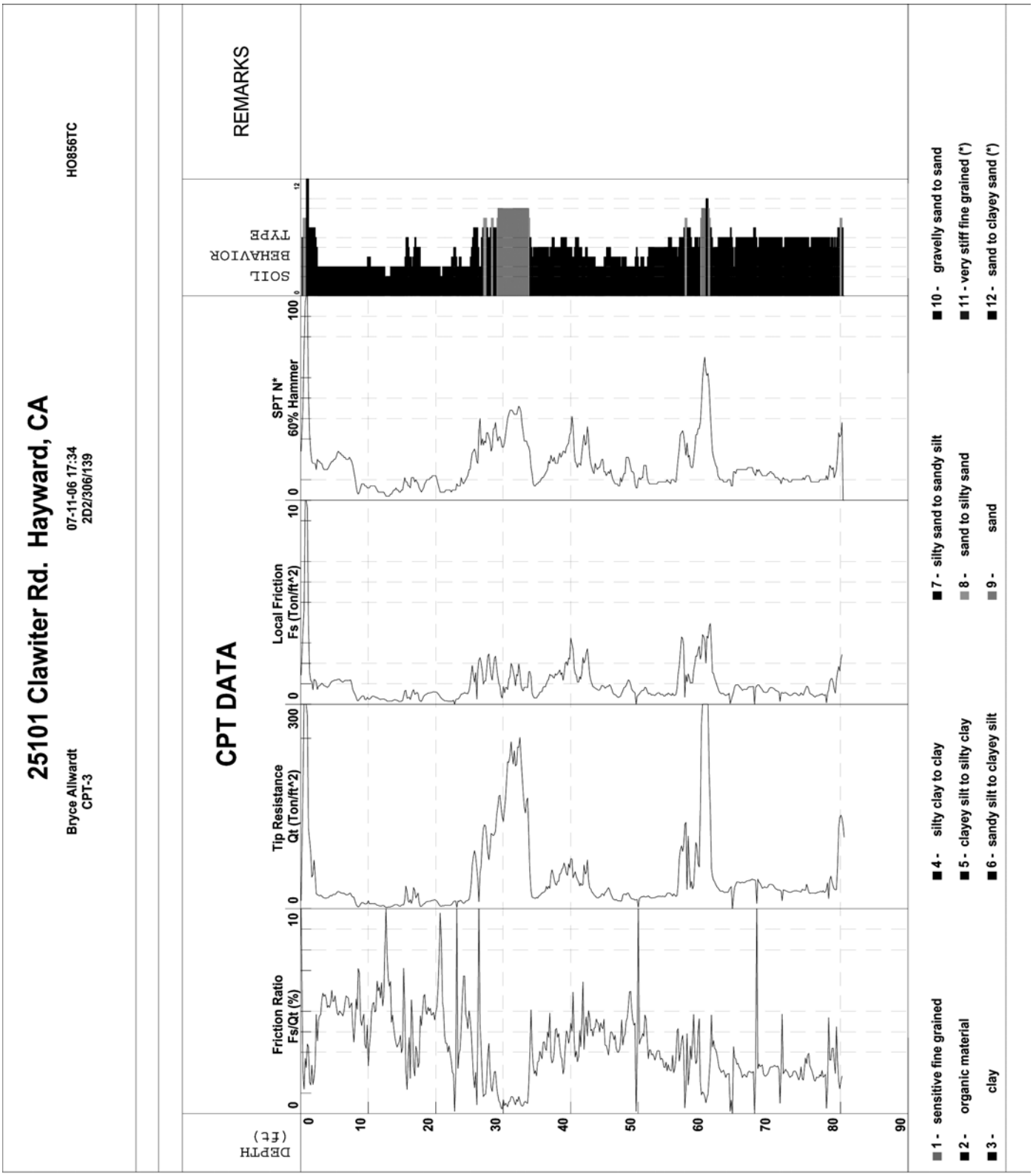


Elevation: 24 feet

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Log of CPT-2

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 4

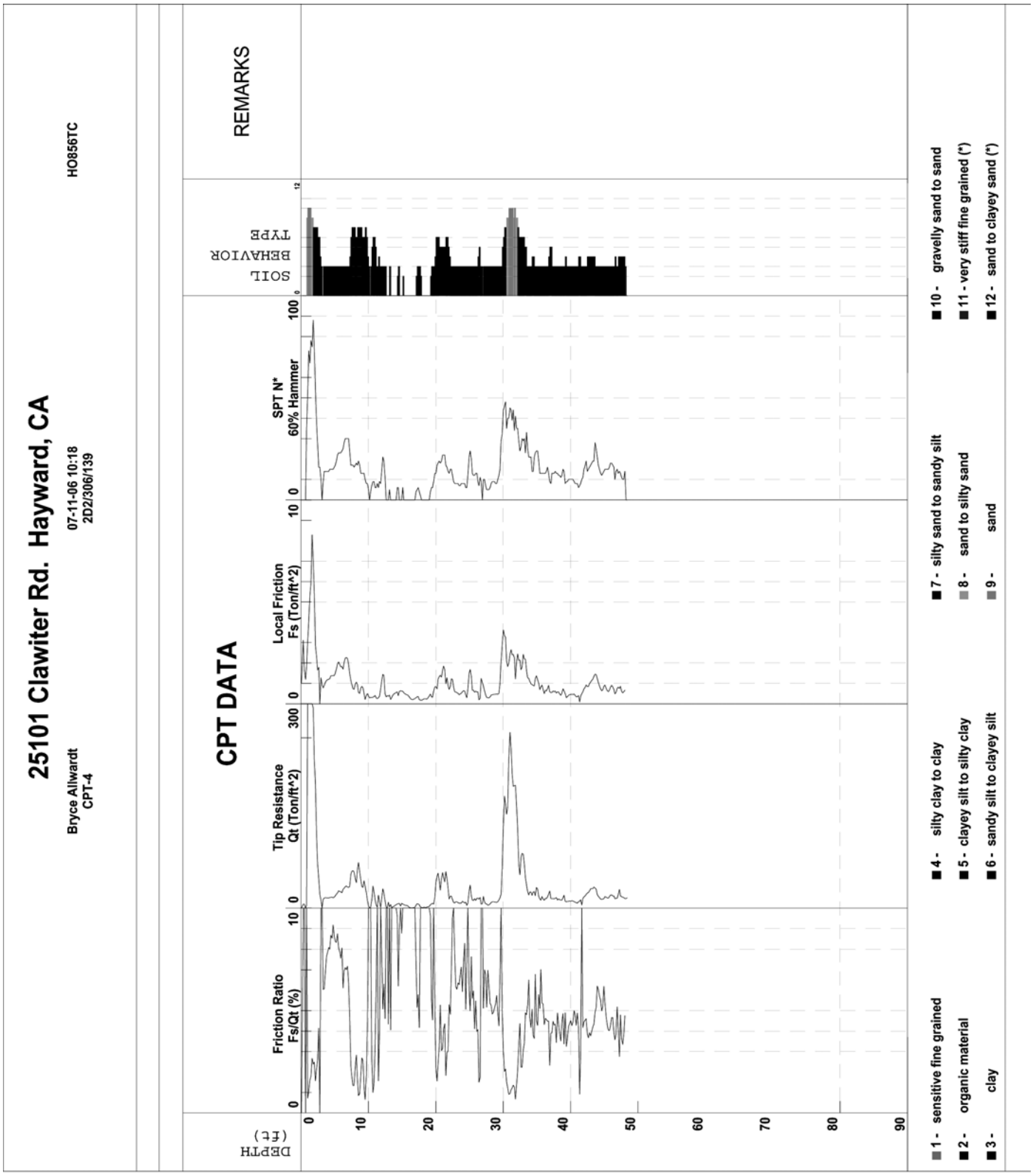


Elevation: 24 feet

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Log of CPT-3

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 5

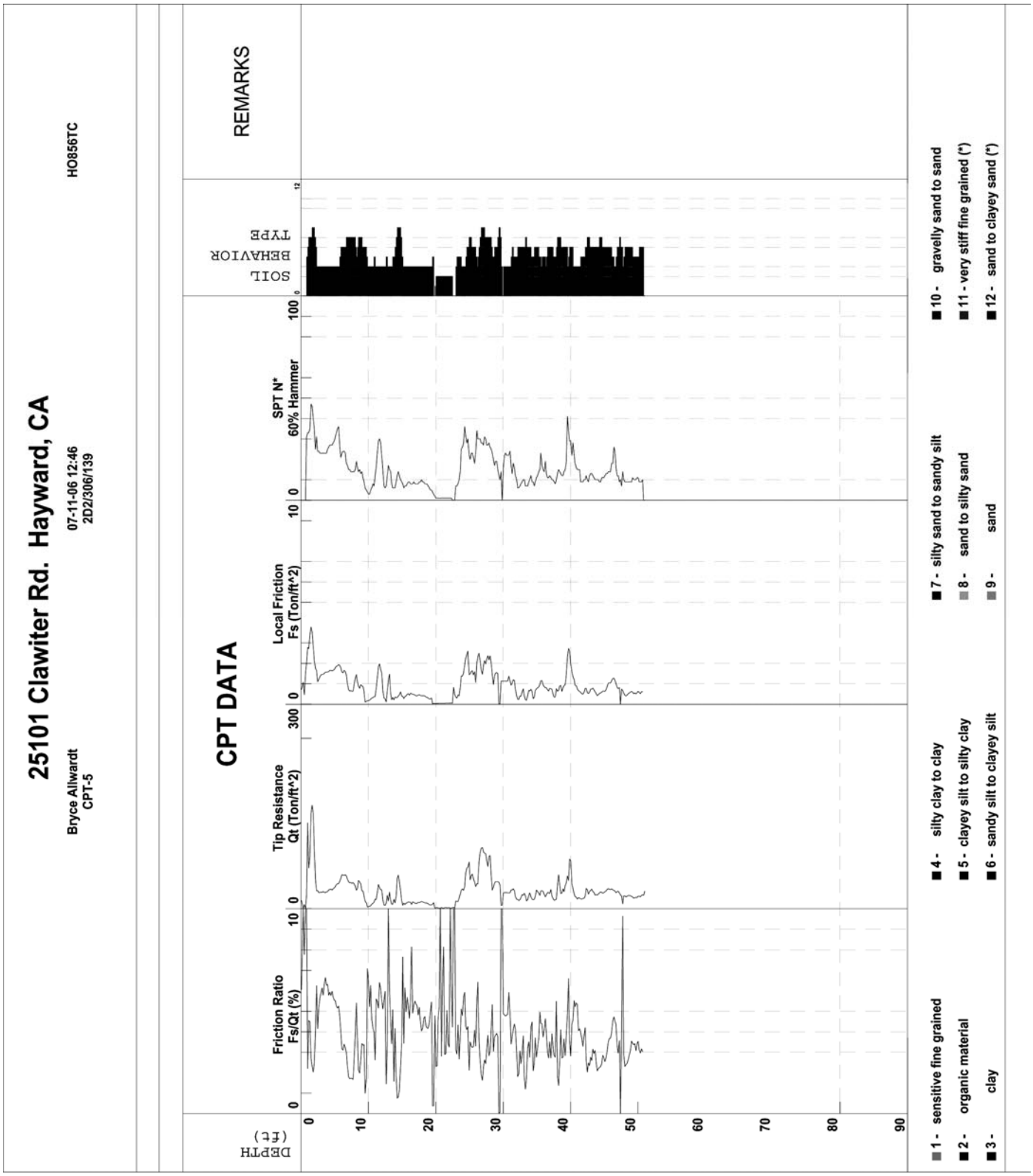


Elevation: 23 feet

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Log of CPT-4

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 6

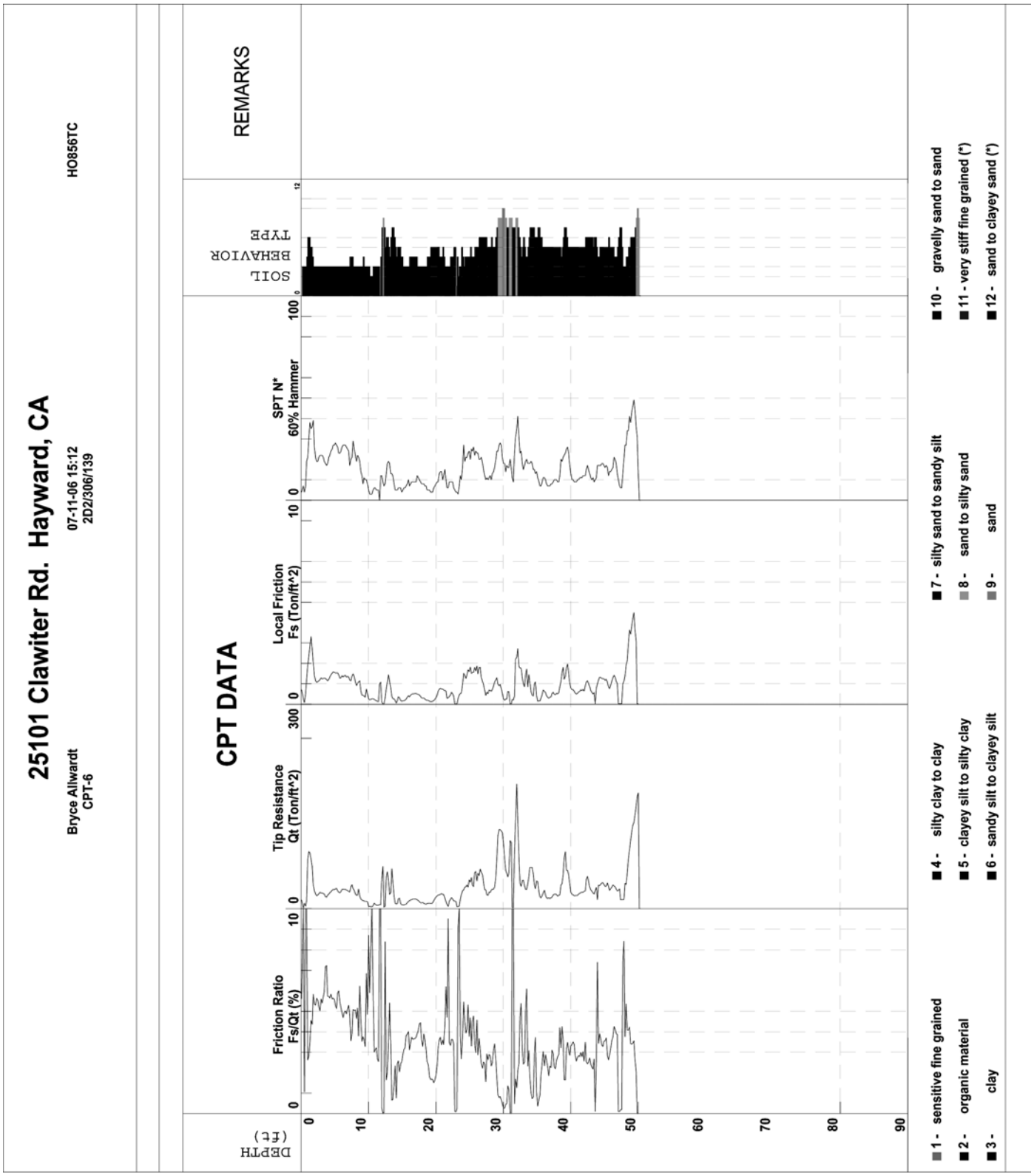


Elevation: 24 feet

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Log of CPT-5

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 7

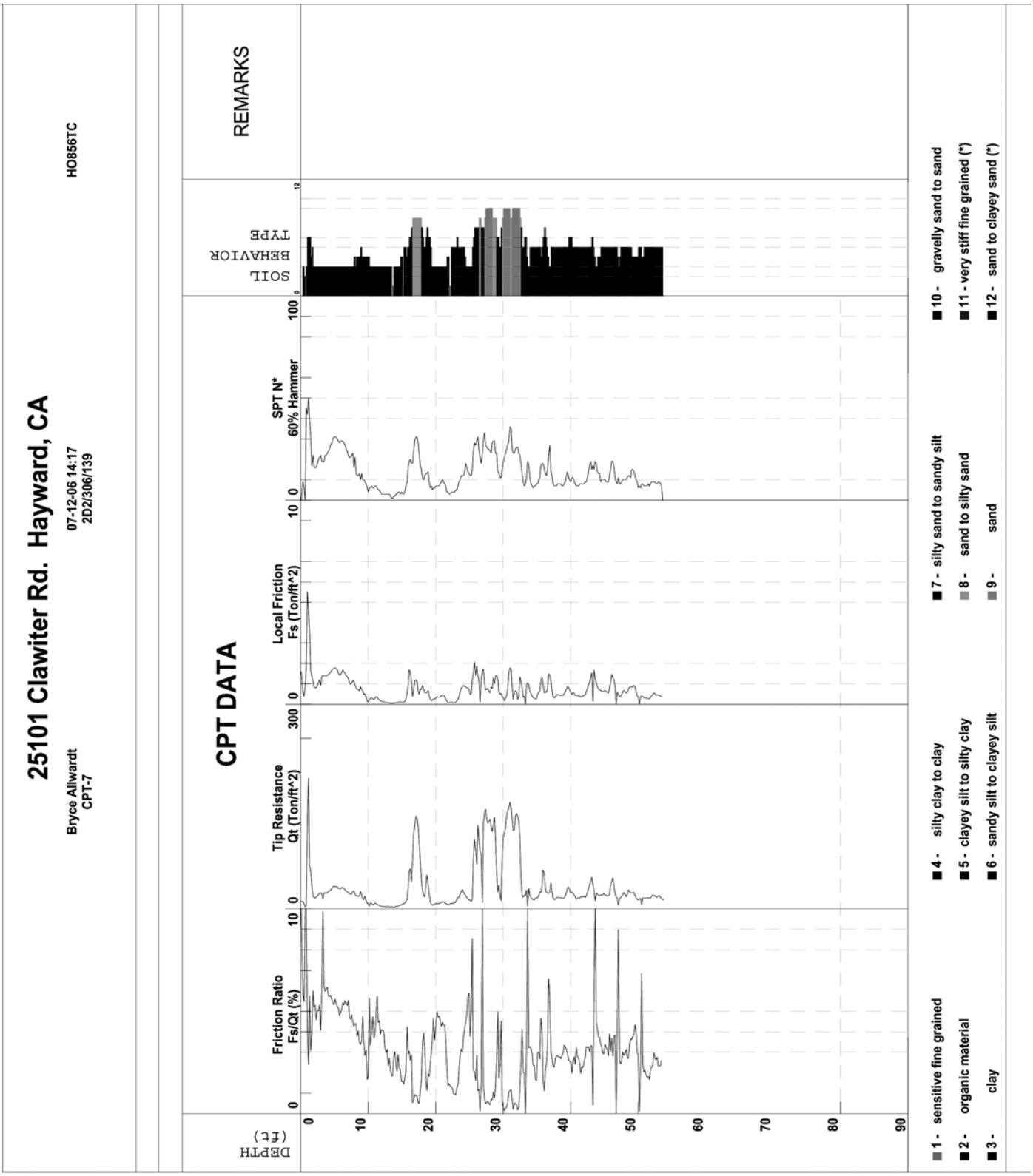


Elevation: 24 feet

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Log of CPT-6

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 8



Elevation: 24 feet

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Log of CPT-7

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 9

Hultgren-Tillis Engineers

LOG OF BORING 1

Date Drilled : July 13 and 19, 2006
Drilling Method : Solid Flight Auger and Rotary Wash
Elevation (Feet) : 28 (Building Slab Grade)
Northing :
Easting :

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Project No. 653.01 Plate 10

Sampler Type: SPT; 2.5-inch; 3.0-inch; Shelby Tube

Water Levels: During Drilling; After Completion

Depth in Feet	Samples	Blow Count	Graphic	USCS	Water Levels	Material Description	Torvane (tsf)	Pocket Penetrometer (tsf)	Moisture Content (%)	Dry Density (pcf)	Other Laboratory Tests
0						8-inch Reinforced Concrete Slab					
				GC		Gray Clayey Gravel (GC), medium dense, moist (Fill)					
		28									
5				CH		Dark Gray Fat Clay (CH), very stiff, moist					
		22						3.7	26	95	LL=58 PI=40
10				SC		Brown Clayey Sand (SC), loose to medium dense, moist					
		7		CL		Brown Lean Clay (CL) with sand, medium stiff to stiff, moist, with root holes		0.7			
15		Push			▼	11:15 a.m., 07/13/2006			30	90	TxUU (see Plate 15)
						wet, no sand			25	96	Consol (see Plate 18)
20		Push									
		Push				stiff, saturated	0.65		30	92	TxUU (see Plate 16)
									29	93	Consol (see Plate 19)
25		6				no root holes					

Hultgren-Tillis Engineers

LOG OF BORING 1

Date Drilled : July 13 and 19, 2006
Drilling Method : Solid Flight Auger and Rotary Wash
Elevation (Feet) : 28 (Building Slab Grade)
Northing :
Easting :

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Project No. 653.01 Plate 11

Sampler Type: SPT; 2.5-inch; 3.0-inch; Shelby Tube

Water Levels: During Drilling; After Completion

Depth in Feet	Samples	Blow Count	Graphic	USCS	Water Levels	Material Description	Torvane (tsf)	Pocket Penetrometer (tsf)	Moisture Content (%)	Dry Density (pcf)	Other Laboratory Tests
25		6				Brown Lean Clay (CL), stiff, saturated					
		Push				Light Brown, stiff to very stiff, with sand		2.0	22	104	
30		14		CL				4.0			
35		15				Gray and Brown					
40		28		CL		Gray Sandy Lean Clay (CL), stiff to very stiff, saturated		3.5 2.0	22	105	
45		11		CL		Brown Lean Clay (CL) with abundant gravel, medium stiff to stiff, saturated	0.5	1.0			
						Bottom of boring at 48.5 feet					
50											

Hultgren-Tillis Engineers

LOG OF BORING 2

Date Drilled : July 20, 2006
Drilling Method : Solid Flight Auger and Rotary Wash
Elevation (Feet) : 28 (Building Slab Grade)
Northing :
Easting :

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Project No. 653.01 Plate 12

Sampler Type: SPT; 2.5-inch; 3.0-inch; Shelby Tube

Water Levels: During Drilling; After Completion

Depth in Feet	Samples	Blow Count	Graphic	USCS	Water Levels	Material Description	Torvane (tsf)	Pocket Penetrometer (tsf)	Moisture Content (%)	Dry Density (pcf)	Other Laboratory Tests
0						6-inch Reinforced Concrete Slab					
		51		GC		Brown and Gray Clayey Gravel (GC), dense to very dense, dry (Fill)					
5		49									
				CH		Dark Gray and Brown Fat Clay (CH), very stiff, moist					
10		37						4.2			Corrosion Test (see Plate 22)
				CL		Brown Sandy Lean Clay (CL) with root holes, stiff, moist to wet					
15		Push						1.3			
		Push					0.65				
		8		SC		Brown Clayey Sand (SC), loose, saturated			20	109	Sieve Analysis (see Plate 20)
20											
				CL		Brown Sandy Lean Clay (CL), stiff, saturated					
		Push					0.65	1.3	26	94	TxUU (see Plate 17)
25											

Hultgren-Tillis Engineers

LOG OF BORING 2

Date Drilled : July 20, 2006
Drilling Method : Solid Flight Auger and Rotary Wash
Elevation (Feet) : 28 (Building Slab Grade)
Northing :
Easting :

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Project No. 653.01 Plate 13

Sampler Type: SPT; 2.5-inch; 3.0-inch; Shelby Tube

Water Levels: During Drilling; After Completion

Depth in Feet	Samples	Blow Count	Graphic	USCS	Water Levels	Material Description	Torvane (tsf)	Pocket Penetrometer (tsf)	Moisture Content (%)	Dry Density (pcf)	Other Laboratory Tests
25						Brown Lean Clay (CL), stiff, saturated					
		12		CL				1.3			
30						Brown Silty Sand (SM), medium dense, saturated, fine-grained					
		21									Sieve Analysis (see Plate 20)
35				SM							
		39				dense, with gravel					
40						Brown Sandy Lean Clay (CL), stiff, saturated					
		17					0.65	1.5			
45				CL							
		23				Gray and Brown, very stiff		3.8	21	108	
50						Bottom of boring at 48.5 feet Groundwater was obscured by rotary wash drilling					

MAJOR DIVISIONS				GROUP NAMES
COARSE-GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVELS MORE THAN 50% OF COARSE FRACTION IS RETAINED ON No. 4 SIEVE	CLEAN GRAVELS WITH LESS THAN 5% FINES	GW	WELL-GRADED GRAVEL
			GP	POORLY GRADED GRAVEL
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SANDS 50% OR MORE OF COARSE FRACTION PASSES No. 4 SIEVE	CLEAN SANDS WITH LESS THAN 5% FINES	SW	WELL-GRADED SAND
			SP	POORLY GRADED SAND
		SANDS WITH OVER 12% FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE-GRAINED SOILS 50 PERCENT OR MORE PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	SILT
			CL	LEAN CLAY
			OL	ORGANIC CLAY, ORGANIC SILT
	SILTS AND CLAYS LIQUID LIMIT 50 OR MORE		MH	ELASTIC SILT
			CH	FAT CLAY
			OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			Pt	PEAT

UNIFIED SOIL CLASSIFICATION SYSTEM- ASTM D 2487

Perm	-	Permeability	TxUU	Shear Strength (psf)	- Unconsolidated Undrained Triaxial Shear
Consol	-	Consolidation	TxCU	Shear Strength (psf)	- Consolidated Undrained Triaxial Shear
LL	-	Liquid Limit (%)	UC	Compressive Strength (psf)	- Unconfined Compression
PI	-	Plasticity Index (%)			
Gs	-	Specific Gravity			
Sieve	-	Particle Size Analysis			
P	-	Push			

KEY TO TEST DATA

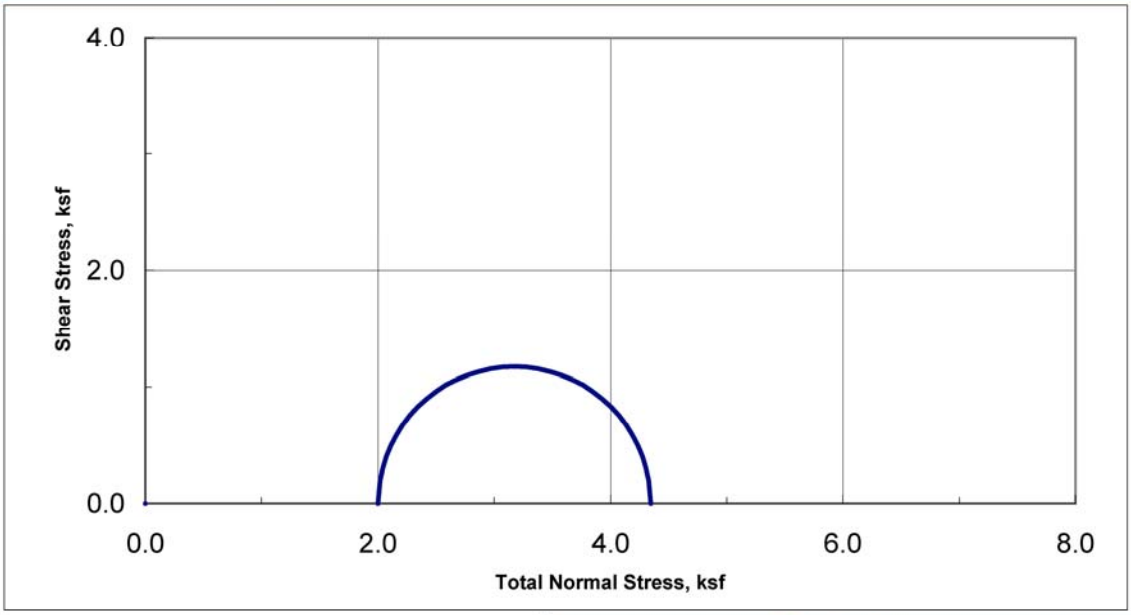
Eastshore Energy Center
25101 Clawiter Road
Hayward, California

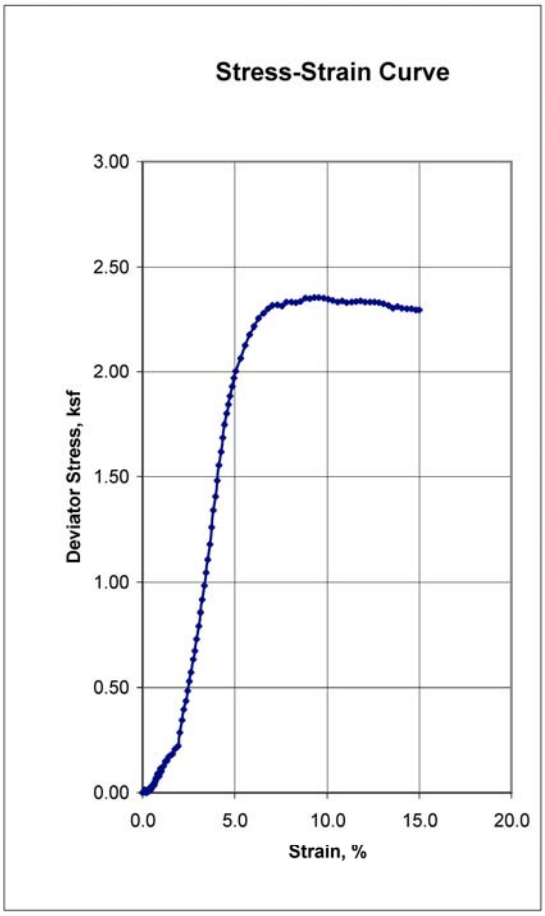
Soil Classification

Hultgren - Tillis Engineers | Project No. 653.01 | Plate No. 14

Unconsolidated-Undrained Triaxial Test

ASTM D-2850





Sample Data	1	2	3	4
Moisture %	29.8			
Dry Den,pcf	89.7			
Void Ratio	0.878			
Saturation %	91.8			
Height in	6.00			
Diameter in	2.87			
Cell psi	13.9			
Strain %	9.30			
Deviator, ksf	2.352			
Rate %/min	1.00			
in/min	0.060			
Job No.:	212-071			
Client:	Hultgren-Tillis Engineers			
Project:	653.01			
Boring:	1			
Sample:				
Depth ft:	15-17			

Visual Soil Description	
Sample #	
1	Brown CLAY with Root Holes (Silty)
2	
3	
4	
Remarks:	

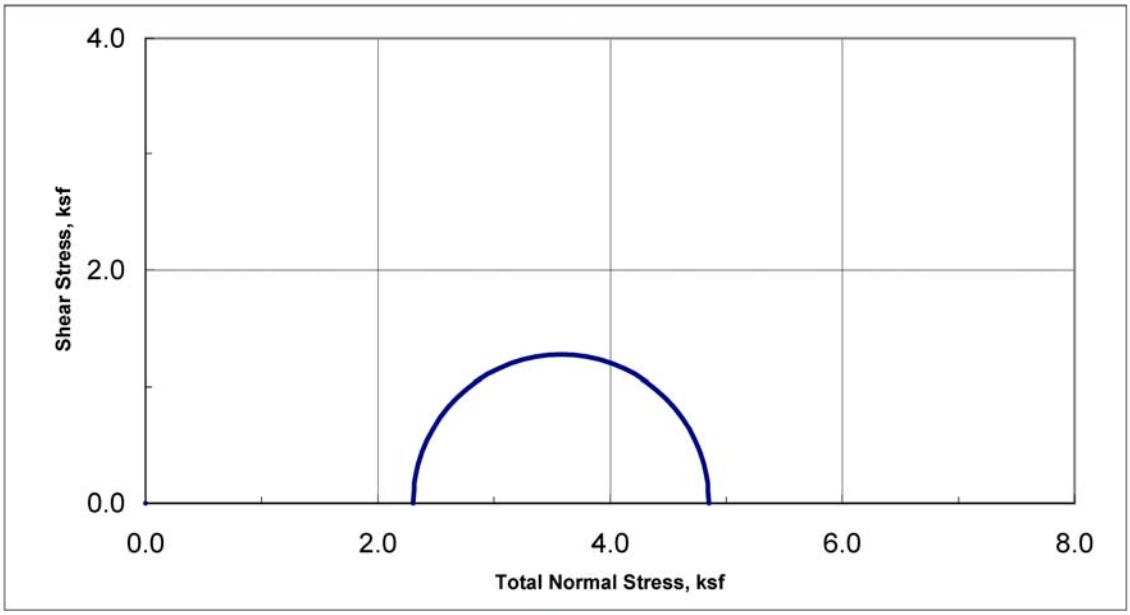
Eastshore Energy Center
25101 Clawiter Road
Hayward, California

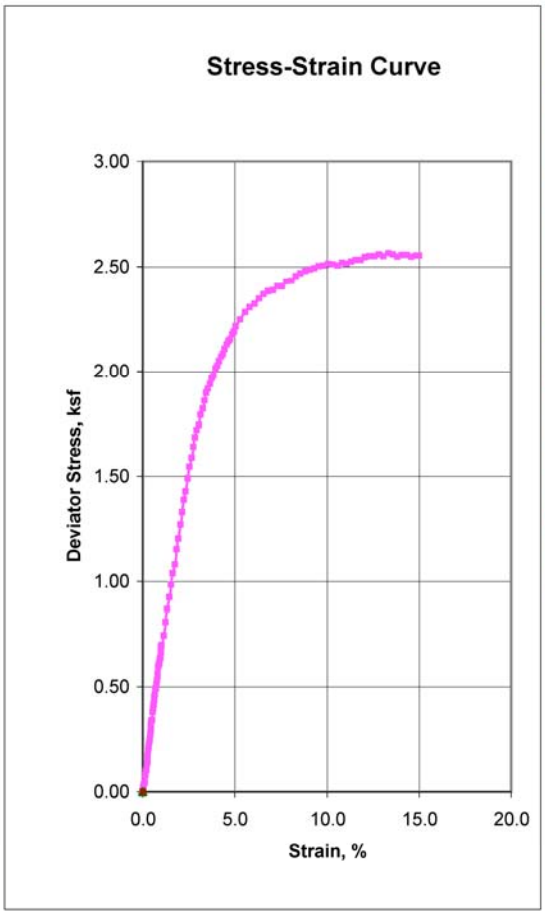
Unconsolidated-Undrained Triaxial Test Result

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 15

Unconsolidated-Undrained Triaxial Test

ASTM D-2850





Sample Data	1	2	3	4
Moisture %		29.5		
Dry Den,pcf		92.3		
Void Ratio		0.827		
Saturation %		96.5		
Height in		5.99		
Diameter in		2.86		
Cell psi		16.0		
Strain %		12.80		
Deviator, ksf		2.562		
Rate %/min		1.00		
in/min		0.060		
Job No.:	212-071			
Client:	Hultgren-Tillis Engineers			
Project:	653.01			
Boring:		1		
Sample:				
Depth ft:		21-23		

Visual Soil Description	
Sample #	
1	
2	Brown CLAY with Root Holes
3	
4	
Remarks:	

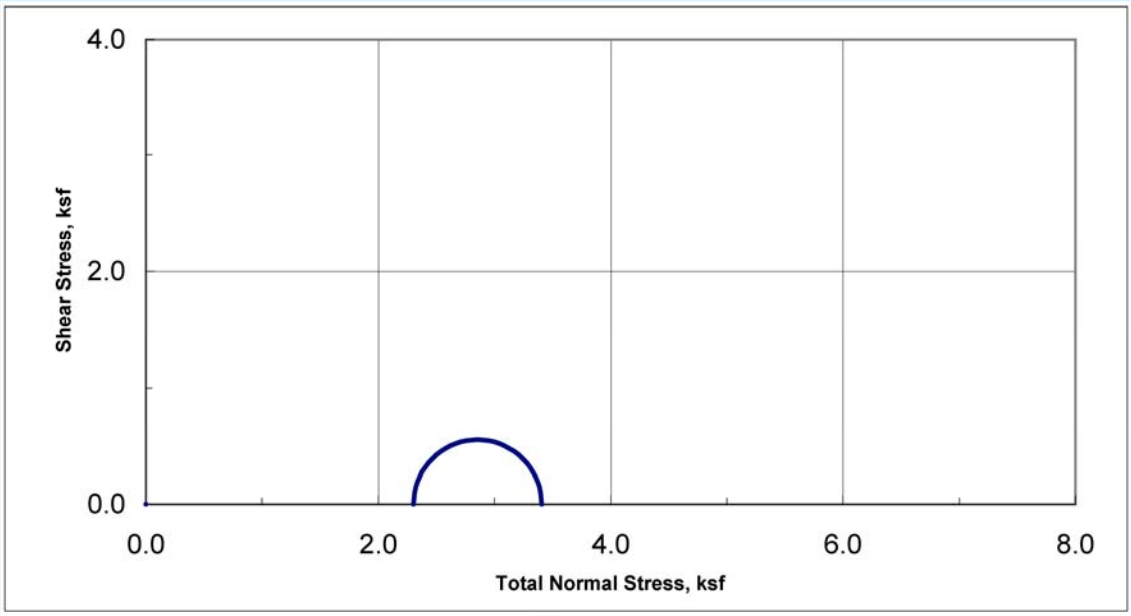
Eastshore Energy Center
25101 Clawiter Road
Hayward, California

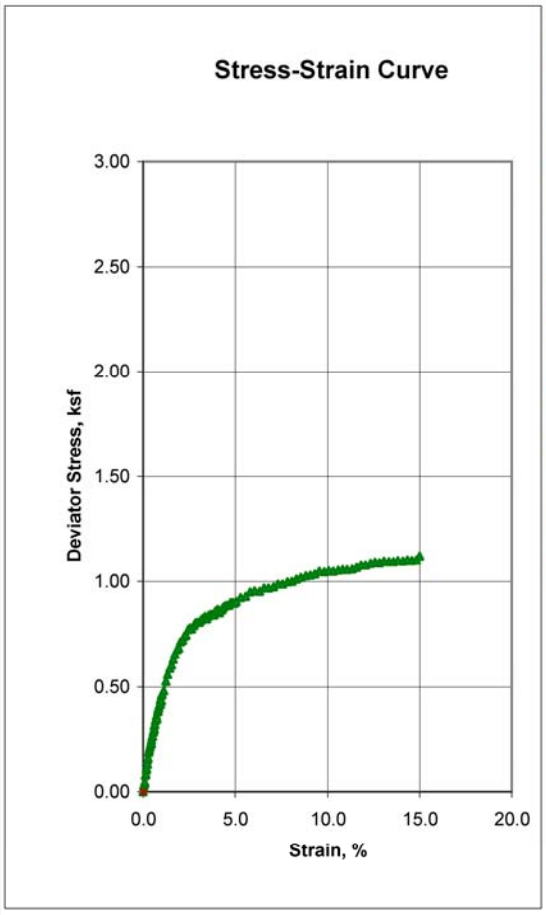
Unconsolidated-Undrained Triaxial Test Result

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 16

Unconsolidated-Undrained Triaxial Test

ASTM D-2850





Sample Data	1	2	3	4
Moisture %			26.3	
Dry Den,pcf			93.7	
Void Ratio			0.799	
Saturation %			89.0	
Height in			5.99	
Diameter in			2.87	
Cell psi			16.0	
Strain %			15.00	
Deviator, ksf			1.121	
Rate %/min			1.00	
in/min			0.060	
Job No.:	212-071			
Client:	Hultgren-Tillis Engineers			
Project:	653.01			
Boring:			2	
Sample:				
Depth ft:			22-24	

Visual Soil Description	
Sample #	
1	
2	
3	Brown Sandy CLAY with Root Holes
4	
Remarks:	

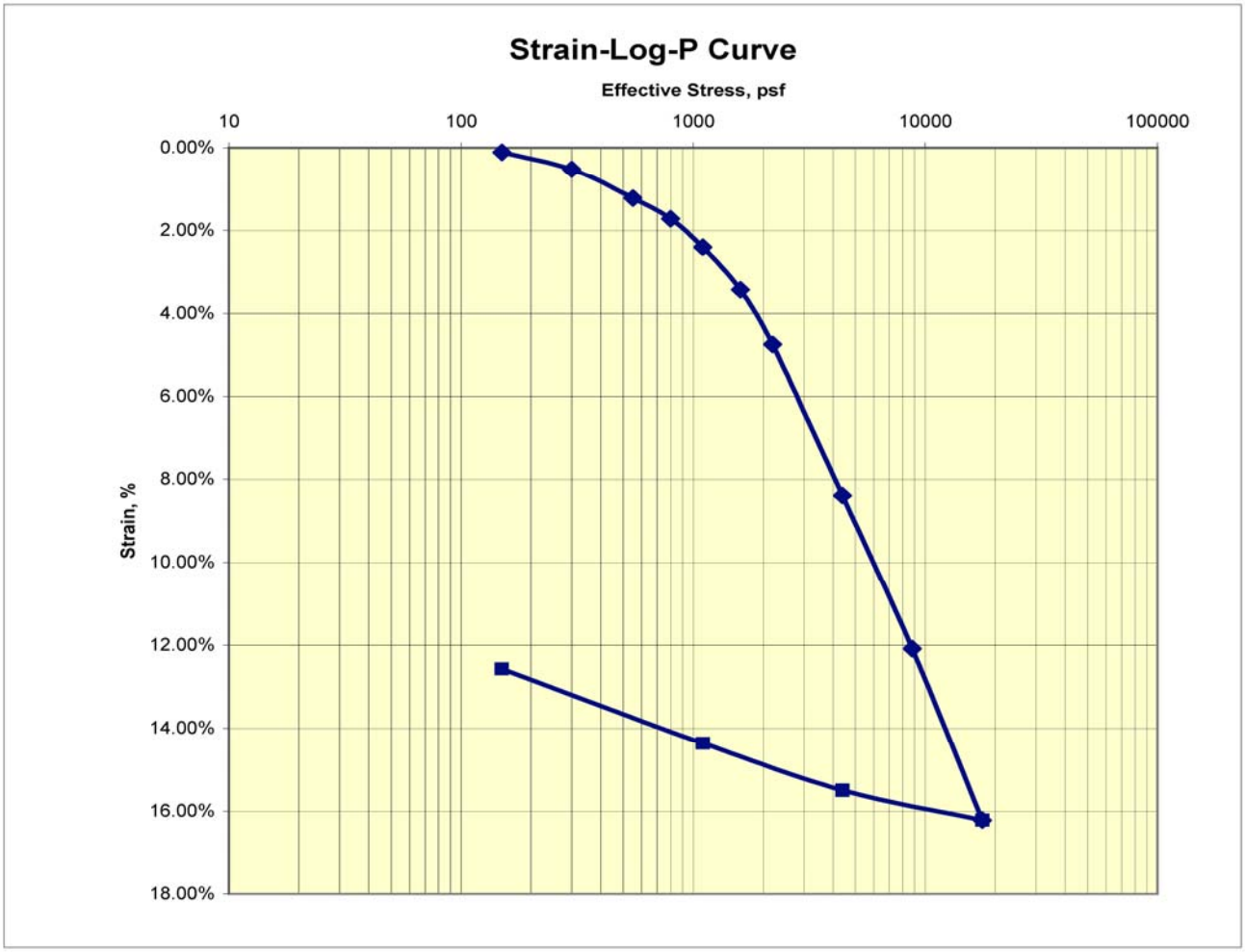
Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Unconsolidated-Undrained Triaxial Test Result

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 17

Consolidation Test
ASTM D2435

Job No.:	212-071	**Boring:**	1	**Run By:**	MD
Client:	Hultgren - Tillis Engineers	**Sample:**		**Reduced:**	PJ
Project:	Clawiter Road - 25101	**Depth, ft.:**	15-17	**Checked:**	PJ/DC
Soil Type:	Brown Sandy CLAY (Silty) near Sandy SILT, slightly plastic			**Date:**	8/8/2006



Ass. Gs = 2.7	Initial	Final
Moisture %:	24.8	20.8
Dry Density, pcf:	96.4	108.0
Void Ratio:	0.748	0.560
% Saturation:	89.6	100

Remarks:

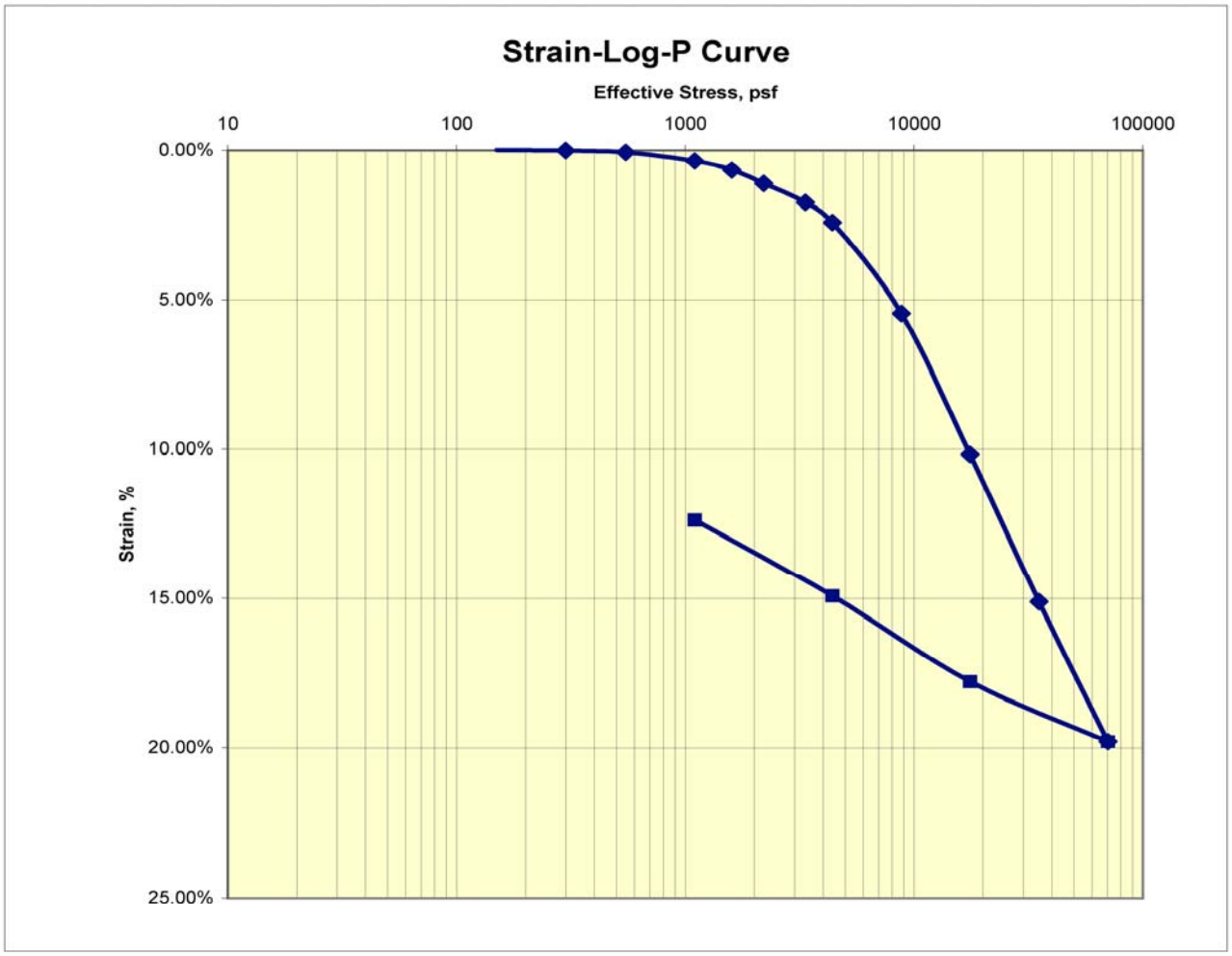
Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Result of Consolidation Test

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 18

Consolidation Test
ASTM D2435

Job No.:	212-071	**Boring:**	2	**Run By:**	MD
Client:	Hultgren - Tillis Engineer	**Sample:**		**Reduced:**	PJ
Project:	Clawiter Road - 25101	**Depth, ft.:**	22-24	**Checked:**	PJ/DC
Soil Type:	Brown CLAY, trace Root holes			**Date:**	8/14/2006



Ass. Gs = 2.75	**Initial**	**Final**
Moisture %:	28.6	25.2
Dry Density, pcf:	92.9	101.6
Void Ratio:	0.847	0.690
% Saturation:	92.8	100

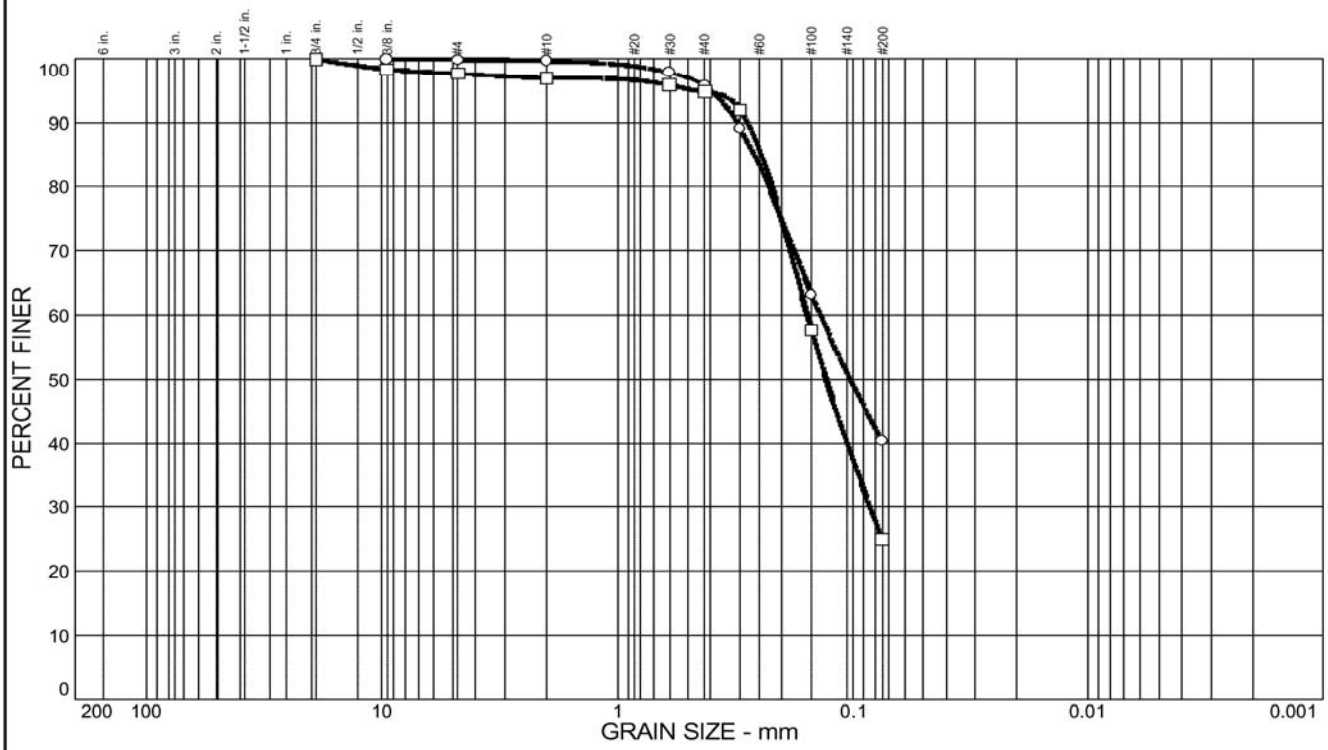
Remarks: The 3000 psf load was shifted to 3350 in order to smooth the curve.

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Result of Consolidation Test

Hultgren - Tillis Engineers | Project No. 653.01 | Plate No. 19

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		0.1	59.6	40.3					
□		2.3	72.7	25.0					

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
3/4		100.0	
3/8	100.0	98.4	
GRAIN SIZE			
D_{60}	0.138	0.156	
D_{30}		0.0843	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	99.9	97.7	
#10	99.7	97.0	
#30	97.9	95.9	
#40	95.7	94.8	
#50	89.2	92.0	
#100	63.2	57.6	
#200	40.3	25.0	

SOIL DESCRIPTION

○ Brown Silty SAND

□ Brown Silty SAND

REMARKS:

○

□

○ Source: B 2 Elev./Depth: 18.5-19'

□ Source: B 2 Elev./Depth: 32-33'

COOPER TESTING LABORATORY

Client: Hultgren - Tillis Engineers

Project: Clawiter Road - 25101

Project No.: 212-071 Figure

Eastshore Energy Center

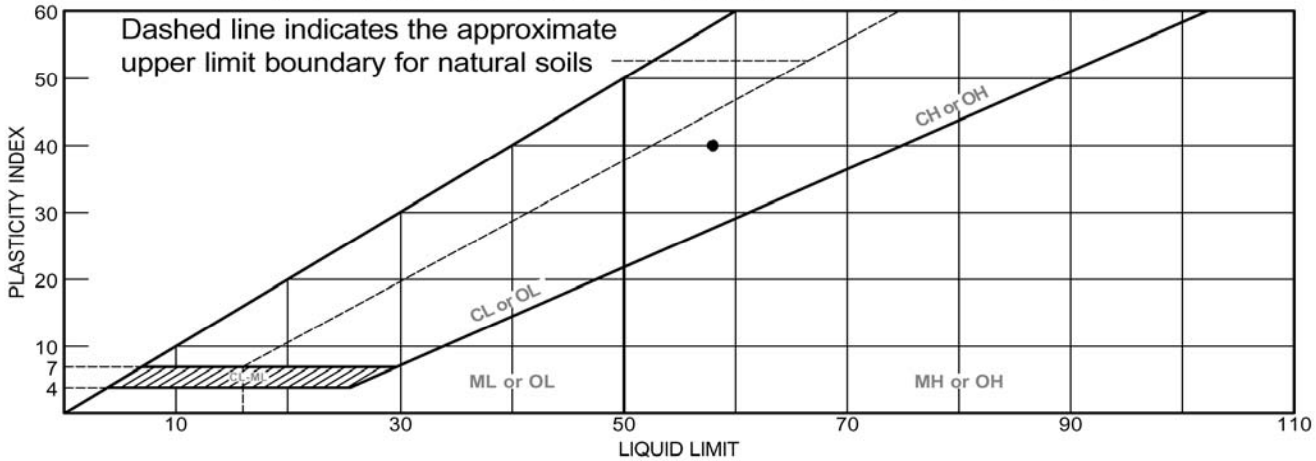
25101 Clawiter Road

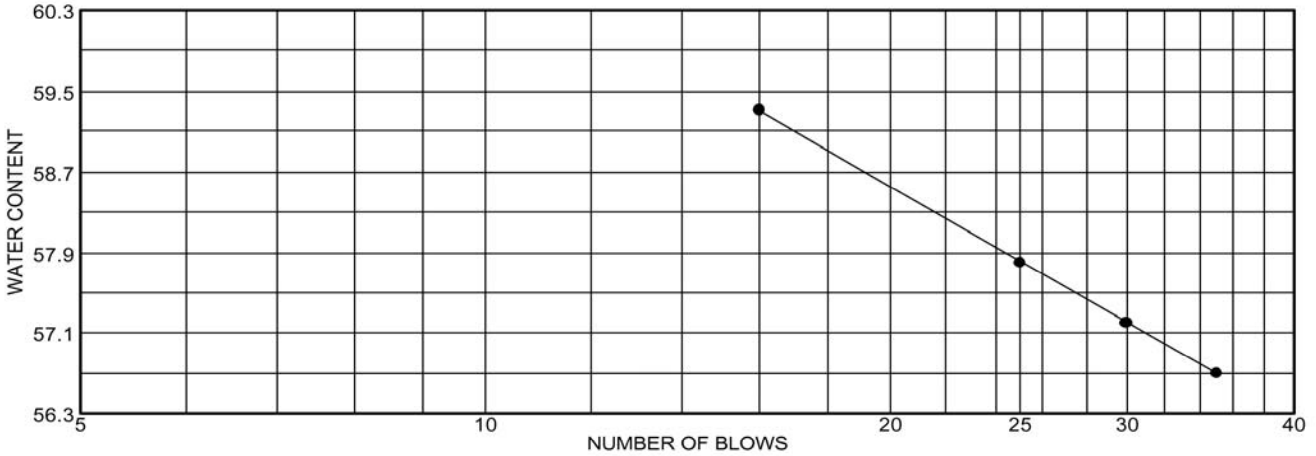
Hayward, California

Sieve Analysis Results

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 20

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Black Fat CLAY	58	18	40			

Project No. 212-071 **Client:** Hultgren - Tillis Engineers

Project: Clawiter Road - 25101

● **Source:** B 1 **Elev./Depth:** 7-7.3'

Remarks:

●

LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

Eastshore Energy Center
25101 Clawiter Road
Hayward, California

Atterberg Limits

Hultgren - Tillis Engineers	Project No. 653.01	Plate No. 21

Table 1

CONCECO/MATCOR Engineering, Inc.

Client: Hultgren-Tillis Engineers
CME Job No. 2S06231

Job Name: Soil Analysis
Client Job No. Project 653.01

Date Sampled: 07/20/06 | Date Tested: 07/25/06 - 07/28/06 | Date Received: 07/24/06

SOIL TEST DATA

Sample No.	Resistivity (ohm-cm)		Redox (mV)	pH	Sulfides	Sulfates (ppm)	Chlorides (ppm)	% Moisture	Soil Description
	As Received	Saturated (min)							
2 @ 9.0' - 9.5'	1,607	1,607	n/a	7.19	n/a	200	135	16.32	Moist mottled dk. brown clayey silt

*Notes

1 Appendix A of ANSI/AWWA C105/A215, TABLE A, provides soil test methods and evaluation for conditions corrosive to gray or ductile-cast iron pipe and fittings.

2 The above tests (excluding redox and sulfides) were performed in accordance with the following Caltrans Test Methods:

a. California Test 643 (1993): METHODS FOR ESTIMATING THE SERVICE LIFE OF STEEL CULVERTS.

b. California Test 532 (1993): METHOD FOR ESTIMATING THE TIME TO CORROSION OF REINFORCED CONCRETE SUBSTRUCTURES

c. California Test 422 (1978): METHOD FOR TESTING SOILS AND WATERS FOR CHLORIDE CONTENT.

d. California Test 417 (1986): METHOD OF TESTING SOILS FOR SULFIDE CONTENT.

3 ASTM D458: METHOD OF TESTING SOILS FOR SULFIDE CONTENT.

4 The soil remaining, after testing, will be retained in our office for 30 days. After the retainer period, it will be disposed of appropriately.

Technical Area: Hazardous Materials Management
Author: Dr. Alvin Greenberg

BACKGROUND

Aqueous ammonia (19%) will be used in the SCR process to control oxides of nitrogen. The AFC states that the Off-site Consequence Analysis (OCA) will be provided during the AFC process (section 8.12.5). The AFC also discusses the delivery of aqueous ammonia to the facility but does not state the size (capacity) of the delivery trucks nor the preferred hazardous materials transport route.

Staff needs the OCA modeling results (including the methodology and input/output files), the capacity of the delivery tanker, and the preferred route(s) from the supplier to the facility in order to evaluate potential impacts to on-site workers and the off-site public.

Also, Table 8.12-3 of the AFC lists the chemicals proposed for use at the power plant during operations. Staff needs the specific identity and CAS number of all chemicals proposed for use.

DATA REQUESTS

29. Please provide the Off-site Consequence Analysis as per the California Accidental Release Prevention Program (Cal-ARP) guidance, including the methodology and the input/output files.

    Response:

    The offsite consequence analysis is attached (See Attachment HM-29). The analysis demonstrates that in the unlikely event of a release of aqueous ammonia, there will be no significant off-site ammonia concentration impacts extending beyond the facility fenceline and no significant impact to public health.

30. Please provide the following information regarding the transportation of aqueous ammonia:

    a. the size (capacity) of the delivery trucks, and

    Response:

    The delivery trucks will be approximately 7,500 gallons in size, but are filled to 6,000 gallons of aqueous ammonia for deliveries.

    b. the exact preferred route(s) from the supplier to the facility

    Response:

    The preferred route for ammonia deliveries is identified in Section 8.10.4.3.2 - Transport of Hazardous Materials. The preferred and alternative routes are as follows:

The aqueous ammonia will be delivered by truck along public roads. The truck will travel on SR-92 and will exit at the Clawiter Road interchange. The truck will then travel north along Clawiter Road to the plant site. An alternative route from SR-92 will be to use the Industrial Boulevard interchange. The truck will then travel northwest along Industrial Boulevard, west on Depot Road, and south along Clawiter Road to the plant site.

31.

a. Please provide a more detailed description of the aqueous ammonia storage tank and secondary containment area including dimensions and placement of the tank, the secondary containment structure, and the location and dimensions of the tanker truck transfer pad.

Response:

Two 10,000 gallon aboveground storage tanks will be used to store the 19-percent aqueous ammonia. Each tank will be surrounded by a 60-foot by 23.5-foot by 3-foot secondary containment structure capable of holding the full contents of the tank, plus rainwater. The tanks will be sited in north-south configuration, and will be located adjacent to the tanker truck transfer pad. The tanker truck transfer pad will be located to the west of the storage tanks and area will be approximately 12 feet x 26 feet in size. Figure HM-31 identifies the placement of the tank and the tanker truck transfer pad.

b. Please provide a preliminary design drawing of these features that would be helpful.

Response:

A preliminary design drawing identifying the aqueous ammonia storage tank, secondary containment area, and the location and dimensions of the tanker truck transfer pad is provided as Figure HM-31.

32. Please provide the chemical name and CAS number for the corrosion inhibitor listed, following the material found in Table 8.12-3 of the AFC.

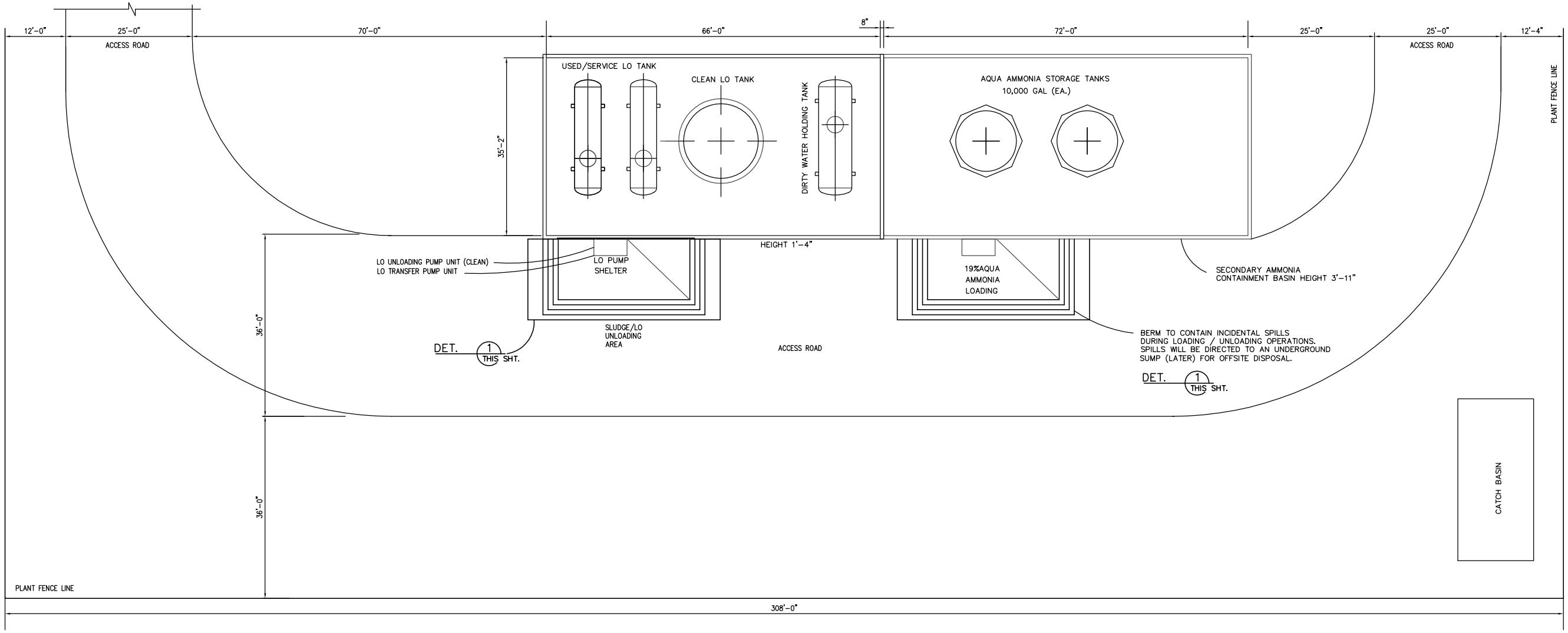
Response:

The corrosion inhibitor to be used will be the Texaco Extended Life Corrosion Inhibitor. The chemical components and CAS Number may be found in Table HM-1. In addition the MSDS for this product is attached (See Attachment HM-32).

TABLE HM-1
Eastshore Chemical Inventory

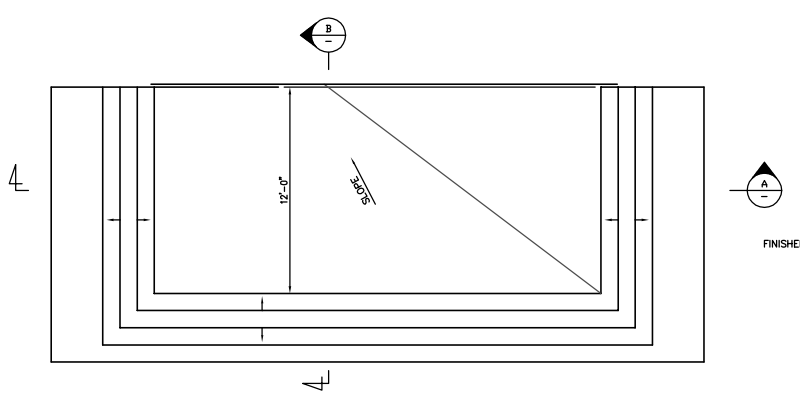
Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite	CERCLA SARA RQ	RQ of Material as Used Onsite	EHS TPQ	Regulated Substance TQ	Prop 65
Corrosion inhibitor (Texaco Extended Life Corrosion Inhibitor)	Potassium 2-ethylhexanoate (10-30%) 1H-Benzotriazole, methyl (1-5%)	3164-85-0 29385-43-1	50 gal	[a]	[a]	[a]	[a]	No

[a] No reporting requirement; chemical has no listed threshold under this requirement.

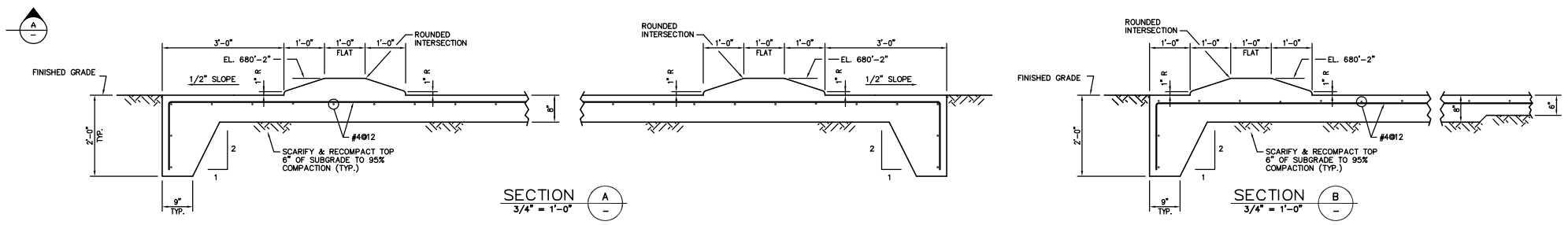


NORTH

PLANT PARTIAL PLAN – STORAGE CONTAINMENT AREA



DETAIL 1 (1/4" = 1'-0")



SECTION A (3/4" = 1'-0")

SECTION B (3/4" = 1'-0")

1" = 25' 0' 25' 50' 75'

REV	DATE	DESCRIPTION	DWN	DES	CHK	PE/PM	CLIENT APPV	REV	DATE	DESCRIPTION	DWN	DES	CHK	PE/PM	CLIENT APPV

PREPARED BY: Stantec
WALNUT CREEK, CALIFORNIA (925) 941-1400
DWN GCI 06/21/06 DES JL PROJ MGR

PREPARED FOR: TIERRA ENERGY

PROJECT: FIG. HM-31

TITLE: EASTSHORE ENERGY CENTER
HAYWARD, CALIFORNIA
STORAGE CONTAINMENT PLAN & SECTIONS

SCALE	PROJECT NUMBER	DRAWING NUMBER	REV
AS NOTED	091600	600-FIG.HM-31	

ESIB0301

XREF LIST:

PLOT SCALE: 42 X 30

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Attachment HM-29

Off-site Consequence Analysis

TECHNICAL MEMORANDUM CH2MHILL

Off-Site Consequence Analysis
Eastshore Energy Center

PREPARED FOR: Greg Trewitt/Tierra Energy

PREPARED BY: Ben Beattie/CH2M HILL, Jerry Salamy/CH2M HILL, Stephen O'Kane/CH2M HILL

DATE: January 3, 2006

Eastshore Energy, LCC, proposes to develop the Eastshore Energy Center (Eastshore), located at 25101 Clawiter Road in the City of Hayward, Alameda County, California. Eastshore will be a nominal 115.5-megawatt (MW) net intermediate/peaking load facility operating up to 4,000 hours per year using natural gas-fired reciprocating engine technology.

Eastshore will consist 14 nominal 8.4 MW Wartisila model 20V34SG natural gas-fired reciprocating engine–generator sets. Eastshore is required by both the Clean Air Act and the Bay Area Air Quality Management District (BAAQMD) to install Best Available Control Technology to control emissions of criteria air pollutants from the reciprocating engines. Nitrogen oxide (NOx) emissions from the engines will be controlled using selective catalytic reduction (SCR). The SCR control system proposed for Eastshore uses ammonia as the reduction reagent Aqueous ammonia (ammonium hydroxide at 19 percent nominal concentration by weight) will be vaporized and injected into the flue gas stream from the engines, then passed through a catalyst bed. In the presence of the catalyst, the ammonia (NH_3) and NO_X react to form nitrogen (N_2) and water vapor (H_2O) thereby reducing the NOx emissions.

The Eastshore facility will store 19-percent aqueous ammonia solution in a two stationary 10,000 gallon aboveground storage tanks. Each tank will be surrounded by a 60-foot by 23.5-foot by 3-foot secondary containment structure capable of holding the full contents of the tank, plus rainwater. The secondary structure is located 72 feet (22 meters) from the nearest property boundary.

Aqueous ammonia will be delivered to the plant by truck transport. The ammonia delivery truck unloading station will include a curbed and sloped pad surface. The truck unloading station will slope to a collection trough that will drain into the secondary containment structure of the ammonia tanks.

The ammonia tanks will be equipped with a pressure relief valve set at 50 pounds per square inch gage (psig), a vapor equalization system, and a vacuum breaker system. The storage tanks will be maintained at ambient temperature and atmospheric pressure.

The California Energy Commission requested an offsite consequence analysis (OCA) be conducted for the accidental release of aqueous ammonia at Eastshore. The accidental

release scenario involves the failure and complete discharge of the contents of the aqueous ammonia storage tanks.

Analysis

An analysis of a tank failure and subsequent release of aqueous ammonia was prepared using a numerical dispersion model. The analysis assumed the complete failure of a storage tank, the immediate release of the contents of the tank and the formation of an evaporating pool of aqueous ammonia within the secondary containment structure. Evaporative emissions of ammonia would be subsequently released into the atmosphere. Meteorological conditions at the time of the release would control the evaporation rate, dispersion and transport of ammonia released to the atmosphere. For purposes of this analysis, the following meteorological data were used:

- U.S. Environmental Protection Agency (USEPA) default (worst case) meteorological data, supplemented by daily temperature data as defined by 19 CCR 2750.2.

The maximum temperature recorded near Eastshore in the past 3 years was 99 °F or 310.4 Kelvin, measured at the Oakland Airport, California (http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?caokap+sfo). Maximum temperatures combined with low wind speeds and stable atmospheric conditions are expected to result in the highest predicted ammonia concentrations at the furthest distance downwind of the release site.

Table 1 displays the meteorological data values used in the modeling analysis.

TABLE 1
Meteorological Input Parameters

Parameter	Worst Case Meteorological Data
Wind Speed meters/second	1.5
Stability Class	F
Relative Humidity, Percent	50
Ambient Temperature, Kelvin (°F)	310.4 (99)

A numerical model analysis was conducted based on an evaporating pool release caused by the complete failure of a single tank, using the meteorological data presented in Table 1. Modeling was conducted using the SLAB numerical dispersion model. A complete description of the SLAB model is available in *User's Manual for SLAB: An Atmospheric Dispersion Model for Denser-Than-Air Releases, D. E. Ermak, Lawrence Livermore National Laboratory, June 1990*. The SLAB user manual contains a substance database, which includes chemical-specific data for ammonia. These data were used in modeling run without exception or modification.

Emissions of aqueous ammonia were calculated pursuant to the guidance given in *RMP Offsite Consequence Analysis Guidance, EPA, April 1999* and using the emission calculation tool for evaporating solutions provided in the Area locations of Hazardous

Atmospheres (ALOHA) model provided by the EPA (http://www.epa.gov/ceppo/cameo/index.htm).

Release rates for ammonia vapor from an evaporating 19-percent solution of aqueous ammonia were calculated assuming mass transfer of ammonia across the liquid surface occurs according to principles of heat transfer by natural convection. The ammonia release rate was calculated using ALOHA, meteorological data displayed in Table 1 and the dimensions of the secondary containment area. For the worst case condition, it was assumed that a complete failure of the storage tank occurred which resulted in an evaporating pool of aqueous ammonia within the secondary containment area.

An initial ammonia evaporation rate was calculated and assumed to occur for one hour after the initial release. This assumption results in a conservative estimate of the actual release rate. For concentrated solutions, the initial evaporation rate is substantially higher than the rate averaged over time periods of a few minutes or more since the concentration of the solution immediately begins to decrease as evaporation begins.

A release of the entire contents of one of the storage tanks (10,000 gallons of 19-percent aqueous ammonia) was assumed to be the worst case scenario. The failure of the tank would cause the aqueous ammonia to leak into the containment area and the release of ammonia gas would result from evaporation.

Although the edge of the tank containment area is raised above ground level, the release heights used in the model were set at 0 m above ground level (AGL) to maintain the conservative nature of the analysis. Downwind concentrations of ammonia were calculated at heights of 0, 1.6, and 5 meters above ground level. Reported distances to specified toxic endpoints are the maximum distances for concentrations at the specified distance above ground level. The California Office of Environmental Health Hazard Assessment (OEHHA) has designated 1.6 meters as the breathing zone height for individuals. A height of 5 meters represents the height of a two story building.

An alternative to the storage tank failure release scenario was also considered. The release of aqueous ammonia from a tank loading hose failure with a leak below the excess flow valves activation set-point and the subsequent impacts was considered. An alternative release analysis would normally be completed under typical or average meteorological conditions for the area. However, after review of the possible failure modes, it was determined that the impact of this leak would be captured by the complete tank failure as a worst-case for the hose failure since the tank loading hose failure would occur in the same location as the worst case scenario with less material potentially spilled.

Toxic Effects of Ammonia

With respect to the assessment of potential impacts associated with an accidental release of ammonia, four offsite "bench mark" exposure levels were evaluated, as follows: (1) the lowest concentration posing a risk of lethality, 2,000 ppm; (2) the Occupational Safety and Health Administration's (OSHA) Immediately Dangerous to Life and Health (IDLH) level of 300 ppm; (3) the Emergency Response Planning Guideline (ERPG) level of 150 ppm, which is the American Industrial Hygiene Association's (AIHA) updated ERPG-2 for ammonia; and (4) the level considered by the California Energy Commission (CEC) staff to be without

serious adverse effects on the public for a one-time exposure of 75 ppm (*Final Staff Assessment-Blythe Energy Project Phase II, 02-AFC-1, April 2005)*.

The odor threshold of ammonia is approximately 5 ppm, and minor irritation of the nose and throat will occur at 30 to 50 ppm. Concentrations greater than 140 ppm will cause detectable effects on lung function even for short-term exposures (0.5 to 2 hours). At higher concentrations of 700 to 1,700 ppm, ammonia gas will cause severe effects; death occurs at concentrations of 2,500 to 7,000 ppm.

The ERPG-2 value is based on a one-hour exposure or averaging time; therefore, the modeled distance to ERPG-2 concentrations are presented in terms of one-hour (or 60 minute) averaging time. The ERPG-2 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action. OSHA's IDLH for ammonia is based on a 30-minute exposure or averaging time; therefore, the IDLH modeling concentrations at all offsite receptors will be given in terms of a 30-minute averaging time.

Modeling Results

Table 2 shows the modeled distance to the four benchmark criteria concentrations: lowest concentration posing a risk of lethality, (2,000 ppm), OSHA's IDLH (300 ppm), AIHA's ERPG-2 (150 ppm), and the CEC significance value (75 ppm).

TABLE 2
Distance to EPA/CalARP and CEC Toxic Endpoints

Scenario	Distance in Meters to 2,000 ppm	Distance in Meters to IDHL (300 ppm)	Distance in Meters to AIHA's ERPG-2 (150 ppm)	Distance in Meters to CEC Significance Value (75 ppm)
0 m AGL	11.06	11.79	11.92	11.98
1.6 m AGL	12.55	13.51	13.83	13.99
5 m AGL	18.26	19.82	20.08	20.21

The model input file and the output files are available upon request.

The results of the off-site consequence analysis for the worst case release scenario of ammonia at Eastshore indicate that the concentrations above the most stringent benchmark criteria (CEC's significance value of 75 ppm) does not extend off the project site (see Figure 1).

Assessment of the Methodology Used

Numerous conservative assumptions were used in the above analysis of the tank failure. These include the following:

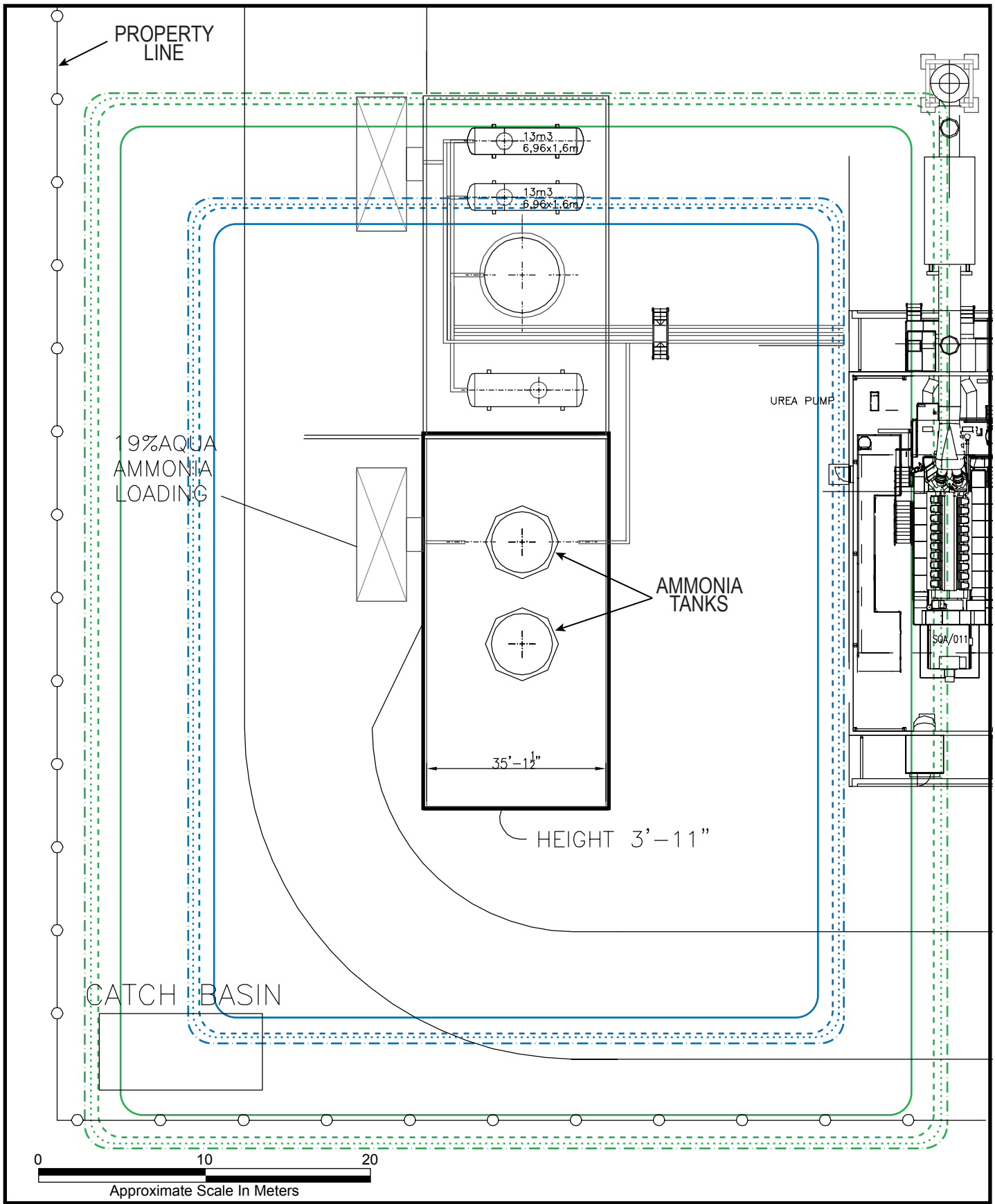
- Modeling & Meteorology

- Worst case of a constant mass flow, at the higest possible initial evaporation rate for the modeled wind speed and temperature was used, whereas in reality the evaporation rate would decrease with time as the concentration in the solution decreases.
- Worst case stability class was used, which almost exclusively occurs during nighttime hours, but the maximum ambient temperature of 99°F was used, which would occur during daylight hours.
- Again worst-case meteorology corresponds to nighttime hours, whereas the worst-case release of a tank failure would most likely occur during daytime activities at the power plant. At night, activity at a power plant is typically minimal.

Conclusions

Several factors need to be considered when determining the potential risk from the use and storage of hazardous materials. These factors include the probability of occurrence, population densities near the project site, meteorological conditions, and the process design. Considering the results of this analysis, the probability of a catastrophic storage tank failure occurring under low wind speeds, maximum potential air temperatures, and F class atmospheric stability, the risk posed to the public from the storage of aqueous ammonia at Eastshore site is insignificant.

As described above, numerous conservative assumptions have been made at each step in the analysis. This compounding of conservative assumptions has resulted in a significant overestimation of the potential impact of an ammonia release at Eastshore and the predicted distances to the benchmark criteria do not extend off the project site and pose no threat to public receptors. Therefore, it is concluded that the risk from exposure to aqueous ammonia due to Eastshore is less than significant.



1.6 m AGL	5 m AGL	
12.55 m	18.26 m	Distance in Meters to 2,000 ppm
13.51 m	19.82 m	Distance in Meters to IDHL (300 ppm)
13.83 m	20.08 m	Distance in Meters to AIHA's ERPG-2 (150 ppm)
13.99 m	20.21 m	Distance in Meters to CEC Significance Value (75 ppm)

N

FIGURE 1
AREA OF POTENTIAL IMPACT OF AMMONIA TANK FAILURE
EASTSHORE ENERGY CENTER
HAYWARD, CALIFORNIA
ALAMEDA COUNTY

CH2MHILL

EY082006001SAC figure_1.ai 01-12-07 tdaus

Attachment HM-32

Corrosion Inhibitor Material Safety Data Sheet

Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Heavy Duty Extended Life Corrosion Inhibitor Nitrite Free

Product Use: Antifreeze/Coolant
Product Number(s): CPS221642
Company Identification
ChevronTexaco Global Lubricants
6001 Bollinger Canyon Road
San Ramon, CA 94583
United States of America

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
ChevronTexaco Emergency Information Center: Located in the USA. International collect calls accepted.
(800) 231-0623 or (510) 231-0623
Product Information
email : lubemsds@chevrontexaco.com
Product Information: 800-LUBE-TEK
MSDS Requests: 800-414-6737

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Water	7732-18-5	55 - 75 %weight
Potassium 2-ethylhexanoate	3164-85-0	10 - 30 %weight
1H-Benzotriazole, methyl-	29385-43-1	1 - 5 %weight

SECTION 3 HAZARDS IDENTIFICATION

****
EMERGENCY OVERVIEW

- MAY BE HARMFUL IF SWALLOWED
- CAUSES EYE IRRITATION
- CONTAINS MATERIAL THAT MAY CAUSE ADVERSE REPRODUCTIVE EFFECTS BASED ON ANIMAL DATA
- POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL THAT MAY CAUSE BIRTH DEFECTS BASED ON ANIMAL DATA

****

IMMEDIATE HEALTH EFFECTS
Eye: Contact with the eyes causes irritation. Symptoms may include pain, tearing, reddening, swelling

and impaired vision.
Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin.
Ingestion: May be harmful if swallowed.
Inhalation: Not expected to be harmful if inhaled. If this material is heated, fumes may be unpleasant and produce nausea and irritation of the eye and upper respiratory tract.

DELAYED OR OTHER HEALTH EFFECTS:
Reproduction and Birth Defects: Contains material that may cause adverse reproductive effects based on animal data. Contains material that may cause birth defects based on animal data.
See Section 11 for additional information. Risk depends on duration and level of exposure.

SECTION 4 FIRST AID MEASURES

Eye: Flush eyes with water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get medical attention if irritation persists.
Skin: No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: If swallowed, get medical attention. Do not induce vomiting. Never give anything by mouth to an unconscious person.
Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

FIRE CLASSIFICATION:
OSHA Classification (29 CFR 1910.1200): Not classified by OSHA as flammable or combustible.

NFPA RATINGS: Health: 1 Flammability: 0 Reactivity: 0

FLAMMABLE PROPERTIES:
Flashpoint: Not Applicable
Autoignition: Not Applicable
Flammability (Explosive) Limits (% by volume in air): Lower: Not Applicable Upper: Not Applicable

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will not burn.
Combustion Products: Combustion may form oxides of: Potassium .

SECTION 6 ACCIDENTAL RELEASE MEASURES

Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner

consistent with applicable regulations.
Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures: Do not get in eyes. Avoid breathing mist. Do not taste or swallow. Wash thoroughly after handling.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:
If user operations generate airborne material, use process enclosures, local exhaust ventilation, or other engineering controls to control exposure.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: Wear protective equipment to prevent eye contact. Selection of protective equipment may include safety glasses, chemical goggles, face shields, or a combination depending on the work operations conducted.
Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: Natural rubber, Neoprene, Nitrile Rubber, Polyvinyl Chloride (PVC or Vinyl).
Respiratory Protection: If exposure to harmful levels of airborne material may occur when working with this material, wear an approved respirator that provides protection, such as:
Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.
No applicable occupational exposure limits exist for this material or its components.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Red
Physical State: Liquid
Odor: Faint or Mild
pH: 8.2 - 8.8
Vapor Pressure: No data available
Vapor Density (Air = 1): No data available

Boiling Point: 100°C (212°F)
Solubility: Completely Soluble
Freezing Point: -17.8°C (0°F)
Melting Point: No Data Available
Specific Gravity: 1.06
Viscosity: No data available

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Hazardous Decomposition Products: None known (None expected)
Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS
Eye Irritation: The eye irritation hazard is based on evaluation of data for similar materials or product components.
Skin Irritation: The skin irritation hazard is based on evaluation of data for similar materials or product components.
Skin Sensitization: No product toxicology data available.
Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for similar materials or product components.
Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for similar materials or product components.
Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

ADDITIONAL TOXICOLOGY INFORMATION:
2-Ethylhexanoic acid (2-EXA) caused an increase in liver size and enzyme levels when repeatedly administered to rats via the diet. When administered to pregnant rats by gavage or in drinking water, 2-EXA caused teratogenicity (birth defects) and delayed postnatal development of the pups. Additionally, 2-EXA impaired female fertility in rats. Birth defects were seen in the offspring of mice who were administered sodium 2-ethylhexanoate via intraperitoneal injection during pregnancy.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY
The toxicity of this material to aquatic organisms has not been evaluated. Consequently, this material should be kept out of sewage and drainage systems and all bodies of water.

ENVIRONMENTAL FATE
No data available.

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components

may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT Shipping Description: Anti-freeze Preparations, Proprietary, NOT REGULATED AS A HAZARDOUS MATERIAL

IMO/IMDG Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORTATION UNDER THE IMDG CODE

ICAO/IATA Shipping Description: Anti-freeze Preparations, Proprietary, NOT REGULATED AS A DANGEROUS GOOD

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES:

1.	Immediate (Acute) Health Effects:	YES
2.	Delayed (Chronic) Health Effects:	YES
3.	Fire Hazard:	NO
4.	Sudden Release of Pressure Hazard:	NO
5.	Reactivity Hazard:	NO

REGULATORY LISTS SEARCHED:

01-1=IARC Group 1	03=EPCRA 313
01-2A=IARC Group 2A	04=CA Proposition 65
01-2B=IARC Group 2B	05=MA RTK
02=NTP Carcinogen	06=NJ RTK
	07=PA RTK

No components of this material were found on the regulatory lists above.

CHEMICAL INVENTORIES:
All components comply with the following chemical inventory requirements: AICS (Australia), DSL (Canada), EINECS (European Union), ENCS (Japan), IECSC (China), PICCS (Philippines), TSCA (United States).

One or more components does not comply with the following chemical inventory requirements: KECI (Korea).

NEW JERSEY RTK CLASSIFICATION:
Refer to components listed in Section 2.

WHMIS CLASSIFICATION:
Class D, Division 2, Subdivision A: Very Toxic Material -
Teratogenicity and Embryotoxicity
Reproductive Toxicity
Class D, Division 2, Subdivision B: Toxic Material -

Skin or Eye Irritation

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 1 Flammability: 0 Reactivity: 0

HMIS RATINGS: Health: 1* Flammability: 0 Reactivity: 0
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT: This revision updates the following sections of this Material Safety Data Sheet: 15
Revision Date: 07/12/2004

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Government Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	MSDS - Material Safety Data Sheet
CVX - ChevronTexaco	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the ChevronTexaco Energy Research & Technology Company, 100 Chevron Way, Richmond, California 94802.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

Technical Area: Paleontology
Author: Patrick Pilling, Ph.D., P.E., G.E.

BACKGROUND

Reviewing existing technical reports is essential to completely evaluate a site with respect to paleontological resources. Section 8.16.3.1 references an existing paleontological resource/inventory report for the Russell City project; however, a copy of this report was not included with the AFC.

DATA REQUEST

33. Please provide a copy of the report titled Paleontological Resource Inventory/Impact Assessment Technical Report that has been prepared for this nearby site.

    Response:

    The Paleontological Resource Inventory/Impact Assessment Technical Report being requested was submitted as confidential Appendix 8.8-A of the Russell City AFC (01-AFC-7) under separate cover as a confidential filing directed to Mr. Steve Larson, former Executive Director. We believe this material was associated with Docket Log # 20370 filed May 22, 2001 titled Application for Confidential Designation. Since this is confidential information that is not under Eastshore control, we are unable to provide a copy of the material at this time. We have requested a copy of this material from Mr. Greg Wheatland of Ellison, Schneider & Harris (counsel for the Russell City project). If we are successful in obtaining a copy, we will promptly submit it to Staff. Alternatively, we recommend that Staff obtain this material directly from its Russell City confidential records already on file with the Commission.

Technical Area: Public Health
Author: Dr. Alvin Greenberg

BACKGROUND

The AFC states that the current version of ISCST3 was used in the air dispersion modeling of emissions from the project and that the Hot Spots Analysis and Reporting Program (HARP) model was used to assess cancer risk and chronic and acute impacts because HARP contains an earlier version of ISCST3. Staff needs certain data in order to independently confirm the HRA results as found in the AFC. Staff also needs distances to certain receptors to complete its analysis of impacts.

The project applies Toxics-Best Available Control Technology (T-BACT) to the 14 lean-burn engines. Toxic pollutant emissions from facility equipment are assumed to result in a reduction factor of 40% of California Air Toxics Emissions Factor (CATEF) uncontrolled emission factors due to the efficiency of the oxidative catalyst. The AFC states that this assumption is "highly conservative."

DATA REQUESTS

34. Please provide the HARP transaction file (.tra) **and/or** the following information that was used in the HARP modeling:

    a. Stack parameters and locations in Universal Transverse Mercator (UTM) coordinates

    b. Information on Project buildings and tanks used in building downwash analysis (locations in UTM coordinates and dimensions)

    c. Meteorological data used

    Response:

    The HARP transaction file named ES083006.TRA was supplied with the AFC. The file has also been resubmitted directly via email to CEC staff. The stack parameters and UTM locations are included in the HARP transaction file. Building downwash information, including plant reference coordinates and dimensions for project buildings and stacks, is included in the transaction file. Detailed building downwash information was also provided with the BAAAMD air permit application with form HRSA; a copy of the application was provided to the CEC. The five-year meteorological data file for Union City named ES90_94.ASC was supplied with the AFC. The file has also been resubmitted directly via email to CEC staff. This is the same meteorological data file that was used to complete air dispersion modeling for criteria pollutant emissions from the project.

35. Please provide a table and a map showing distances from the combustion turbine stacks to various the following receptors including:

    a. the fenceline,

    b. the location of the cancer risk of the Maximum Exposed Individual (MEI),

c. the location of the acute hazard MEI,

d. the location of the chronic hazard MEI,

e. the location of the Points of Maximum Impact (PMI) for cancer risk and acute & chronic hazards, and

f. the six few representative sensitive receptors nearest to the project, and

g. the location of any schools within 2 miles of the project fenceline.

Response:

Maps are included at the end of this section. A table is provided below, listing the distance and direction from the geographical center of the 14 lean burn, gas-fired IC engine exhaust stacks to each location requested. The nearest six sensitive receptors include four schools, one nursing home, and one preschool. For schools, distances are measured to the nearest, approximate boundary location.

Figure 35(i) showing the PMI locations is provided for response to request 35 a-e. The maximum exposed individual (MEI) locations for cancer, chronic and acute risk presented in Appendix 8.1D of the AFC are equivalent to the PMI locations. The 70-year (residential exposure) cancer risk value and maximum chronic hazard index value at the point of maximum impact (PMI) location, also an off-site worker location, were calculated to be less than the risk significance thresholds. Therefore, cancer, chronic, and acute risks at an actual resident location were not calculated, nor was any worker exposure adjustment necessary to calculate off-site worker cancer risk. The PMI acute risk location is the proposed Eastshore facility property line. The table below lists the PMI impact locations for only lean-burn IC engine TAC emissions (including acrolein).

Figure 35(ii) has been provided for response to request 35 f-g. The location of the nearest six sensitive receptors and schools within two miles can be viewed by referencing the EDR report provided in Attachment 8.1D-2 of Appendix 8.1D of the AFC. EDR report labels have been provided in the table below, and in the map included with this response. The six nearest sensitive receptors and schools identified within less than two miles from the center of sources have been included in the table below.

TABLE PH-1
Nearest Sensitive Receptors

Location Name	Approx. Distance from Facility (meters)[1]	Direction from Facility (meters)[1]	EDR Report Label (s)
Nearest Fenceline	28	N	---
PMI Cancer Risk	181	ESE	---
PMI Chronic Risk	181	ESE	---
PMI Acute Risk	90	N	---
Mohrland School	900	NNE	A2
Eden West Convalescent Hospital	800	NNE	A3
Ochoa Intermediate School	1,050	ENE	B4
Courtyard Care Center	1,125	NNE	A5
Eden Gardens Elementary School	1,160	E	6, B7
Montessori Children's House	1,450	E	C10, C12

TABLE PH-1
Nearest Sensitive Receptors

Location Name	Approx. Distance from Facility (meters)[1]	Direction from Facility (meters)[1]	EDR Report Label (s)
Lea's Christian School	1,450	E	C11
Brenkwitz High School	1,870	ESE	D15
Russell School	1,770	NNW	16
Cornerstone Christian Academy	1,950	NNE	17
Gansberger School	1,820	E	18
Southgate Elementary	2,365	E	G21, G22
Lorin A. Eden Elementary	2,220	SE	F20, F23
Winton Grove School	2,460	NNE	H25
Longwood Elementary	2,560	NNE	27, H28
Martin Luther King Elementary School	2,575	E	I29
St. Joachim Elementary School	2,960	N	J30, J37
Mount Eden High School	3,090	ESE	K36, K38
Schafer Park Elementary	3,040	ENE	L39, L44
Eldridge Elementary	3,045	E	N41
Sequoia School	3,190	NE	42, N43
County Community School	3,170	NE	M45
Alternative/Opportunity School	3,170	NE	M46
Park Elementary School	3,025	NE	M47

[1]Facility location taken as the geographic center of sources at location UTM 577586, 4165781. Facility stacks are located at 577528, 4165781 on the west to 577643, 4165780on the east, a distance of about 115 meters.

36. Please provide references and other background information to support the assumption of 40% reduction in emissions.

Response:

The 40% value is taken as a conservative estimate of the reduction in Toxic Air Contaminant (TAC) emission factors that will be achieved from installation of oxidation catalyst. The TACs included in the health risk assessment are also Precursor Organic Compounds (POC), or VOC. POC emissions reduction with the oxidation catalyst will likely exceed 70% to 90% as stated in available references. Appendix A for Proposed Determination of RACT and BARCT for Stationary Spark-Ignited IC Engines (California Air Resources Board, www.arb.ca.gov/ractbarc/rb-iceapps.pdf) states that VOC emission reductions of greater than 90% are typical. The draft BAAQMD engineering evaluation (www.baaqmd.gov/pmt/public_notices/2003/6453/A1606_nsr_6453_eval_050103.pdf) for the City of Fairfield lean-burn IC engine installation lists 70% POC abatement with oxidation catalyst.

The Eastshore Energy Facility's new lean-burn IC engines will feature state-of the-art combustion technology that will limit TAC emissions formation, and will feature an oxidation catalyst system that is expected to reduce uncontrolled emissions by at least 70% to greater than 90%. Thus, 40% reduction from the uncontrolled CATEF emission factors is considered a conservative estimate of TAC emissions for this project.

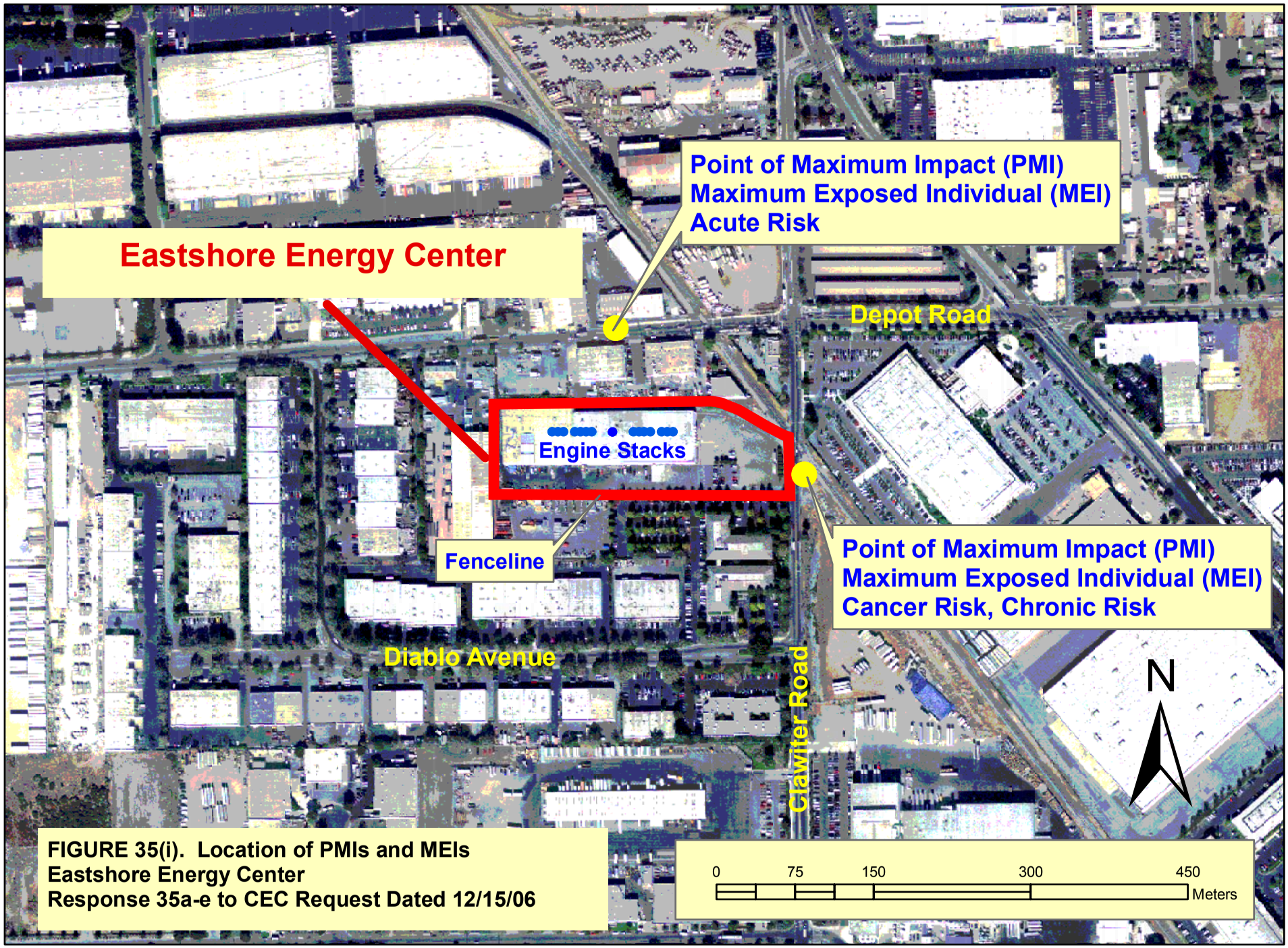
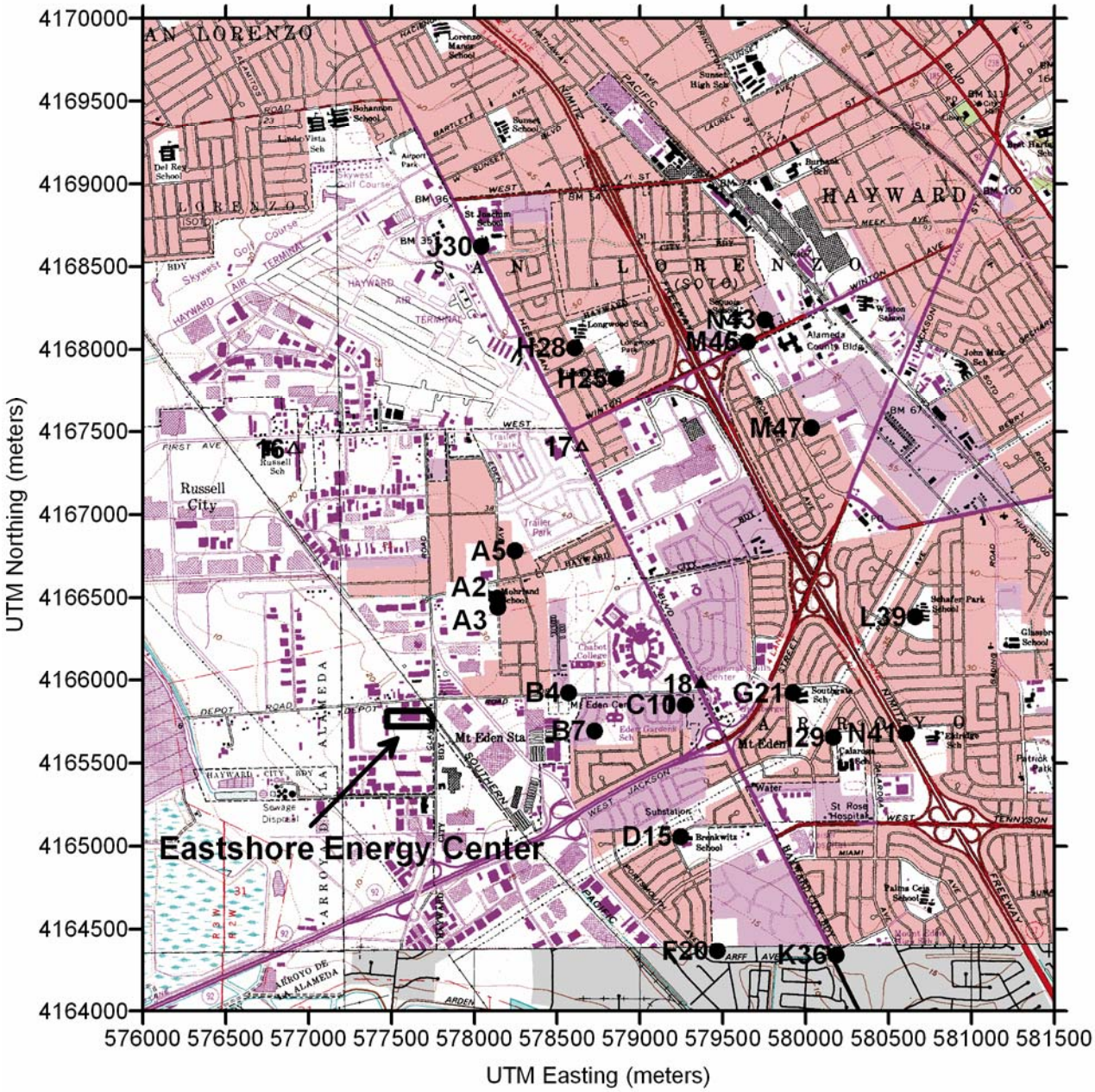


FIGURE 35(i). Location of PMIs and MEIs
Eastshore Energy Center
Response 35a-e to CEC Request Dated 12/15/06

FIGURE 35(ii). Locations of Six Nearest Sensitive Receptors and Schools Within Two Miles
Eastshore Energy Center
CEC Data Request Dated 12/15/06



USGS 7.5' Base Maps: San Leandro, Hayward, Newark, and Redwood Point (NAD27 Coordinates)

LEGEND:

SCALE: 1 inch = 1000 meters

Morhland School - A2	Eden West Convalescent Hospital - A3	Ochoa Intermediate School - B4
Courtyard Care Center - A5	Eden Gardens Elementary School - B7	Montessori Children's House - C10
Lea's Christian School - C10	Brenkwitz High School - D15	Russell School - 16
Cornerstone Christian Academy - 17	Gansberger School - 18	Southgate Elementary - G21
Lorin A. Eden Elementary - F20	Winton Grove School - H25	Longwood Elementary - H28
Martin Luther King Jr School - I29	St. Joaquim Elementary School - J30	Mount Eden High School - K36
Schafer Park Elementary - L39	Eldridge Elementary - N41	Sequoia School - N43
County Community School - M46	Alternative/Opportunity School - M46	Park Elementary School - M47

Note: Labels correspond to the EDR report provided in Attachment 8.1D-2 of Appendix 8.1D of the AFC.

Technical Area: Soil and Water Resources
Author: Richard Latteri

BACKGROUND

The Eastshore Energy Center proposes to use potable water for all construction, operation and landscaping activities as outlined in Section 8.14.4.1 of the AFC. Potable water for the Eastshore project is to be provided by the City of Hayward. The City of Hayward's sole source of potable water is the San Francisco Regional Water System operated by the San Francisco Public Utilities Commission. The primary source of water for the San Francisco Regional Water System is the Hetch Hetchy Reservoir located in the Sierra Nevada mountains in Tuolumne County.

The State Water Resource Control Board's policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (Resolution 75-58) states that the use of fresh inland water should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. The SWRCB policy requires that power plant cooling water should come from, in order of priority: wastewater being discharged to the ocean; ocean water; brackish water from natural sources or irrigation return flow; inland waste waters of low total dissolved solids; and other inland waters. Additionally, Water Code Section 13551 finds the use of potable water for industrial and irrigation uses is a waste or an unreasonable use of potable water within the meaning of Section 2 of Article X of the California Constitution if recycled water is available.

Additional information on the estimated amount of potable water consumption and the availability of other nonpotable sources is required for staff to conduct a complete analysis of potential impacts to water resources.

DATA REQUEST

37. Please provide an itemized estimate in tabular format of daily and annual average potable water consumption for plant construction, equipment wash water, hydrostatic testing of all pipelines, plant operation, and landscape irrigation of the Eastshore project. Please provide the daily potable water consumption as an average and maximum flow in gallons per minute and the annual potable water consumption in acre-feet per year.

    Response:

    The response to this question is divided into two parts, construction requirements and commercial operation requirements.

    Construction water needs can be divided into three primary categories: personal consumptive and hygiene purposes site dust control; and first fills and flushes. Since the basic construction period will be about one year (followed by a six month start-up), these uses will terminate after this period of time. Since the general contractor and its subcontractors will be responsible for providing their own bottled water for worker consumption, and since hygiene facilities will be

provided by portables, no city water is expected to be used for these purposes; as a result, associated water usage values are considered near zero for personal consumption/hygiene and are not tabulated below.

The following table lists water volumes expected for construction dust control, flushes, and first fills. The calculation of annual quantities assumes 325,870 gallons/acre-foot. Note that the water usage for site dust control assumes a usage of 1,500 gallons distributed over an 8 hour work day. Equipment flushing and hydro-testing uses will only occur at the end of construction and prior to startup and initial operation, so "daily" use does not apply for these two situations.

TABLE S&WR-1
Water volumes expected for construction dust control, flushes, and first fills

Item	Description	Daily Use Ave (gpm)	Daily Use Max (gpm)	Yearly Use (acre-feet)
1	Site dust control	3.125	3.125	1.15
2	Equipment flushing & hydros	N/A	N/A	0.18
3	Equipment first fills	N/A	N/A	0.05

With respect to plant operational uses, the following table lists the approximate, expected daily and annual uses of potable water for the indicated items.

TABLE S&WR-2
Approximate, expected daily and annual uses of potable water

Item	Description	Daily Use Ave (gpm)	Daily Use Max (gpm)	Yearly Use (acre-feet)
1	Engine (turbocharger) washes	N/A	1.5	0.06
2	Cooling system refills	N/A	5.4	0.09
3	Personnel consumption/hygiene	0.23	0.36	1.23
4	Landscape irrigation	1.67	1.67	0.22

The following notes apply to Table S&WR-2:

1. Engine turbocharger wash occurs approximately every 150 fired hours. Each wash requires about 50 gallons/engine, or about 700 gallons for all fourteen engines. Washes will not occur on most days, although for purpose of presentation we have presented an "average daily" value that reflects the total anticipated consumption averaged over the entire year.
2. The maximum daily use rate of 1.5 gpm for engine turbocharger washes assumes all 14 engines' turbochargers are washed during one 8 hour day. The yearly use assumes 4,000 fired hours of operation for all fourteen engines.
3. Engine cooling systems are only recharged on cooling system overhauls. As a result, average daily usage does not apply to this situation.
4. Cooling system daily max use value of 5.4 gpm assumes one engine's cooling system loop entire capacity (about 1,300 gal) is filled over a 4 hour period. The annual acre-feet calculation assumes the cooling systems for all fourteen engines are re-charged each year, which is unlikely.

5. Personnel consumption/hygiene uses assumes 13 employees; about 500 gal/day general use, and about 50 gal/day/person.
6. Landscape irrigation assumed to average about 200 gal/day, consumed over a two hour period. The annual quantity conservatively assumes use every day of the year, even though winter use should be minimal to zero.

38. Please provide a "Will Serve" letter from the City of Hayward, which commits the City to the long-term (30 – 35 years) delivery of potable water, a discussion of the reliability of this supply including a backup water source for plant operation, and the potential impact from project use to other municipal and industrial users over the 30 – 35 year delivery period.

Response:

Eastshore has formally requested a will serve letter from the City of Hayward, but it has not been received to date. We expect the City to respond favorably to this request very shortly and the will serve letter will be provided as soon as it is received. Given the very small quantity of water involved, in the unlikely event that the City were unable to provide water to the project either temporarily or permanently, there are nearby sources of industrial water that could be accessed to deliver water to the site by truck with no disruption to the facility operation. The water demand represented by the Eastshore project is a miniscule fraction of the City's overall water delivery program (representing the equivalent water demand of no more than a few single family residences) and will not impact City's ability to deliver water to municipal and industrial customers in the future in any substantive way.

39. Please provide the rationale and economic justification for not using an alternative nonpotable water source consistent with the SWRCB Resolution 75-58.

Response:

As discussed in the objection separately filed on December 21st, 2006 to this docket, Eastshore believes that this question as irrelevant and inapplicable. Consequently, no economic analysis is being supplied.

As noted in our application and in our response to question 37, water use is sporadic, very low in quantity, and primarily concentrated on personal consumptive and hygiene uses. Further, the quantities used for "process" purposes are essentially limited to turbocharger washes (required about every 150 fired hours) and to the refilling of the closed-loop engine cooling systems (required only after cooling system maintenance/overhauls). Note that small amount of cooling system water use is batch and intermittent, different from combined cycle power plants (which generally use "spray" cooling towers for engine cooling) that require considerable quantities of water on a continuous "makeup" basis.

Since water use is heavily weighted to typical commercial applications, and since the projected volumes are extremely modest and largely consistent with prior site

uses, the existing city service provided to this site is expected to easily meet the needs of the facility, and no alternative and/or supplementary service is required.

40. Please provide an economic analysis comparing the use of degraded groundwater (if available) and secondary/tertiary treated recycled water versus the use of potable water over a 35 year period that encompasses both the demolition/construction and operation phases of the Eastshore project.

Response:

Consistent with the rationale for our response to question 39 and our separately filed objection to same and since site water use is small and largely for personal consumptive and hygiene purposes, Eastshore Energy believes that a 35 year economic analysis is inappropriate for this particular situation. However, a preliminary indication of the possible cost to extend service from Hayward's WPCF facility is provided below.

In response to staff's question on the possible availability of degraded ground water for site use, it appears that only limited groundwater supplies have been developed in the project area due to the availability of high-quality water from the City. Groundwater development is limited to a small number of domestic wells (including a small mutual water company) and an emergency City well. Although groundwater contamination is known to occur in the shallow aquifer, there are no active remediation projects that are producing degraded groundwater that could be available for project use.

The only other water source Eastshore Energy is aware of would be from Hayward's WPCF facility. The distance an interconnecting piping run would need to extend along city streets from that facility to the site is approximately 4,000 feet. Assuming that an approximate 6" line would be needed, the cost to extend the line would be approximately $320,000. This cost does not include any fees that would likely be required to procure easements/rights-of-way, nor does it include the cost required to install on site the water treatment system that would be needed in order to meet the applicable standards for recycled water (published in Title 22 of the California Code of Regulations) as defined by the California Department of Health Services and implemented by the San Francisco Bay RWQCB. All implementation procedures for such a system would of course need to be followed, including preparation of an Engineering Report. As a result of the above, it is likely that the total installed cost for this theoretical WPCF water delivery system would be well in excess of $500,000.

BACKGROUND

To determine the potential impacts to water and soil resources from the construction of the Eastshore Energy Center project, the Energy Commission requires a Drainage Erosion and Sediment Control Plan (DESCP). The DESCP will be updated and revised as the project moves from the preliminary to final design phases and is to be a separate document from the Construction Storm Water Pollution Prevention Plan (SWPPP). The DESCP submitted prior to site mobilization must be designed and sealed by a professional engineer/erosion control specialist.

The City of Hayward is a co-permittee of the Alameda County Clean Water Program, which is a coordinated effort by local governments in Alameda County to improve water quality in San Francisco Bay. In February of 2003, the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) approved a new Municipal Stormwater Permit (Order No. 2003-0021) for Alameda County, which requires more stringent Best Management Practices (BMPs) prior to stormwater discharge from new development or redevelopment. While Appendix 8.14A of the AFC and the Eastshore Energy Center Data Adequacy Supplement contain several erosion/sediment control BMPs and water pollution control drawings, these will need to be aggregated into a draft DESCP.

DATA REQUEST

41. Please provide a draft DESCP containing elements A through I below outlining site management activities and erosion/sediment control BMPs to be implemented during site mobilization, excavation/demolition, construction, and post-construction activities. Within the draft DESCP, please provide a discussion of those additional requirements of Order No. 2003-0021 as they relate to construction and post-construction BMPs. The level of detail in the draft DESCP should be commensurate with the current level of planning for site demolition and corresponding site grading and drainage. Please provide all conceptual erosion control information for those phases of construction and post-construction that have been developed or provide a statement when such information will be available.

    A. Vicinity Map – A map(s) at a minimum scale 1”=100’ will be provided indicating the location of all project elements with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

    B. Site Delineation – All areas subject to soil disturbance for the Eastshore project (project site, lay down/demolition areas, all linear facilities, landscaping areas, and any other project elements) shall be delineated showing boundary lines of all construction/demolition areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.

    C. Watercourses and Critical Areas – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. Indicate the proximity of those features to the Eastshore project construction, lay down/demolition, and landscape areas and all transmission and pipeline construction corridors.

    D. Drainage Map – The DESCP shall provide a topographic site map(s) at a minimum scale 1”=100’ showing all existing, interim and proposed drainage systems and drainage area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off-site for a minimum distance of 100 feet in flat terrain.

E. **Drainage of Project Site Narrative** – The DESCP shall include a narrative of the drainage measures to be taken to protect the site and downstream facilities. The narrative should include the summary pages from the hydraulic analysis prepared by a professional engineer/erosion control specialist. The narrative shall state the watershed size(s) in acres that was used in the calculation of drainage measures. The hydraulic analysis should be used to support the selection of BMPs and structural controls to divert off-site and on-site drainage around or through the Eastshore project construction and laydown/demolition areas.

F. **Clearing and Grading Plans** – The DESCP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections or other means. The locations of any disposal areas, fills, or other special features will also be shown. Illustrate existing and proposed topography tying in proposed contours with existing topography.

G. **Clearing and Grading Narrative** – The DESCP shall include a table with the quantities of material excavated or filled for the site and all project elements of the Eastshore project (project site, lay down/demolition areas, transmission corridors, and pipeline corridors) to include those materials removed from the site due to demolition, whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported. The table shall distinguish whether such excavations or fill is temporary or permanent and the amount of material to be imported or exported.

H. **Best Management Practices Plan** – The DESCP shall identify on the topographic site map(s) the location of the site specific BMPs to be employed during each phase of construction (initial grading/demolition, project element excavation and construction, and final grading/stabilization). BMPs shall include measures designed to prevent wind and water erosion in areas with existing soil contamination. Treatment control BMPs used during construction should enable testing of groundwater and/or stormwater runoff prior to discharge to San Francisco Bay.

I. **Best Management Practices Narrative** – The DESCP shall show the location (as identified in H above), timing, and maintenance schedule of all erosion and sediment control BMPs to be used prior to initial grading/demolition, during project element excavation and construction, final grading/stabilization, and post-construction. Separate BMP implementation schedules shall be provided for each project element for each phase of construction. The maintenance schedule should include post-construction maintenance of structural control BMPs, or a statement provided when such information will be available.

Response:

Five copies of the DESCP have been provided to CEC staff under separate cover.

Technical Area: Transmission System Engineering
Author: Laiping Ng

BACKGROUND

Section 2.2.5 and Section 5.2.3 of the AFC indicate that the Eastshore Power Plant Switchyard will consist of two step-up transformers. Figure 2.2-5, 115 kV Substation Single Line Diagram, and Figure 5.2-1(E1), Switchyard Single Line Diagram, also shows two 75/90/110 MVA, 13.8/115 kV, step-up transformers. However, the PG&E System Impact Study indicated that there will be only one 75/100/125 MVA, 13.8/115 kV, step-up transformer.

Staff needs clarification regarding the proposed project Substation and switchyard in order to prepare the Staff Assessment for the Eastshore Energy Center project.

DATA REQUEST

42. Please indicate the ratings and number of 13.8/115 kV step-up transformers that will be used for the proposed project.

    Response:

    There will be two identical 13.8/115 kV step-up transformers in the Eastshore Energy Center switchyard. Each transformer will be rated at 60/72/90 MVA.

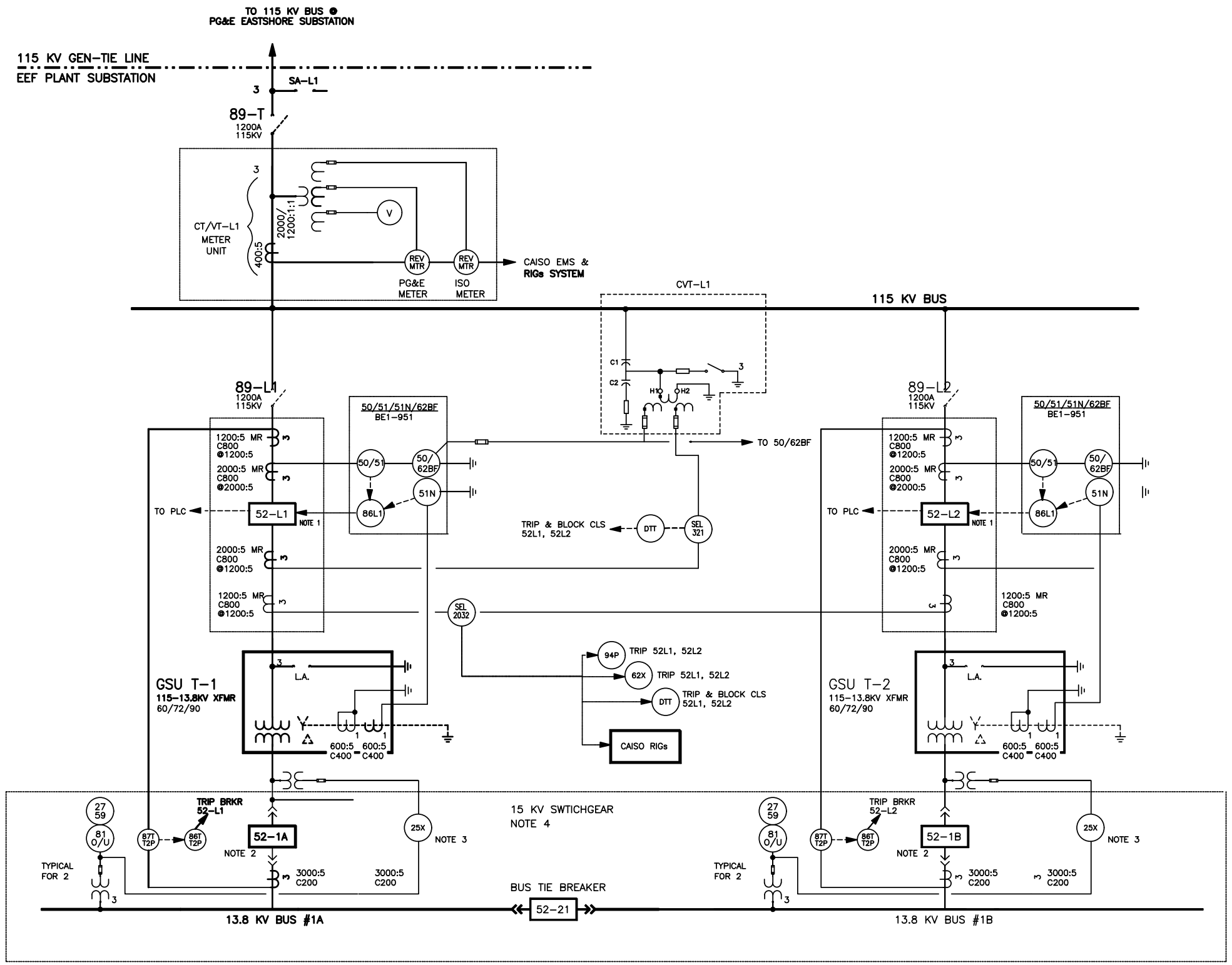
43. Please resubmit the 115 kV Substation and switchyard diagrams with the appropriate design and showing all equipment for generator's interconnection with the switchyard including any bus duct connectors, switchgear, disconnect switches, generator step-up transformers, breakers and their respective ratings.

    Response:

    An updated on-line diagram EEF-E-1 is attached (See Attachment TSE-43).

Attachment TSE-43

One-line Diagram EEF-E-1



NOTES

1– CLOSE ALLOWED ONLY WHEN LOW SIDE TRANSFORMER BREAKER OPEN (INTERLOCKED).

2– CLOSE ALLOWED ONLY WHEN HIGH SIDE TRANSFORMER BREAKER CLOSED (INTERLOCKED). 25X RELAY TO PROVIDE DEAD BUS HOT LINE SUPERVISION TO CLOSE CIRCUIT.

3– CLOSE ON GENERATOR BREAKERS SUPERVISED BY 25G SYNCHRONIZER AND 25GX SYNC CHECK RELAYS. 25GX SET TO SYNC AND CLOSE FOR HOT BUS HOT LINE CONDITION ONLY.

4– FOR 15 KV SWTICHGEAR SINGLE-LINE DIAGRAMS SEE WARTSILA DWGS EE-01 (SHEETS 1 THRU 4).

PG&E REQUIRED RELAYS (UTILITY GRADE)

21 – PHASE DISTANCE (3PH) (PREFERRED, OR ALTERNATE 51V)
→»» 25 – SYNCHRONIZER (1PH) (SEE SECT. 5.8)
25X – SYNC. CHECK (1PH) (SEE SECT. 5.8)
50/51T – TRANSFORMER PHASE OVERCURRENT (3PH + 1NST)
51TN – TRANSFORMER GROUND OVERCURRENT (1PH)
51V – VOLTAGE CONTROLLED OVERCURRENT (3PH) (ALTERNATE 21)
→»» 59 – OVER VOLTAGE TRIP V ≥ 115%: TIME ≤ 0.1 SEC (1PH OR 3PH)
27 – UNDER VOLTAGE TRIP V ≤80.0%: TIME ≤ 0.5 SEC (3PH) OPTIONAL
62X.Y.Z – BREAKER FAILURE INITIATE AUXILIARY RELAYS
81–U – UNDER FREQUENCY (SEE SECTION 5.7) OPTIONAL
81–O – OVER FREQUENCY (SEE SECTION 5.7) OPTIONAL
86 – LOCKOUT
87T – TRANSFORMER DIFFERENTIAL (3PH)
90V – AUTOMATIC VOLTAGE REGULATOR
PSS – POWER SYSTEM STABILIZER (SEE SEC. 4.5)
{DISCRETE DEVICE NOT INCORPORATED INTO MULTIFUNCTION RELAY.

52 – CIRCUIT BREAKER
L – LINE
T – TRANSFORMER
G – GENERATOR
Rn – NEUTRAL RESISTOR
SA – SURGE ARRESTER
WH – WATT HOUR METER
*** – INTERLOCK OR SYNCH CHECK TO PREVENT CLOSE OF BREAKER IF TRANSMISSION LINE IS DE-ENERGIZED (DEAD)
*** – 15/25 REQUIRED, BUT TESTING NOT WITNESSED BY PSCO
✱ – OPTIONAL FOR TRANSMISSION CONNECTED GENERATION
NOTE – TO PROVIDE REDUNDANCY, NOT ALL REQUIRED RELAYING MAY BE INCLUDED IN ONE MULTI-FUNCTION RELAY.

REV NO.	DATE	DESCRIPTION	BY	CHK	DES SUPV	ENGR	APPR
C	12/26/06	REVISED FOR CEC PERMIT	AKT	AT			
B	6/28/06	ISSUED FOR CEC PERMIT	AKT	AT			
A	10/1/05	ISSUED FOR INFORMATION	FM	AT			

SCALE: NOT TO SCALE DATE: 10/1/05

Tierra Energy/Ramco Generating

Eastshore Energy Project
Hayward, California

115 KV SUBSTATION
SINGLE LINE DIAGRAM

WestPower

DRAWING NO. EEF-E-1 REV. C

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Technical Area: Visual Resources
Author: Mark R. Hamblin

BACKGROUND

AFC page 8.11-3, Table 8.11-1 indicates that the height of the exhaust stack is 70 feet inclusive of the exhaust silencer. AFC, page 8.11-2 the second bullet states "Fourteen (14) approximately 70-foot tall stacks, each with a separate continuous emissions monitoring system (CEMS)."

On AFC page 8.11-13 it states "A visual simulation, which added the proposed power plant to the Key Observation Point (KOP) 1 photo, was prepared. It is not included in this assessment because the proposed power plant, and in particular, the 70-foot-high exhaust stacks, would not be visible from this intersection, located approximately 2,800 feet from the site. No change to the views in any direction from this location would occur as a result of either constructing or operating the proposed project. No changes to the visual quality of the views from this residential area are expected as a result of project implementation."

On December 18, 2006 the U.S. EPA's revised national ambient air quality standards (NAAQS) for particulate matter less than 2.5 micrometers (PM2.5) downward from 65 to 35 micrograms per cubic meter for 24-hour average concentration, becomes effective (Federal Register Vol.71, No. 200, pg. 61144, October 17, 2006; effective December 18, 2006). The U.S. EPA's revised standards may trigger an increase in the height of the proposed project's 70-foot exhaust stacks resulting in visibility from KOP 1 - Gettysburg Avenue and Bradford Avenue intersection.

DATA REQUEST

44. If the height of the project's exhaust stack(s) is increased as a result of the implementation of U.S. EPA's revised air quality standards for PM2.5 or PM10, please provide a new color full-page photo-simulation of the project from KOP 1.

    Response:

    The height of the proposed exhaust stacks will remain unchanged. Therefore, no simulation is required.

Technical Area: Worker Safety/Fire Prevention
Author: Dr. Alvin Greenberg

BACKGROUND

Sections 2.2.12 and 8.7.4.5 of the AFC describes in a very limited manner the fire prevention, suppression, and response systems for the proposed power plant during the construction and operational phases. Section 8.7.4.5 describes the off-site fire response, paramedic services, and Hazardous Materials (HazMat) spillmat response available in a brief and cursory manner. The AFC does not describe the fire prevention, suppression, and response systems that would be on-site in great detail nor the off-site response capabilities of the Hayward Fire Department and the potential impacts on the Hayward Fire Department.

Staff needs more specific information on the fire prevention and response plans, including HazMat spill response and Emergency Medical Services (EMS) response during the Construction and Operational Phases.

DATA REQUESTS

45. Please provide specific information on the fire prevention and response methods planned for the project's Construction Phase and Operational Phase. This will include both fixed and portable systems and include response from the Hayward Fire Department.

    Response:

    A Fire Protection and Prevention Program will be in place at the project site during both Construction and Operational phases as identified in Table 8.7-5 of the AFC. Construction and operation activities will be conducted in accordance with Article 80 of the Uniform Fire Code, NFPA 10, Title 29 CFR 1926, and 8 CCR 1920.

    Construction Phase: For small localized fires that can be extinguished by one or two onsite workers, fire extinguishers will be located such that the travel distance from any work area to the nearest extinguisher is less than 100 feet. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher will be located within 50 feet. Fire extinguishers will be maintained in a fully charged and operable condition, visually inspected each month, and will undergo a maintenance check each year.

    During construction, the greatest fire hazard is anticipated to be cutting and welding activities. When practicable, objects to be welded or cut will be moved to a safe location. All movable combustibles will be relocated at least 35 feet from the work site or covered and protected by approved fire retardant material. Fire-extinguishing equipment will be immediately available in the work area. When welding or cutting operations are such that normal fire-prevention precautions are not sufficient, additional trained personnel will be assigned to guard against fire while the actual welding or cutting operation is being performed and for a

sufficient period of time after completion of the work to ensure that no possibility of fire exists.

In the event of a larger fire, the Hayward Fire Department (HFD) Station 6 will be contacted. As described in Section 8.8.3.6.2 of the AFC, Station 6, located at 1401 West Winton Avenue, is 1 mile from the site with an average response time of 3 to 4 minutes. Throughout the service area, there is a maximum response time of 8 minutes from any HFD station.

Additional ignition sources will be controlled by prohibiting smoking in areas containing flammable or potentially explosive materials or atmospheres, and providing designated smoking areas with approved receptacles for discarding smoking materials.

Operational Phase: During operations, ignition sources will be controlled by prohibiting smoking in areas containing flammable or potentially explosive materials or atmospheres, and providing designated smoking areas with approved receptacles for discarding smoking materials.

As discussed in Section 2.3.2.1 of the AFC, during the Operational Phase, the project will rely on both onsite fire protection systems and the local fire protection services. The new fire protection system will be independent of the existing plant fire protection system.

The fire fighting system will consist of a fire water loop supplying fixed suppression systems and fire hydrants (located in accordance with NFPA 24).

The control room and administration building will be equipped with an automatic fire fighting system; the control room with a an FM-200 type system as described in section 2.2.12 of the AFC ; other areas with automatic wet pipe sprinkler systems. The administrative building and other structures will also be equipped with portable fire extinguishers as required by the NFPA and HFD.

It is expected that plant personnel will be able to extinguish most small non-structural fires. If plant personnel cannot control a fire, the HFD will be contacted. As described in Section 8.8.3.6.2 of the AFC, Station 6, located at 1401 West Winton Avenue, is 1 mile from the site with an average response time of 3 to 4 minutes. Throughout the service area, there is a maximum response time of 8 minutes from any HFD station.

46. Please provide a detailed description of the planned EMS and HazMat spill response capability for the Construction and Operational Phases.

Response:
As discussed in Section 8.12.8.1 of the AFC, the quantities of hazardous materials handled during the Construction Phase are relatively small, and best management practices will be implemented by construction personnel. Small spills will be contained and cleaned up immediately by trained, onsite personnel. Larger spills will be reported via emergency phone numbers to obtain help from offsite containment and cleanup crews.

Small spills (those that require approximately 10 minutes to clean up) will likely be composed of petroleum products (oil and/or fuel). In the event of a spill to soil, the soil will be excavated and disposed of in containers for offsite disposal. Empty drums, shovels, and spill cleanup items (absorbent pads and oil absorbent) will be located adjacent to potential spill sources such as the refueling area and the hazardous materials storage area.

In the event of a larger spill, the spill will be contained using absorbent pigs, "kitty litter" absorbent, and/or absorbent pads. Contaminated soil will be placed into barrels or trucks by contracted containment and cleanup crews for offsite disposal at an appropriate facility in accordance with law.

All personnel working on the project during the construction phase will be trained in handling hazardous materials and the dangers associated with hazardous materials. In addition, an onsite health and safety person will be designated to implement health and safety guidelines and to contact emergency response personnel and the local hospital, if necessary. The coordinator will have basic first aid skills, however in the event of an emergency, Emergency Medical Services (EMS) support will be provided by the HFD. Typical EMS response time to an emergency can be as little as 2-3 minutes, particularly from the closest station, Station No. 6, with a maximum of 8 minutes.

Operational Phase: As discussed in Section 8.12.4.2 of the AFC, various hazardous materials will be stored on site during facility operation. All hazardous materials will be handled and stored in accordance with applicable codes and regulations.

A Hazardous Materials Business Plan will be developed and filed with the City of Hayward's Fire Department HMD and updated annually in compliance with CCR 19 and the Health and Safety Code Section 25504. Emergency response procedures will be specified in the Hazardous Materials Business Plan.

Designated personnel will be trained as members of a plant hazardous material response team, and team members will receive first responder and hazardous material technical training in appropriate methods to mitigate and control accidental spills.

It is expected that plant personnel will be able to mitigate and control most accidental spills. However, in the event of a chemical emergency, plant personnel will defer to the Alameda County HazMat Team for containment and cleaning. The City of Hayward has a mutual aid agreement with Alameda County for hazardous material spills. HFD Station #6, the nearest station to the site, will be the first responder.

47. Please provide a chart showing the locations of Hayward Fire Department Stations, their distance from the project site in miles, the fire response time, the EMS response time, and the HazMat response time all estimated by the fire department. Because the Hayward Fire Department does not have a HazMat

Incidence Team, please include distances and response times for the Alameda County HazMat Incidence Team.

Response:

A figure identifying the locations of the HFD Stations is provided as Figure WS47-1. Response times for each of the stations and the HazMat and EMS response times are provided in Table DR47-1 below. The data provided in the table is based on conversations between Colm Kenny of CH2M HILL and Bob Negri of HFD (510.293.5049) and Colm Kenny and Dave Lord of Alameda County Fire Department, ACFD (510.618.3490), both occurring on January 4th, 2007.

Typically, HFD has a maximum response time of 8 minutes from the time of dispatch within the city, which includes the Eastshore site. Extenuating circumstances may increase that time, but these instances are rare. Typical response time can be as little as 2-3 minutes, particularly from the closest station, Station No. 6.

All Hayward fire fighters are trained paramedics and would be able to administer medical care upon arriving on the scene. Hayward emergency medical response service is coordinated through ACFD, which subcontracts to a private company. This company works under a contract that requires them to have a maximum response time of 10 minutes. They have 2 dispatch stations, each having an ambulance and team on hand ready for dispatch. Additionally, they have a fleet of roaming ambulances available for dispatch. Depending on the location of the chosen ambulance at the time of dispatch, response time could be as little as 1 minute.

Hayward hazardous materials response service is provided by ACFD. In a hazardous materials event, HFD would first be dispatched to the scene. Upon arriving, they would establish their command post and assess the situation. This would take a maximum estimated time of 15 minutes (8 minutes for scene response, and 7 minutes for command post establishment and site assessment). Once the HFD determines that the ACFD hazardous materials team is needed, they would have their dispatch contact Alameda County police dispatch, who would alert the hazardous materials team. At this point, it would take ACFD hazardous materials team less than 30 minutes to assemble, travel to Hayward, and deploy at the scene.

TABLE DR471
Hayward Fire Department Stations

Station #	Distance from Project Site	Fire Response Time[1]	EMS Response Time[2]	HazMat Response Time[3]
Fire Station # 1 22690 Main Street, 94541 (510) 293-8611	3 miles	<8 min	<10 min	<45 min
Fire Station # 2 360 West Harder Road, 94544 (510) 293-8612	2 miles	<8 min	<10 min	<45 min
Fire Station # 3 31982 Medinah Street, 94544 (510) 293-8613	5.2 miles	<8 min	<10 min	<45 min
Fire Station # 4 27836 Loyola Avenue, 94545 (510) 293-8614	1.7 miles	<8 min	<10 min	<45 min
Fire Station # 5 28595 Hayward Boulevard, 94542 (510) 293-8615	5.3 miles	<8 min	<10 min	<45 min
Fire Station # 6 1401 West Winton Avenue, 94545 (510) 293-8616	1 mile	<8 min	<10 min	<45 min
Fire Station # 7 28270 Huntwood Avenue, 94544 (510) 293-8617	3.1 miles	<8 min	<10 min	<45 min
Fire Station # 8 25862 Five Canyons Parkway, 94552 (510) 293-8618	5.5 miles	<8 min	<10 min	<45 min
Fire Station # 9 24912 Second Street, 94542 (510) 293-8619	4.0 miles	<8 min	<10 min	<45 min

[1] HFD's EMS Coordinator indicated that barring extenuating circumstances maximum fire response time will be 8 minutes, with an average response time of 4 minutes.
[2] Hayward Fire Department EMS Coordinator indicated that barring extenuating circumstances maximum EMS response time will be 10 minutes, with actual time dependent on the location of the responding unit at the time of dispatch.
[3] Alameda County Fire Department indicated that barring extenuating circumstances maximum Hazardous Materials Team response from time of dispatch call from Hayward Fire Department is 30 minutes. An additional 15 minutes is estimated for Hayward Fire Department initial response (maximum 8 minutes from dispatch, plus an additional 7 minutes for command post set up and scene assessment).

48.

a. Please identify any impacts this project will have on the Hayward Fire Department, and the Alameda County Fire Department and HazMat Incidence Team, and its ability to respond to a fire, HazMat spill, or EMS issue at this project site and cumulatively with the Russell City project site. Also identify and training, personnel, or equipment needs of the Hayward Fire Department and the Alameda County Fire Department and HazMat Incidence Team.

b. Please discuss the potential for cumulative impacts, given other projects in the area such as the Russell City Energy Center.

Response:

The following response is based on a conversation between Colm Kenny, CH2M HILL, and Steve Jolly of the HFD's Administrator's Office (510.583.4930):

HFD has the necessary resources to simultaneously respond to most emergency incidents at the RCEC and Eastshore sites. In the event of any incident that might overwhelm HFD's resources and capabilities, HFD has mutual aid agreements in place with all surrounding jurisdictions to provide additional resources, in accordance with the National Response Plan (NRP). In the event of a catastrophic incident, such as a major earthquake, the NRP has provisions for providing additional resources from state and federal agencies.

49. Please describe in detail the HazMat training and equipment anticipated to be provided to on-site project personnel.

Response:

Plant personnel will be trained in the management and handling of hazardous materials (including hazardous waste) commensurate with their roles and responsibilities. Training will be provided by qualified personnel and plant personnel will not be allowed to perform their duties unsupervised until properly trained. All personnel will be trained within 6 months of hire or assuming new duties. This initial training will be refreshed annually and more often if warranted. Training will be modified, as necessary, as the result of modifications to plant operations, changes in roles or responsibilities, periodic evaluation of the effectiveness of the standard operating procedures, revisions to regulatory requirements, etc. Written training records will be maintained at the plant for a minimum of 3 years.

A detailed outline of training elements is provided below:

Eastshore Energy Center
Hazardous Materials and Waste Management
Training Outline

I. Purpose
   - Safety First!
   - Training required for management hazardous materials and waste
   - Definition of hazardous materials, hazardous waste, and other solid waste
   - Provide training commensurate with roles and responsibilities

II. Overview of Site Operations

III. Regulatory Drivers, Permits and Plans
   - 19 CCR (hazardous materials management), 22 CCR (hazardous waste), City of Hayward Municipal Code
   - Hazardous Materials Business Plan Permit, Hazardous Waste Generator Identification Number
   - Hazardous Materials Business Plan, Waste Management Plan

IV. Training Frequency and Recordkeeping
   - Initial, Annual Refresher and As Needed Training
   - Qualified Trainer
   - Proof of Adequate Training
   - Training Logs

VI. Organizational Structural
   - General Organizational Structure
   - Roles and Responsibilities
   - Job Descriptions
   - External Contacts (e.g., Emergency Response)

VII. Hazardous Materials Management
   - Hazardous Materials Business Plan
   - Hazardous Materials Inventory and Use
   - Management of Incompatible Materials
   - Material Safety Data Sheets
   - Personal Protection Equipment

VIII. Hazardous Waste Management
   - Waste Characterization/Waste Streams
   - Accumulation Time
   - Container and Tank Management
   - Waste Minimization
   - Universal Hazardous Waste
   - Hazardous Waste Manifests
   - Pre-shipment Requirements

IX. Other Solids Waste Management (focus on separating general refuse from possible hazardous materials/waste)

IX. Inspections
   - Site Inspection Form

- o Hazardous Materials Inspections
- o Hazardous Waste Inspections
- o Frequency

X. Spill Prevention and Other Emergencies, Response, Reporting, and Follow-up
- o Site Best Management Practices (structural and non-structural BMPs)
- o On-site Emergency Response Equipment
  - o Type
  - o Location
  - o Use
- o Example Spill Scenarios and Other Emergencies and Response Procedures (e.g., release of petroleum product, fire)
- o Self-response vs. Contacting External Emergency Response Agencies
- o Definition of a Reportable Release

XI. Prohibited Activities
(e.g., no transporting waste offsite in own vehicles, storage of incompatibles)

XII. Reporting and Recordkeeping
- o Hazardous Materials Reporting and Recordkeeping
- o Hazardous Waste Reporting and Recordkeeping

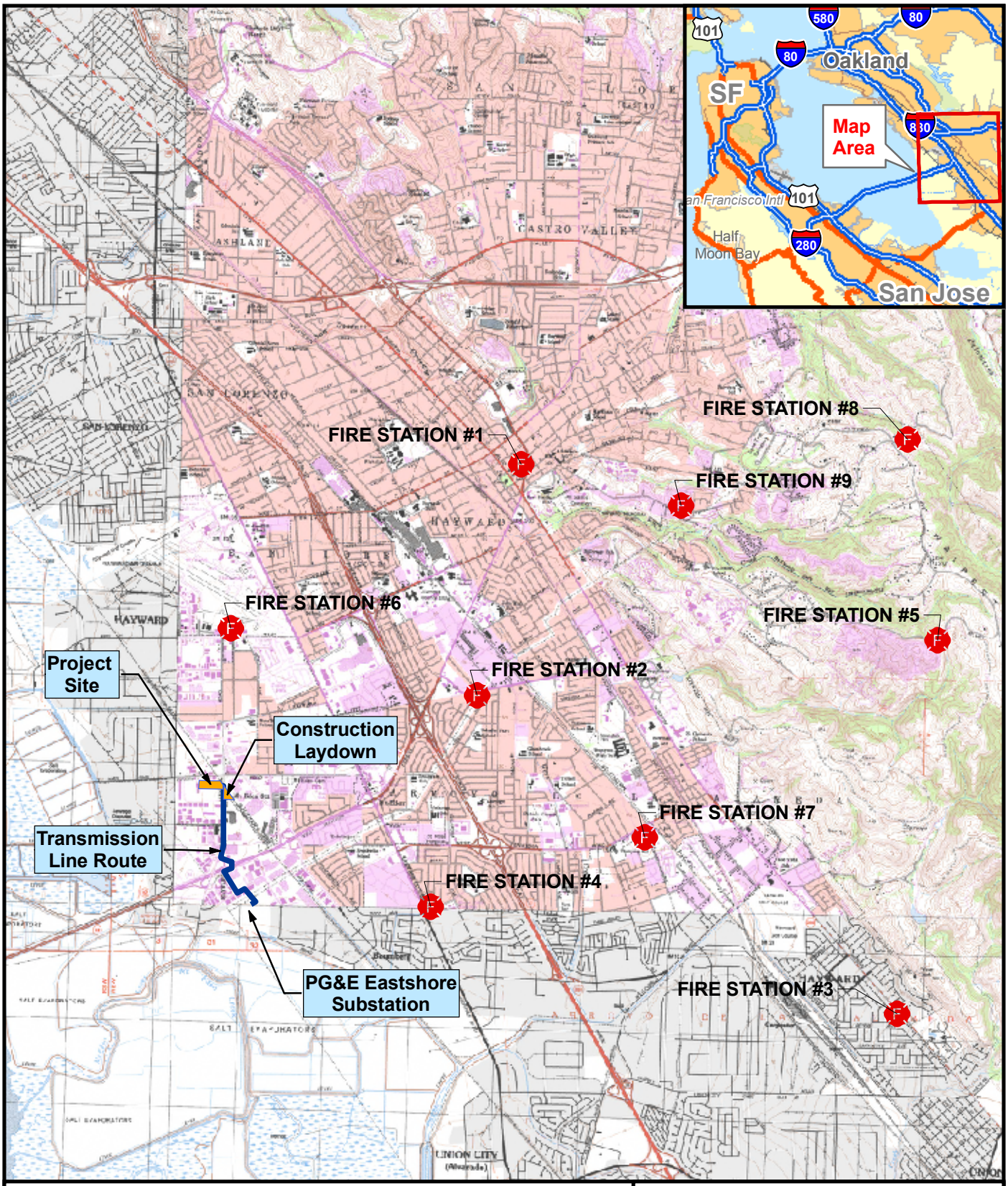
XIII. Other Regulated Activities

XIV. Other Plans and Procedures

XV. Regulatory Agency Interaction

XIV. Management of Change
- o Change in Personnel
- o Change in Roles and Responsibilities
- o Change in Inventory
- o Change in Treatment Process

Table 8.12-2 of the AFC lists the hazardous materials anticipated to be used at the site. By general grouping, these materials include aqueous ammonia, cleansers/detergents, petroleum products, panels, and sulfuric acid. Personnel will be trained to respond to small leaks or incipient fires that are easily contained and remain onsite, including use of appropriate PPE (e.g., respiartors). Personnel will be trained to call 911 for all other incidents. In addition, spill response contractors will be used to cleanup and transport waste material offsite. For small leaks of aqueous ammonia (e.g., from valves or gaskets), an inventory of sorbent neutralization pads, general purpose spill kits, and 55-gallon plastic drums (for accumulation of pads and debris) will be maintained onsite. For all other hazardous materials, an inventory of general purpose spill kits, containment drums and overpack drums will be maintained onsite. In addition, fire extinguishers will be placed at locations around the plant for use in fighting incipient fires. Specific quantities and locations of and maintenance schedule for hazardous materials/fire response equipment will be determined when preparing the Hazardous Materials Business Plan required to be submitted and approved by the local Certified Unified Program Agency, the Hayward Fire Department, prior to plant operation.



LEGEND

Site Location

Transmission Line Route

City of Hayward Fire Stations

N

0 0.5 1 2 Miles

SCALE IS APPROXIMATE

FIGURE WS-47
FIRE STATION LOCATIONS
EASTSHORE ENERGY CENTER
HAYWARD, CALIFORNIA

CH2MHILL

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Attachment

Eastshore Waste Management Errata

TABLE 8.13-2
Wastes Generated During the Construction Phase

Waste	Origin	Composition	Estimated Quantity	Classification	Disposal
Construction nonhazardous waste (e.g., Scrap wood, glass, plastic, paper, packing)	General demolition and construction debris (e.g., roofs, timber columns)	Normal refuse	5 cubic yards/month	Nonhazardous	Recycle and/or dispose of in a Class II or III landfill
Demolition materials inclusive of concrete, wood, scrap metal and excavation from existing structures	General demolition and construction debris(foundations, footings) and excess soils	Normal refuse	9859 cubic yards in months 1 & 2	Nonhazardous	Dispose of in Class II or III landfill, Recycle of materials where/when possible.
Empty hazardous material containers	General construction	Drums, containers, totes	100 containers*	Hazardous and non-hazardous solids	Containers < 5 gallons will be disposed as normal refuse. Containers > 5 gallons will be returned to vendors for recycling or reconditioning.
Spent welding materials	General welding activity	Solid	20 lb/mo	Hazardous	Disposal at a Class I landfill
Waste oil filters	Construction equipment and vehicles	Solids	100 lb/mo	Non-hazardous	Recycle at a permitted TSDF
Engine waste lube oil	Engine / Generator lube oil flushes	Hydrocarbons	19,000 gal. of flush lube oil	Hazardous	Recycle at a permitted TSDF
Oily rags, oil sorbent excluding lube oil flushes	Cleanup of small spills	Hydrocarbons	Two 55-gal drums/mo	Hazardous	Recycle or dispose at a permitted TSDF
Solvents, paint, adhesives	Maintenance	Various, e.g. VOCs, SVOCs, metals, epoxies	180 lb/mo	Hazardous	Recycle at a permitted TSDF
Spent alkaline batteries	Equipment	Metals	50 batteries per month	Universal waste solids	Recycle or dispose offsite at an Universal Waste Destination Facility
Waste oil	Equipment, vehicles	Hydrocarbons	50 gal/mo	Non-RCRA hazardous liquid	Dispose at a permitted TSDF
Sanitary waste	Portable toilet holding tanks	Sewage	200 gal/day during life of construction	Non-hazardous liquid	Remove by contracted sanitary service

TABLE 8.13-2
Wastes Generated During the Construction Phase

Waste	Origin	Composition	Estimated Quantity	Classification	Disposal
Stormwater	Rainfall	Water	2,553 gpm during peak intensity rainfall	Non-hazardous liquid	Discharge to stormwater drain
Fluorescent, mercury vapor lamps	Lighting	Metals and PCBs	50 lb/yr	Universal waste solids	Recycle or dispose offsite at an Universal Waste Destination Facility
Chemical cleaning fluid waste	Pipe cleaning and flushing	Citric Acid	50 lb dissolved in 39,000 gal (during construction)	Hazardous or non-hazardous liquid	Sample and characterize—if clean, dispose of in sanitary sewer; otherwise, manage appropriately offsite
Hydrotest water	Testing equipment and piping integrity	Water	20,000 gal (life of project construction)	Hazardous or non-hazardous liquid	Sample and characterize—if clean, dispose of in storm drain; otherwise, manage appropriately offsite

* Containers include < 5-gallon containers and 55-gallon drums or totes.