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August 15, 2014

VIA E-FILING (W/OUT CD) AND HAND DELIVERY

Carlsbad Energy Center Project (07-AFC-6C)
Mike Monasmith, Project Manager
Paul Kramer, Hearing Officer
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Carlsbad Energy Center Project Petition to Amend (07-AFC-06C)
Project Owner's Responses to Data Requests in Set One (Nos. 1 - 30)

Dear Mr. Monasmith:

On July 16, 2014, California Energy Commission staff ("**Staff**") filed Data Request Set 1 (TN 202715) (the "**Data Requests**") requesting supplemental data related to Carlsbad Energy Center LLC's ("**Project Owner**") Petition to Amend the Carlsbad Energy Center Project (07-AFC-06C). Project Owner hereby submits the enclosed responses to Staff's Data Requests, subject to Project Owner's August 5, 2014 Objections to Data Request Set 1 and Request for Time Extension (TN 202886) with respect to Data Requests 24, 25 and 28 through 30. Project Owner has responded as thoroughly as possible to Staff's Data Requests, including providing new and revised Figures, modeling and analysis. On or before September 19, 2014, Project Owner will provide Staff with the depictions and reports for which Project Owner has requested additional preparation time.

Please contact me or my colleague Allison Harris if there are questions about the enclosed Responses.

Locke Lord LLP

By: _____
John A. McKinsey
Attorneys for El Segundo Energy Center LLC

JAM:awph

Enclosures (compact disks will be hand-delivered; files too large to upload)

SAC 800443v.1

Carlsbad Energy Center Project
Petition to Amend

(07-AFC-06C)

Data Response Set 1

(Responses to Data Requests 1 to 30)

Submitted to

California Energy Commission

Prepared by

Carlsbad Energy Center LLC

With Assistance from

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6 Hutton Centre Drive Suite 700
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August 15, 2014

Contents

Introduction

Attached are Carlsbad Energy Center LLC (Project Owner) responses to the California Energy Commission (CEC) Data Request, Set 1 (numbers 1 through 30) regarding the Carlsbad Energy Center Project (CECP) (07-AFC-06C) Petition to Amend (PTA). Any capitalized term not defined in this Data Response Set 1 shall have the meaning given to it in the PTA.

The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as the CEC presented them and are keyed to the Data Request numbers.

New or revised graphics or tables are numbered in reference to the respective Data Request number to which they correspond. For example, the first table used in response to Data Request 1 would be numbered Table DR1-1. The first figure used in response to Data Request 1 would be Figure DR1-1, and so on. Figures or tables from the CECP PTA that have been revised have “R1” following the original number, indicating revision 1.

Additional tables, figures, or documents submitted in response to a data request (for example, supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of each discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

Air Quality (1–19)

BACKGROUND: EPS DEMOLITION EMISSIONS ASSUMPTIONS

The May 2, 2014 Petition to Amend (PTA) request includes a request that the Encina Power Station (EPS) demolition be included within the Amended CECP license. However, the amendment request provides limited information regarding the proposed demolition methods, particularly those proposed to remove the 400-ft exhaust stack and the 12-story power plant building. Staff requires the following data requests to be answered to fully understand and evaluate the air quality impacts of the proposed EPS demolition.

DATA REQUEST

1. Please describe or show graphically the periods/activities of assumed overlap for the seven demolition stages/segmented tasks outlined in PTA, Section 2.2, and identify the corresponding matching months in the CalEEMod modeling input/output files.

Response: The following is a summary of the time periods associated with each segmented demolition task discussed in the PTA (Section 2.2). Prior to these activities, during Months 1-6 there will be site mobilization and non-structural demolition including removal of insulation, doors, windows, hardware, some mechanical equipment, and finish materials. Following the seven segmented activities during Months 20-22, there will be some rough grading of the site, final debris cleanup, removal of temporary facilities, and removal of contractor equipment. The months are in terms of months following start of EPS demolition activities. These listed time periods (in terms of month numbers) match the month numbers used in the CalEEMod model inputs/outputs.

- Power plant building and contents (Months 9 - 19, stack demolition during Months 14–19)
- Combustion turbine and structures, east power plant building (Months 12–15)
- Ocean water intake/discharge piping, structures and equipment (Months 7–11)
- Northwest structures, tanks, and piping (Months 12–15)
- Fuel oil piping and supports (Months 12–15)
- Southeast corner structures (Months 12–15)
- Two domestic water tanks on SDG&E property (Months 12–15)

DATA REQUEST

2. Please clearly identify in which demolition stage the stack demolition will occur.

Response: The stack demolition is expected to occur during Months 14 to 19 of the 22-month EPS demolition period.

DATA REQUEST

3. Please describe in detail the primary demolition method(s) for the 400-ft exhaust stack (i.e., felling, implosion, crane-mounted impact hammer, crane-mounted platform for workers to use hand held impact hammers, some combination of these methods, or other methods).

Response: The current plan for the demolition of the EPS exhaust stack is the use of mechanical dismemberment rather than felling. During the first phase of this process, the base of the stack will be modified using an excavator/breaker to create a passage for debris to pass through during stack demolition activities—the stack essentially will be used as a chute for conveying the demolition debris to the ground for load-out. During the next phase, the ductwork connecting the boilers to the stack will be demolished and removed so that the stack is left free standing for the installation of an engineered mast climbing platform system. Once the mast climbing platform system is installed on the exterior of the stack, the stack demolition work will begin starting at the top of the stack and moving downwards. This will be done using

work crews or small robotic demolition units installed on the movable mast platform. The work crews or robotic units will be equipped with hammers, crushers, or shears. As the crews break apart the stack, the material is pushed inside the stack where it is funneled to the base. The material is contained inside the stack for safety and for controlled load out of the material. The platform secondarily functions to capture any additional debris that falls outside of the stack. Additionally, this demolition technique minimizes fugitive dust. A front end loader is then used at the stack base to remove material as needed. The platform is lowered as necessary to remove each section until the remaining stack height is approximately 80 feet. At this point, the mast climbing platform system will be removed and the remaining portion of the stack will be demolished using high-reach excavators (equipped with cracker/shear attachments).

DATA REQUEST

4. Please describe in detail the primary demolition method(s) for the power plant building (i.e. implosion, crane mounted impact hammer, wrecking ball, workers using hand held impact hammers, some combination of these methods, or other methods).

Response: The current plan for the demolition of the EPS power plant building is a combination of mechanical dismemberment and felling by controlled demolition methods. The turbine-generator deck will be demolished utilizing high reach excavators equipped with breakers, processors and shears. The excavators will work from the east, breaking down the deck and pedestals to slowly bring the turbine-generators to a lower elevation. Demolition of the ductwork will be performed utilizing high reach excavators, equipped with shears and grapples. The concrete walls of the boiler building will be demolished utilizing high reach excavators. High reach excavators will also be used to shear steel and remove elevated portions of the boilers. Boiler structure framing, steam and mud drums, preheaters, downcomers, etc., will be felled by severing the structural framing at key locations by mechanical or controlled implosion methods, enabling the structure to collapse on itself.

Any additional structures still standing will be brought to grade using high-reach machines. The material will be processed for removal off-site using hydraulic shears.

Grade will vary for the respective portions of the building. The intent is to leave in place the base foundation of the respective Units 1-5 powerblocks and the cooling water intake canals. Equipment and steel I-beam supports at these base elevations will be removed to the associated pedestals, as applicable. This base foundation will be either the surrounding grade of the plant, the elevation of which is 17 feet above mean sea level (msl); surrounding grade of the cooling water canals which is grade 10 feet above msl; Units 1-3 base foundation which is elevation 0 feet above msl; and Units 4-5 which is elevation (-14) feet below msl. Following completion of demolition to grade, these base foundations will be secured with safety railing and access to them will be restricted.

DATA REQUEST

5. Please provide copies of any separate emissions calculations, beyond the provided CalEEMod files, that correspond with the EPS demolition emissions estimate summarized in Appendix 5.1F.

Response: The only EPS demolition emission calculation not provided as part of the PTA was a manual calculation of the onsite paved surface travel emissions. This calculation method is discussed in Response 6d below. A copy of the spreadsheet containing this calculation is included in the enclosed compact disc.

DATA REQUEST

6. Please provide a discussion of the assumptions used to calculate the EPS demolition air quality emissions summarized in Appendix 5.1 F, and embedded in the CalEEMod program files used to calculate the air quality emissions. This should include at a minimum:

a. The off-road equipment assumptions, including the rationale for the number, type and size of the equipment selected (including whether CalEEMod default values were used), and the engine tier selected as a mitigation assumption.

b. The other mitigation measure assumptions used in the program and their assumed control efficiencies.

c. The basis for the vehicle trip distances used in the model for trip types not covered in the data request below.

d. The assumptions used for unpaved road dust emissions calculations.

e. The assumptions used to calculate the fugitive dust emissions from the stack and power plant building demolition work.

f. For the other fugitive dust emission sources, please identify the types of emissions sources included within the CalEEMod program and the basis for the emissions mitigation control efficiencies assumed.

Response:

a. The number and type of the equipment included in the EPS demolition air quality impact analysis were provided by a demolition subcontractor and are summarized in the PTA (Table 2-2-1 in the PTA). Based on the specific equipment type in question (i.e., dozer, grader, loader, etc.), the corresponding engine rating (hp) and load factor were based on CalEEMod model default values for each equipment type.

   Because the EPS demolition phase is expected to be the last phase of the Proposed Project, for the EPS demolition air quality impact analysis it was assumed that EPA Tier 4i and Tier 4 engines would be available for demolition equipment. EPA Tier 4 engines were assumed for the smaller equipment (engines rating less than 75 hp) and EPA Tier 4i engines were assumed for the larger equipment (engines rating equal to and greater than 75 hp).

b. The following fugitive dust mitigation measures were used as part of the CalEEMod model runs performed for the EPS demolition activities:

   - As a CalEEMod model input, the onsite vehicle speed limit was set to 15 miles per hour. As described in Appendix A of the CalEEMod model user guide,[1] the resulting onsite unpaved road travel PM_{10} emission control efficiency associated with this speed limit is based on mitigation measures described by SCAQMD. The SCAQMD lists an unpaved road travel PM_{10} emission control efficiency of 57% for this mitigation measure.[2]
   - For water application in active demolition areas (watered at least 3 times a day), the PM_{10} emission control efficiency is 61% in the CalEEMod model for activities such as debris loading and mechanical/explosive dismemberment of structures.
   - Paved roads within the demolition site will be cleaned at least once per day on days when demolition activities occur. The onsite paved road travel PM_{10} emission control efficiency was set to 9% as a CalEEMod model input based on control levels described by the SCAQMD.[3]

[1] Section 11.1, CalEEMod User Guide, Appendix A, CalEEMod User Guide and all the related documents are available at: http://www.caleemod.com/

[2] SCAQMD Mitigation Measures and Control Efficiencies, Fugitive Dust, Table XI-A

http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

[3] SCAQMD Mitigation Measures and Control Efficiencies, Fugitive Dust, Table XI-C

http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

c. Default CalEEMod model trip distances were used for worker, truck deliveries, and truck hauling offsite vehicle travel. These default round trip distances are 10.3 miles for workers, 7.3 miles for delivery trucks, and 20 miles for haul trucks.

d. No separate onsite unpaved surface vehicle travel fugitive dust emissions were calculated for the EPS demolition phase because the primary access road to the project site will be paved. However, onsite paved road travel emissions (including a fugitive dust component) were manually calculated. The on-site paved road travel emissions were manually calculated by multiplying the CalEEMod model calculated off-site travel emissions (which includes a fugitive dust component) by the ratio of the onsite paved road travel distance vs. offsite paved road travel distance (per vehicle category – workers, delivery trucks, haul trucks). For this calculation, an average onsite round-trip travel distance of approximately 1.08 miles was used.

e. The CalEEMod model was used to calculate fugitive dust emissions for the EPS demolition. This was done by selecting "demolition" as the activity category in the CalEEMod model input files and inputting the estimated type and number of demolition equipment on a month-by-month basis over the expected 22-month EPS demolition period. Based on these inputs, the CalEEMod model calculates the month-by-month fugitive dust emissions for demolition activities.

f. As described in the CalEEMod model user guide,[4] the activities that generate dust emissions during demolition are mechanical or explosive dismemberment of structures, site removal of debris (including loading activities), and onsite vehicle travel. The fugitive dust mitigation measures are discussed in Response 6b above.

DATA REQUEST

7. To confirm the heavy haul truck trip numbers and mileage estimate assumptions used in the emissions calculations, please provide the following:

   a. The total volume and weight of concrete/steel/other wastes generated from the demolition of the stack.

   b. The total volume and weight of concrete/steel/other wastes generated from the demolition of the power plant building.

   c. The types and quantities of stack/power plant building/other demolition wastes that would be recycled (tons) onsite.

   d. The types and quantities of stack/power plant building/other building/structure demolition wastes that would be recycled offsite, the amount shipped per load (tons/truckload), and the location where the recycled materials would be shipped (distance from site by type of material).

   e. The assumed quantity of the contaminated and uncontaminated soil wastes (tons), the amount shipped offsite (total tons), the amount shipped per load (tons/load), and the location where the soil wastes would be shipped (distance from site by type).

   f. The total amount of clean fill or other imported materials (such as aggregate, concrete or other material) that would be required to complete the EPS demolition.

Response:

a. The demolition of the EPS stack is expected to generate approximately 12,829 tons of concrete, 233 tons of scrap metal (including steel), and 45 tons of other debris.

[4] Section 4.4 of the CalEEMod User Guide, Appendix A.

b. The demolition of the EPS power plant building/other structures is expected to generate approximately 32,171 tons of concrete, 35,767 tons of scrap metal (including steel), and 2,955 tons of other debris.

c. The types and approximate quantities of the EPS stack/power plant building/other structures demolition waste expected to be recycled onsite are as follows: 10,263 tons of concrete (from EPS stack demolition), and 25,737 tons of concrete (from EPS power plant building/other structures).

d. The types and approximate quantities of the EPS stack/power plant building/other structures demolition waste expected to be recycled offsite are as follows: 2,566 tons of concrete (from EPS stack demolition), 233 tons of scrap metal (from EPS stack demolition), 6,434 tons of concrete (from EPS power plant building/other structures), and 35,767 tons of scrap metal (from EPS power plant building/other structures). The amount shipped per truck load will range from approximately 18 tons to 22 tons per load. As a general work practice, this material will typically be shipped to the construction/demolition material recycling center that is located nearest to the project site: for concrete, this would be Moody's Recycling located at 3210 Oceanside Blvd., Oceanside CA (approximately a 7-mile haul distance from project site); for scrap metal, this would be EDCO CDI Recycling located at 224 S. Las Posas Road, San Marcos CA (approximately a 10-mile haul distance from project site).

e. Currently the plan is to remove the EPS stack/ power plant building/other structures to grade and leave the foundations intact, as noted in Response 4. Therefore, there are no expected quantities of soil wastes (contaminated/uncontaminated) required to be shipped offsite as a result of EPS demolition activities.

f. Because the current plan is to maintain the foundations of the existing EPS stack/power plant building/other structures, there are no expected quantities of imported clean fill material required as part of EPS demolition activities.

BACKGROUND: CONSTRUCTION EMISSIONS ASSUMPTIONS

The May 2, 2014 Petition to Amend (PTA) request (TN 202287) does not provide clear information regarding the overlap for the construction of this project with the overlap for the Tank Demolition as proposed in another recent PTA request (TN 202267). Staff requires additional information to understand what is included in the emissions estimates of each of these amendment requests. Additionally, staff has a few questions about assumptions used in the CalEEMod emissions estimate performed for the Simple Cycle Amendment request and the emissions results shown in Appendix 5.1F.

DATA REQUEST

8. The fugitive dust particulate emissions estimate appears very low for a construction project. Please identify the following:

   a. Describe the site grading work that is done as part of the tank demolition work versus the site grading work that is done during the project construction as defined in this amendment request.

   b. Please describe the site access route and whether it is all paved or if a portion of the route, including on-road vehicle movement within the bermed area, is unpaved and describe how the emission for the paved and unpaved road transportation were estimated through the input assumptions used in the CalEEMod model.

   c. The reference sources for the silt content assumption used for unpaved road dust emissions calculations and the silt loading assumption for paved road dust calculations.

   d. The basis for the control assumption used for unpaved road dust emissions mitigation.

e. For other fugitive dust emission sources, please identify the types of emissions sources included within the CalEEMod program and the basis for the emissions mitigation control efficiencies assumed.

Response:

a. In the tank demolition/berm removal air quality analysis prepared as part of the Petition to Remove Obsolete Facilities to Support Construction of the Carlsbad Energy Center Project (PTR) and construction air quality analysis done as part of the PTA, grading is a general term used to describe soil work performed by equipment such as graders, scrapers, dozers, crawler tractors, and loaders. During the tank demolition/berm removal phase, this type of equipment will be used for tank demolition activities and as part of the berm removal process (where material from the berms are used to build up the area where the new gas turbine units will be constructed). During the project construction phase, the above equipment will be used to prepare laydown and/or worker parking areas, complete any finished grading required for the area where the gas turbines will be installed, and move material during excavation activities.

   For the 5-month tank demolition phase discussed as part of the PTR, the CalEEMod model phase type "Demolition" was selected (as shown in the PTR, Table 3.1-8). With this phase type selection, the CalEEMod model calculates dust emissions associated with various activities including mechanical dismemberment of structures, debris removal including loading activities, and on-road traffic.[5] For the 1-month berm removal phase, the CalEEMod model phase type "Grading" was selected (as shown in the PTR, Table 3.1-8). With this phase type selection, the CalEEMod model calculates dust emissions associated with various activities including grader, dozer operation, crawler tractor operation, and loader/loading activities.[6]

   For the 24-month project construction phase discussed as part of the PTA, the CalEEMod model phase type "Grading" was selected (as shown in the PTA, Table 5.1F-9). As discussed above, with this phase type selection the CalEEMod model calculated dust emissions associated with various construction equipment activities.

b. As described in Section 2.1.1 of the PTA, the primary construction access will be from the Cannon Road Service Center gate, west of the railroad tracks. Additional construction access will be from Carlsbad Boulevard, at an entrance just south of the EPS. These primary construction access roads will be paved. Other portions of the Amended CECP site are or will be paved to provide internal access to project facilities and site buildings. In addition, the construction worker parking and laydown areas will either be paved or have a gravel surface. For both the tank demolition/berm removal air quality impact analysis performed for the PTR and the Amended Project construction air quality impact analysis performed for the PTA, the onsite worker and delivery truck travel were assumed to occur on paved surfaces (workers traveling to and from parking areas, delivery trucks traveling to and from laydown areas).

   For the tank demolition/berm removal air quality analysis, a manual calculation was performed to calculate the onsite paved surface vehicle travel emissions (combustion and fugitive dust emissions). This was done by first calculating the ratio of the onsite paved surface vehicle trip distance (a round trip distance of approximately 1.08 miles was used) versus the CalEEMod model default offsite vehicle trip distances by vehicle type (default round trip distances of 10.3 miles for workers, 7.3 miles for delivery trucks, and 20 miles for hauling trucks). The offsite paved surface travel emissions per vehicle type (includes a fugitive dust component) calculated by the CalEEMod model were multiplied by these ratios to calculate onsite paved surface travel emissions. For the

[5] Section 4.4 of the CalEEMod User Guide, Appendix A.

[6] Section 4.3 of the CalEEMod User Guide, Appendix A.

Amended Project construction air quality impact analysis, the same manual approach was used to calculate onsite paved road vehicle travel emissions (combustion and fugitive dust emissions).

During the berm removal phase, there are expected to be a large number of onsite unpaved surface trucks hauling within the bermed area as material is removed from the berms and placed in fill areas. Therefore, a separate CalEEMod model run was performed for this unpaved surface haul truck travel activity. This model run assumed a one-way truck hauling distance of 300 feet (average distance from berms to fill areas), the number of these haul truck trips are shown during month 6 when berm removal activities are expected to occur (see PTR, Table 3.1-10), and the CalEEMod model travel mode was set to unpaved surface travel.

c. The CalEEMod model default silt content and silt loading values were used for the unpaved/paved surface travel emission calculations. As described in the CalEEMod model user guide (see Section 4.4.3), EPA AP-42 methods are used to calculate fugitive dust emissions for paved and unpaved road travel. The CalEEMod model defaults for silt content/silt loading are based on statewide averages; these values are as follows: silt content = 8.5% and silt loading of 0.1 g/m2.

d. Please see Response 6b above. These same fugitive dust control levels were also used as part of the CalEEMod model runs performed for the Amended CECP construction activities (unpaved road travel, paved road travel, material loading, grading, and dozer/crawler tractor operation).

e. Please see Response 8a above for the approach used to calculate fugitive dust emissions during the Amended CECP construction phase and Responses 6b and 8d above regarding fugitive dust mitigation measures.

DATA REQUEST

9. Please provide a discussion of the exhaust emission source assumptions used to calculate the air quality emissions summarized in Appendix 5.1F and embedded in the CaIEEMod program files used to calculate the air quality emissions. This should include at a minimum:

   a. The off-road equipment assumptions, including the rationale for the number, type and size of the equipment selected, and the engine tier selected as a mitigation assumption.

   b. For on-road vehicle assumptions, the mitigation assumptions used in the program and the basis for the trip distances used in the model.

Response:

a. The number, type, and engine rating of the equipment included in the PTA air quality construction impact analysis were based on representative similar projects, including the CECP PEAR and two similar LMS 100s based projects licensed by the CEC – Walnut Creek (consisting of five LMS 100s) and Pio Pico (consisting of three LMS 100s). The month-by-month construction equipment numbers/types for the PTA were scaled (based on number of gas turbines associated with each project) from the month-by-month construction equipment inventories found in the AFCs for these representative projects.

The CalEEMod model default engine load factors were used for the construction emission calculations (a function of the type of construction equipment in question). Because construction activities will occur earlier in the overall construction/demolition schedule, and due to the large number of different type/size equipment (both factors impact the availability of Tier 4 engines), it was assumed for the construction air quality analysis that EPA Tier 3 engines would be used for the larger equipment (engines equal to greater than 75 hp) and EPA Tier 4i engines for smaller equipment (engines <75 hp).

b. For on-road vehicle emissions, no additional mitigation assumptions were used in the analysis. The same default CalEEMod model trip distances for workers, delivery trucks, and haul trucks discussed

in Response 6c above were used to calculate on-road vehicle emissions during construction activities.

DATA REQUEST

10. Table 5.1F-4 on page 5.1F-5 in Appendix 5.1 provides erroneous daily emissions totals. The modeling files appear to use the correct daily values. Please provide a correction to table to confirm the proper daily emissions values.

Response: The reference to daily emissions (lbs/day) on Table 5.1F-4 need to be changed to annual emissions (tons/yr). This is a change only to the titles on the table and none of the numbers listed on this table need to be corrected. The revised Table 5.1F-4R1 is included in Attachment DR10-1.

BACKGROUND: OPERATION EMISSIONS ASSUMPTIONS

Essentially all of the major equipment items related to the CECP, including the gas turbine functional type, are changed in the PTA request. Staff requires the following data requests to be answered to fully understand and evaluate the operation air quality emissions estimate for the revised CECP project.

DATA REQUEST

11. Please describe why the emissions calculations for the new natural gas compressor use Table 2-4 from the cited 1995 USEPA reference, which doesn't have a specific component category for compressor seals, rather than Tables 2-1 or 2-2 that do have specific emissions factors for compressor seals. Please also note any specific design or maintenance assumptions that would reduce the emissions from the piping components associated with the compressor.

Response: The “other” VOC emission factor contained in Table 2-4 of the referenced 1995 EPA document was used to calculate fugitive VOC emissions for the Amended CECP gas compressors. As denoted by footnote c to Table 2-4, the “other” VOC emission factor includes emissions from gas compressors. This emission factor was used because it is based on gas components at oil/gas production facilities which were considered more representative of the natural gas system components found at a power plant, compared to components found at a synthetic organic chemical manufacturing facility (Table 2-1) or a petroleum refinery (Table 2-2). While typical industry best practices will be followed for the design/maintenance of the Amended CECP natural gas system, no corresponding reduction in fugitive VOC emissions was assumed for the use of these measures.

DATA REQUEST

12. Staff has compared the hourly emissions estimates for the LMS100 gas turbines, by operating mode, that are provided in the amendment request with the estimate that was prepared and approved for the Pio Pico project (11-AFC-1). There are a few differences, most minor, between these estimates. We have the following questions, in addition to those posed by the San Diego Air Pollution Control District, regarding these differences:

    a. The hourly normal operating emissions for all pollutants, other than particulate emissions, are roughly just under ten percent higher than those proposed for the Pio Pico project even though the Best Available Control Technology (BACT) concentration limits and fuel sulfur assumptions are the same as those used for Pio Pico. Is this difference due to the difference in heat input assumed, which is essentially the same amount higher than assumed for Pio Pico, and why would what look to be essentially identical LMS100PA gas turbines have 100 percent load heat input rates that are so different?

    b. In regards to the question above, is the increase in heat input and gross generator output meant to compensate for the reductions in efficiency due to the use of a fin-fan air cooler as the primary heat rejection unit rather than a cooling tower as proposed for Pio Pico?

c. While the amount of heat input is higher in comparison to Pio Pico, the amount of water assumed to be used for NOx control is notably lower than that assumed for Pio Pico with the same assumed pre-selective catalytic reduction control concentration. Can you please identify why less water is needed for NOx control, such as whether this is due to recent improvements in the gas turbine burner design?

d. Please confirm that this amendment proposes use of the latest LMS100 gas turbine model and confirm that you do not intend on revising the LMS100 gas turbine model or specifications prior to completing the amendment review process.

Response:

a. The maximum heat input and corresponding hourly emission rates for the proposed LMS 100 gas turbines were based on performance data provided by GE (see PTA, Appendix 5.1B, Table 5.1B-2). This represents the most current information available from GE for the latest version of the LMS 100 PA gas turbine and accounts for specific project specifications (i.e., ambient site conditions, site fuel characteristics, intercooler design, etc.). The Project Owner sees little benefit in examining older specifications for the LMS 100 units associated with the Pio Pico Project – a project approved nearly two years ago based on equipment information that may have been obtained/filed as early as 2011 when the Pio Pico Project Application for Certification (AFC) was submitted to the CEC.

b. The gas turbine maximum heat input/gross power output are strictly a reflection of recent information provided by GE for the latest version of the LMS 100 PA and were not adjusted for the type of intercooler selected for the Proposed Project.

c. As with heat input/power output, the water use for NOx control was provided by GE for the latest version of the LMS 100 PA gas turbine. The Project Owner sees little benefit in examining older specifications (including NOx control water use) for the LMS 100 units associated with the Pio Pico Project.

d. As discussed in Response 12a, the LMS 100 heat input/power output data for the units proposed for the Amended CECP are based on the most current data available from GE for the latest version of the LMS 100 PA gas turbine. While the Project Owner currently does not foresee a need to revise the LMS 100 PA specifications provided by GE for the Amended CECP, if GE were to notify the Project Owner that a revision was necessary during the amendment review process, this revised information would be submitted to the CEC in a timely manner.

BACKGROUND: AIR DISPERSION MODELING BASE HEIGHT ASSUMPTIONS

Staff has questions regarding the base height used for construction emissions modeling and the change in base height used for the operations emissions modeling. The base height for the on-site construction emission sources was assumed to be between approximately 14.6 and 15.6 meters, depending on the source location. This is well above the base height of where most of the construction would occur within the existing tank area. In addition to this, a release height of 6 meters has been assumed for the modeled emissions sources, which staff agrees is reasonable for the off-road equipment that have thermally buoyant plumes, but not for the fugitive dust emission sources. The base height during operations has been raised by approximately 4.5 feet in for the amended project (10.52 meters versus 9.144) without providing rationale for this change. Staff needs additional information from the Project Owner to confirm the assumptions used in the construction and operation modeling analyses.

DATA REQUEST

13. Please explain the basis for the construction emission source base height assumptions and provide rationale why, considering the elevated source release height, the base height should not be reduced to the same base height used for the operation emission sources.

Response: The base elevation used for the construction air quality modeling analysis was based on National Elevation Data (NED) for the project site. To be consistent with the air quality modeling performed for operational impacts, the base elevation used for the construction air quality modeling analysis should be lowered to approximately 10.52 meters. Once the various construction/demolition emission calculation issues identified in the above data requests are resolved, the Project Owner will revise the construction air quality modeling analysis using a base elevation of 10.52 meters.

DATA REQUEST

14. Please provide compelling rationale for why the 6-meter release height, in addition to the elevated base height, for the non-thermally buoyant construction fugitive dust emissions sources, is a valid assumption.

Response: To model the impacts from mechanically generated dust emissions from construction equipment, the volumetric source release height needs to account for the vertical velocity caused by activities such as soil leveling by a dozer. In addition, for activities by equipment such as backhoes/loaders/excavators the volumetric source release height needs to account for dumping onto elevated locations such as storage piles or dump trucks. A typical reach distance for a loader is approximately 17 ft (5.2 meters)[7] and the typical reach distance for a backhoe is approximately 20 ft (6.1 meters).[8] This, along with the vertical component of the dust plume when a bucket dumps material, could easily result in dust plume heights justifying a volumetric source release height of 6 meters.

Finally, a volumetric source 6 meter release height for modeling the impacts from construction mechanically generated dust has been used for a number of power plant projects reviewed and approved by the CEC. Listed below are some of these power plant projects.

- Lodi Energy Center (Commission Approval April 2010)[9]
- Ivanpah Solar Electric Generating System (Commission Approval September 2010)[10]
- Almond 2 Power Plant Project (Commission Approval December 2010)[11]

Therefore, both technical data and recent CEC precedent support the use of a 6-meter release height for mechanically generated dust.

DATA REQUEST

15. Please indicate why all fugitive dust emissions were modeled with a 6-meter release height even though the Project Owner's modeling protocol notes that the wind erosion dust emissions would be modeled with a release height of 0.5 meters.

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[7] For example, a Caterpillar Model 924 loader has a bucket reach height of 16.6 feet (http://www.cat.com/equipment).

[8] For example, a Caterpillar Model 430F backhoe has a bucket reach of 20 feet (http://www.cat.com/equipment).

[9] CEC Staff Assessment (October 2009), Air Quality Table 15, cites "AFC Appendix 5.1E Table 5.1E-4." The September 10, 2008 AFC for the Lodi Energy Center (08-AFC-10), Air Quality Appendix 5.1A, Section 5.1E (Construction Emissions and Impact Analysis), Docket Number TN47973, states that "The exhaust and construction dust emissions were modeled as volume sources with a vertical dimension of 6 meters."

[10] CEC Final Staff Assessment (October 2009), Air Quality Table 9, cites "CH2ML 2008h" which is May 9, 2008 Data Responses Set 1D (Docket Number TN46239). The modeling analysis in this set of data responses uses the same approach as in the AFC for the project. The August 31, 2007 AFC for the Ivanpah Solar Electric Generating System (07-AFC-05), Air Quality Appendix 5.1F, Section 5.1F.5.2 (Dispersion Model), Docket Number TN42174, states "The exhaust and construction dust emissions were modeled as volume sources. The windblown dust emissions were modeled as area sources. For the volume sources, the vertical dimension was set to 6 meters."

[11] CEC Revised Staff Assessment (July 2010), Air Quality Table 15, cites "AFC Appendix 5.1E Table 5.1E-7." The May 8, 2009 AFC for the Almond 2 Power Plant Project (09-AFC-02), Air Quality Appendix 5.1, Section 5.1E (Construction Emissions and Impact Analysis), Subsection Analysis of Ambient Impacts from Onsite Construction, Docket Number TN51502, states "The exhaust and construction dust emissions were modeled as volume sources with a vertical dimension of 6 meters."

Response: The 6-meter release height was used for construction/demolition air quality modeling because the fugitive dust emissions during these project phases are associated with mechanical activities. As discussed above, fugitive particulate emissions were calculated for those sources contained in the CalEEMod model, and include dust generated from active disturbance of soil from such activities as site grading, dozer/crawler tractor operation, loader operation, building demolition, truck loading, and vehicles traveling along roadways. As noted in the CalEEMod model User's Guide, "Fugitive dust from wind-blown sources such as storage piles are not quantified in CalEEMod, which is consistent with approaches taken in other comprehensive models."[12] The construction/demolition phases of the project are not expected to entail significant areas of open storage piles and/or untreated disturbed areas. Any temporary piles or other temporarily disturbed areas will be subject to best management practices, which will require that these areas be covered or otherwise stabilized when not in use. For this reason, loose soil is not a substantial characteristic for the project, and exclusion of wind-blown fugitive dust from construction/demolition emission calculations is a reasonable and consistent application of current emission calculation methodology.

DATA REQUEST

16. Please describe if the increase in the assumed base height for the operation emission sources would be completed by using the internal tank berm materials, imported fill, or a combination of the two, and describe how the work necessary to create this increase in base height was included in the construction emissions estimate (equipment use, truck trips, fugitive dust emissions).

Response: The increase in the base height of the area where the new units will be installed is due to material fill associated with the berm removal process. The emission estimates (combustion/fugitive dust) for the berm removal process were analyzed as part of the PTR (PTR, Appendix 3.1, Table 3.1-2). Also refer to the responses to Data Request 8 with regards to the berm removal process.

BACKGROUND: CONDITIONS OF CERTIFICATION

Section 5.1.8 of the PTA request notes that the District's new Determination of Compliance (DOC) is needed to determine appropriate changes to the air quality conditions of certification. Staff agrees this is true for the District's DOC conditions, but there are also ten staff conditions of certification that do not require the new DOC for review, some of which clearly require editing. Other sections in the Amendment Request provide Project Owner-proposed edits to staff conditions of certification, and staff would like the Project Owner to provide their requested edits, including deletions or additions, to the staff air quality Conditions of Certification.

DATA REQUEST

17. Please provide proposed redline and strikeout edits to staff Conditions of Certification AQ-SC1 through AQ-SC10.

Response: Enclosed as Attachment DR17-1 are proposed changes to the Approved CECP air quality Conditions of Certifications (COCs) AQ-SC1 to AQ-SC10. Please note that COCs AQ-SC1 through AQ-SC9 were revised to refer to both construction and demolition activities with regards to dust and Diesel equipment mitigation measures. In addition, AQ-SC9 was deleted because the air quality analysis in the PTA (PTA, Section 5.1.4.3.2) includes the commissioning of all six new gas turbines simultaneously. Therefore, it is no longer necessary to limit commissioning activities to one gas turbine at a time. Finally, AQ-SC10 was deleted because the air quality analysis in the PTA shows a net decrease in VOC and $PM_{10}/PM_{2.5}$ emissions when the

[12] CalEEMod User's Guide, Version 2013.2, Prepared for: California Air Pollution Control Officers Association (CAPCOA), Prepared by ENVIRON International Corporation and the California Air Districts, July 2013, p. 3. Available at: http://www.aqmd.gov/caleemod/doc/UsersGuide.pdf.

Amended CECP emissions are compared to baseline emissions for the existing EPS boilers (PTA, Table 5.1-25). Consequently, it is no longer necessary for additional mitigation for VOC and/or $PM_{10}/PM_{2.5}$ emissions.

BACKGROUND: GREENHOUSE GAS EMISSIONS ESTIMATE ASSUMPTIONS

Staff has questions about the existing project and amended project GHG emissions comparison provided in the PTA request (Table 5.1-40). We need additional information to compare the GHG emissions efficiency.

DATA REQUEST

18. Please provide an estimate of the amount of net electricity generation in megawatt-hours or gigawatt-hours (MWh or GWh) that corresponds with the GHG emissions values presented in Table 5.1-40, including the assumptions and calculation used to determine each of those electricity generation totals.

Response: The detailed GHG emission calculations for the Amended CECP are shown in the PTA (see PTA, Appendix B.1, Table 5.1B-19). As shown by these calculations, the maximum expected annual GHG emissions for the project are approximately 846,574 MT CO2e with a corresponding maximum annual gross output of 1,763,159 MW-hr[13]. Using this same assumption regarding 2,700 hrs/year of full load operation along with the total plant net output of 632 MW (see PTA, page 3-1), the corresponding annual net output is approximately 1,706,400 MW-hr.

BACKGROUND: PROJECT AIR QUALITY/GHG RELATED CORRESPONDENCE

Staff is aware that there may be a considerable amount of correspondence, including large data submittals, between the Project Owner and the San Diego Air Pollution Control District (District) to support the District's air quality permit application review. Also, there is the potential for project-related correspondence with state or federal air quality agencies. Staff needs to stay informed about this correspondence in order to make sure our review is consistent with the review of the District and to understand, in a timely manner, any issues that arise from this correspondence.

DATA REQUEST

19. Please provide (Docket) copies of all project-related correspondence with all local, State and federal air quality agencies within 5 days of receipt or submittal.

Response: The Project Owner has docketed and will continue to docket with the CEC copies of project-related correspondences with all local, State and federal air quality agencies within 5 days of receipt or submittal thereof.

[13] Based on maximum gross output of 108.8 MW per unit, 2,700 hrs/year full load operation per unit, total for 6 units.

Attachment DR10-1
Revised Table 5.1F-4

Table 5.1F-4R1 (Revised 8/11/14)
Construction of Amended CECP - Modeled Emissions, Long-Term Impacts

Long-Term Impacts (annual)					
Annual Number of Work Days, Rolling 12-month period (days/yr)			262		
Daily working hours (hrs/day)			8		
	NOx	CO	SOx	PM10	PM2.5
TOTAL					
Off Road Equipment and On-site Vehicle (Combustion) (~~lbs/day~~ **tons/yr**)	10.55	12.94	0.02	0.49	0.49
Off Road Equipment and On-site Vehicle (Combustion) (lbs/hr)	10.06	12.35	0.02	0.47	0.47
Off Road Equipment and On-site Vehicle (Combustion) (g/sec)	1.27	1.56	0.003	0.06	0.06
Construction and On-site Vehicle (Fugitive Dust) (~~lbs/day~~ **tons/yr**)				0.35	0.18
Construction and On-site Vehicle (Fugitive Dust) (lbs/hr)				0.33	0.17
Construction and On-site Vehicle (Fugitive Dust) (g/sec)				0.04	0.02

Attachment DR1-17
Markup Licensed CECP Air Quality COCs AQ-SC1 to AQ-SC10
(changes shown in strikethrough/underline format)

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with conditions **AQ-SC3**, **AQ-SC4**, and **AQ-SC5** for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and AQCMM Delegates shall have full access to all areas of construction**/demolition** on the project site and linear facilities and shall have the authority to stop any or all construction**/demolition** activities as warranted by applicable construction**/demolition** mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the Compliance Project Manager (CPM).

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit to the CPM for approval, the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM Delegates. The AQCMM and all Delegates must be approved by the CPM before the start of ground disturbance.

AQ-SC2 Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with conditions **AQ-SC3, AQ-SC4, and AQ-SC5**.

Verification: At least 60 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the CPM for approval. The CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt. The AQCMP must be approved by the CPM before the start of ground disturbance.

AQ-SC3 Construction**/Demolition** Fugitive Dust Control: The AQCMM shall submit documentation to the CPM in each Monthly Compliance Report (MCR) that demonstrates compliance with the following mitigation measures for the purposes of preventing all fugitive dust plumes from leaving the project site and linear facility routes. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

A. All unpaved roads and disturbed areas in the project and laydown construction sites shall be watered as frequently as necessary to comply with the dust mitigation objectives of AQ-SC4. The frequency of watering may be reduced or eliminated during periods of precipitation.

B. No vehicle shall exceed 10 miles per hour on unpaved areas within the project and laydown construction**/demolition** sites.

C. The construction**/demolition** site entrances shall be posted with visible speed limit signs.

D. All construction**/demolition** equipment vehicle tires shall be inspected and washed as necessary to be cleaned and free of dirt prior to entering paved roadways.

E. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

F. All unpaved exits from the construction**/demolition** site shall be graveled or treated to prevent track-out to public roadways.

G. All construction**/demolition** vehicles shall enter the construction**/demolition** site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the CPM.

H. Construction**/demolition** areas adjacent to any paved roadway shall be provided with sandbags or other measures as specified in the Storm Water Pollution Prevention Plan (SWPPP) to prevent runoff to roadways.

I. All paved roads within the construction**/demolition** site shall be swept at least twice daily (or less during periods of precipitation) on days when construction**/demolition** activity occurs to prevent the accumulation of dirt and debris.

J. At least the first 500 feet of any public roadway exiting the construction**/demolition** site shall be swept visually clean, using wet sweepers or air filtered dry vacuum sweepers, at least twice daily (or less during periods of precipitation) on days when construction**/demolition** activity occurs or on any other day when dirt or runoff from the construction**/demolition** site is visible on the public roadways.

K. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered or shall be treated with appropriate dust suppressant compounds.

L. All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions shall be provided with a cover or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least two feet of freeboard.

M. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction**/demolition** areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

N. Disturbed areas will be re-vegetated as soon as practical.

The fugitive dust requirements listed in this condition may be replaced with as stringent or more stringent methods as required by SDAPCD Rule 55.

Verification: The project owner shall include in the MCR (1) a summary of all actions taken to maintain compliance with this condition, (2) copies of any complaints filed with the air

district in relation to project construction**/demolition**, and (3) any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC4 Dust Plume Response Requirement: The AQCMM or Delegate shall monitor all construction**/demolition** activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (1) off the project site or (2) 200 feet beyond the centerline of the construction of linear facilities, (3) within 100 feet upwind of any regularly occupied structures not owned by the project owner, or (4) within 50 feet upwind of the I-5 freeway indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes, other than those occurring upwind of the I-5 Freeway, are observed:

Step 1: The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if Step 1 specified above fails to result in adequate mitigation within 30 minutes of the original determination.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if Step 2 specified above fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shut-down source. The owner/operator may appeal to the CPM any directive from the AQCMM or Delegate to shut down an activity, provided that the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM before that time.

The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes occurring upwind of the I-5 Freeway are observed:

Step 1: The AQCMM or Delegate shall immediately cease the activities causing the visible dust plumes if any obscuration of visibility is occurring to drivers on the I-5 freeway. The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods immediately if the visible plumes are seen within 50 feet of the I-5 freeway but are not causing obscuration of visibility to drivers.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression and monitor the start-up and/or continuation of the dust causing activities to ensure that the additional mitigation is effective.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if Step 2 specified above fails to result in effective mitigation. The activity shall not restart until the AQCMM or Delegate is satisfied

that appropriate additional mitigation or other site conditions have changed so that visual dust plumes that could impact visibility on the I-5 Freeway will not occur upon restarting the shut-down source.

Verification: The AQCMP shall include a section detailing how the additional mitigation measures will be accomplished within the time limits or directions specified.

AQ-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM, in the Monthly Compliance Report, a construction/**demolition** mitigation report that demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction/**demolition**-related emissions. The following off-road diesel construction/**demolition** equipment mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by AQ-SC2, and any deviation from the AQCMP mitigation measures shall require prior CPM notification and approval.

a. All diesel-fueled engines used in the construction/**demolition** of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine meets the conditions set forth herein.

b. All construction/**demolition** diesel engines with a rating of 50 hp or higher shall meet, at a minimum, the Tier ~~3~~ **4 or 4i** California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good faith effort to the satisfaction of the CPM that is certified by the on- site AQCMM demonstrates that such engine is not available for a particular item of equipment. In the event that a Tier ~~3~~ **4 or 4i** engine is not available for any off-road equipment larger than 50 hp, that equipment shall be equipped with a Tier ~~2~~ **3** engine, or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier ~~2~~ **3** levels unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is "not practical" for the following, as well as other, reasons.

1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier ~~2~~ **3** equivalent emission levels and the highest level of available control using retrofit or Tier ~~1~~ **2** engines is being used for the engine in question; or

2. The construction/**demolition** equipment is intended to be on site for 10 days or less.

3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not practical.

c. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and that a replacement for the equipment item in question meeting the controls required in item "b" occurs within 10 days of termination of the use, if the equipment would be needed to continue working at this site for more than 15 days after the use of the retrofit control device is terminated, if one of the following conditions exists:

1. The use of the retrofit control device is excessively reducing the normal availability of the construction**/demolition** equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.

2. The retrofit control device is causing or is reasonably expected to cause engine damage.

3. The retrofit control device is causing or is reasonably expected to cause a substantial risk to workers or the public.

4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.

d. All heavy earth-moving equipment and heavy duty construction**/demolition** - related trucks with engines meeting the requirements of (b) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

e. All diesel heavy construction**/demolition** equipment shall not idle for more than five minutes. Vehicles that need to idle as part of their normal operation (such as concrete trucks) are exempted from this requirement.

f. Construction**/demolition** equipment will employ electric motors when feasible.

Verification: The AQCMM shall include in the Monthly Compliance Report the following to demonstrate control of diesel construction**/demolition**-related emissions:

A. A summary of all actions taken to control diesel construction**/demolition** related emissions;

B. A list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained; and

C. Any other documentation deemed necessary by the CPM, and the AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC6 The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. EPA, and any revised permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any proposed air permit modification to the CPM within five working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

AQ-SC7 The project owner shall not conduct any on-site remediation of contaminated soils at the project site, other than removal and transport.

Verification: The project owner shall provide transportation and disposition records of the contaminated soil removal and offsite remediation completion demonstrating compliance with this condition as part of the MCR until the contaminated soil removal is complete.

AQ-SC8 The project owner shall submit to the CPM Quarterly Operation Reports, following the end of each calendar quarter that include operational and emissions information as necessary to demonstrate compliance with the Conditions of Certification herein. The Quarterly Operation Report will specifically note or highlight incidences of noncompliance.

Verification: The project owner shall submit the Quarterly Operation Reports to the CPM and District, if requested by the District, no later than 30 days following the end of each calendar quarter.

~~**AQ-SC9** Only one combustion turbine shall undergo commissioning at a time.~~

~~**Verification:** The project owner shall provide the CPM CEMS data demonstrating compliance with this condition as part of the monthly commissioning status report (**AQ-80**).~~

~~**AQ-SC10** The project owner shall provide emission reduction mitigation to offset the project's PM (based on PM2.5) and VOC emission increases at a ratio of 1:1. These emission reductions are based on the following maximum annual emissions for the facility (tons/yr).~~

~~**Emission Reduction Credits/Pollutant**~~	~~**Tons/Yr**~~
~~PM10~~	~~7.6~~
~~VOC~~	~~8.4~~
~~Total Tons~~	~~16.0~~

~~Emission reductions can be provided using any one of the following methods in the following order of preference of their use:~~

1. ~~Additional enforceable emission reductions created at the Encina Power Station site, such as the permanent shutdown of the Encina gas turbine peaker.~~

2. ~~The project owner can fund enforceable emission reductions through the Carl Moyer Fund in the amount of $16,000/ton, or the applicable ARB Carl Moyer Program Guideline cost effectiveness cap value at the time of funding the emission reductions, for the total ton quantity listed in the above table, minus any tons offset using the other two listed methods, with an additional 20 percent administration fee to fund the SDAPCD and/or other responsible local agencies with jurisdiction within 25 miles of the project site to be used to find and fund local emission reduction projects to the extent feasible. Emission reduction projects funded by this method will be weighted for evaluation and selection, within the funding guideline value of $16,000/ton of reduction, or revised current funding guideline limit value, based on the proximity of the emission reduction project and the relative health benefit to the local community surrounding the project site. Emission reduction project cost will not be a consideration for selection as long as the emission reduction project is within the approved 2008, or later year as applicable, Carl Moyer funding guideline value,~~

3. ~~The project owner can fund other existing public agency regulated stationary or mobile source emission reduction programs or create a project specific fund to be administered through the SDAPCD or other local agency, which would provide enforceable surplus emission reductions. This funding shall include appropriate administrative fees as determined by the administering agency to obtain local emission reductions to the extent feasible. The project owner shall be responsible for demonstrating that the amount of such funding meets the emission reduction requirements of this condition. Emission reduction projects funding by this method will be weighted for evaluation and selection based on the proximity of the emission reduction project and the relative health benefit to the local community surrounding the project site.~~

4. ~~2.9 tons of PM10 ERCs currently owned by the applicant can be used to partially offset the PM emissions increase.~~

5. ~~ERC certificates from other emission reductions occurring in the San Diego Air Basin can be purchased and used to offset each pollutant on a 1:1 offset ratio basis only if local emission reduction projects are clearly demonstrated to be unavailable using methods 1 to 3 to meet the total emission reduction burden required by this condition. ERCs can be used on an interpollutant basis for SOX for PM10 and NOX for VOC, where the project owner will provide a letter from the SDAPCD that indicates the District's allowed interpollutant offset ratio, or PM10 for SOX ERCs can be used on a 1:1 basis.~~

~~Carl Moyer or other emission reduction funding shall be provided to the responsible agencies prior to the initiation of on-site construction activities. The project owner shall work with the appropriate agencies to target emission reduction projects in the project area to the extent feasible. Emission reduction project selection information will be provided to the CPM for review and comment. Unused administrative fees shall be used for additional emission reduction program funding. ERC certificates, if used, will be surrendered prior to first turbine fire.~~

Verification: ~~The project owner shall submit to the CPM confirmation that the appropriate quantity of Carl Moyer Project or other emission reduction program funding and/or ERCs have been provided prior to initiation of on-site construction activities for emission reduction program funding and at least 30 days prior to turbine first fire for ERCs. The project owner shall provide emission reduction project selection information to the CPM for review and approval at least 15 days prior to committing funds to each selected emission reduction project. The project owner shall provide confirmation that the level of emission reduction program funding will meet the emission reduction requirements of this condition.~~

Traffic and Transportation (20)

BACKGROUND: THERMAL PLUME DATA

The PTA request would change the turbine type and the air-cooled heat rejection unit number and sizes. While these changes clearly do not create a potential for visible water vapor plume impacts, staff does require additional information for the fin-fan coolers to assess the amended project's potential for thermal plume impacts.

DATA REQUEST

20. Please identify the following parameters for a single fin-fan cooler:

    a. Heat rejection (MW/hr)

    b. Air flow (kg/hr)

    c. Temperate increase (°C)

    d. Surface area of the exhaust (m^2)

    e. Average exhaust velocity (m/sec)

Response: The following summary of the requested information was provided by GE for the fin-fan intercooler and lube oil coolers equipped on each gas turbine unit**.**

TABLE DR20-1
Exhaust Information for Intercoolers and Lube Oil Coolers

Fin-Fan Intercooler (these are totals for the six bays of the cooler)	
Heat rejection (MW/hr)	41.2
Air flow (kg/hr)	8,672,832
Temperate increase (°C)	17.0
Surface area of the exhaust (m2)	535.1
Average exhaust velocity (m/sec)	4.1
Lube Oil Fin-Fan Cooler - Synthetic Lube Oil	
Heat rejection (MW/hr)	0.1
Air flow (kg/hr)	48,288
Temperate increase (°C)	9.6
Surface area of the exhaust (m2)	34.0
Average exhaust velocity (m/sec)	2.1
Lube Oil Fin-Fan Cooler - Mineral Lube Oil	
Heat rejection (MW/hr)	1.2
Air flow (kg/hr)	221,248
Temperate increase (°C)	19.9
Surface area of the exhaust (m2)	34.0
Average exhaust velocity (m/sec)	2.1

Transmission System Engineering (21–30)

BACKGROUND: ONE-LINE DIAGRAMS

The Petition to Amend (PTA) does not include complete electrical one-line diagrams of the four 230/13.8kV and two 138/13,8 kV CECP switchyards, the Encina "Cannon" 230 kV Substation (pre and post-project) , the SDG&E Encina 138 kV and 230 kV switchyards, and details of 230 kV and 138 kV generation tie lines (PTA, sections 3.1and 3.2, pages 3-1 to 3-4).

DATA REQUEST

21. Provide a complete electrical one-line diagram (or resubmit Figure 2.1-2 with size/ratings of the applicable equipment and/or missing elements) of the four proposed CECP 230 /13.8 kV switchyards, one for each of the proposed CTG Units 6, 7, 8 and 9, and also for the two proposed 138/13.8 kV switchyards for CTG Units 10 & 11. The diagrams should show all equipment for the interconnection facilities within the switchyards including sizes and/or ratings as follows:

    a. Generator ratings in MVA, Voltage and maximum MW output capability with power factor;

    b. Any bus duct connectors, overhead conductors or cables between the generator units and the 13.8/15 kV switchgear buses, breakers and disconnect switches on the low side of each generator step-up transformer (GSU);

    c. The GSU transformer with ratings and percentage impedance of the GSU transformers based on the base MVA ratings;

    d. Any short overhead conductors/cables from the high side of the GSU transformer to the respective switchyard 230 kV/138 kV buses

    e. Configuration of the 230 kV and 138 kV switchyards, including breakers, disconnect switches and proposed generator (gen) tie line outlets.

Response: An updated one line diagram is provided with the requested information, Figure DR21-1. The maximum generated output of the generator @PF 0.85 is 131.8MW. The generator will be limited by combustion turbine and the site conditions as shown in Appendix 5.1B – Detailed Emission Calculations - Table 5.1B-2 GE Performance Runs in the PTA.

DATA REQUEST

22. Provide a clear leveled physical layout drawing of the CECP 230/13.8 kV and 138/13.8 kV switchyards showing all major equipment (generators, buses, transformers, breakers, buses and disconnect switches etc.) and transmission line outlet(s).

Response: The physical layout of the generator and transformer for the 230kV switchyard are provided in Figure DR22-1. The physical layout of the breaker, switches and 230kV takeoff structures are provided in Figure DR22-2. The same equipment for the 138kV switchyard will be substantially similar to that depicted in Figures DR22-1 and DR 22-2.

BACKGROUND: GENERATOR TIE LINE

The submitted generator (gen) tie line routes description and diagrams in the PTA are incomplete and are not distinct (PTA, Figures 2.0-land 2.2 -2).

DATA REQUEST

23. Please provide a discussion and drawing of the physical layout showing distinctly (in a larger scale) the preferred route(s) (along any road, land, transmission line or power station) of the following overhead and underground gen tie lines including their right of way (ROW) width(s) between the proposed Amended CECP 138/230 kV switchyards and SDG&E 138/230 kV Encina Power Station (EPS) switchyards. Describe whether the ROW would be through private and/or public lands (including land west of the railroad tracks following demolition activities sought by the Petitioner in the PTA).

    i. The two, 200 foot-long 138 kV overhead gen tie lines between the proposed CECP 138 kV switchyards for CTG Units 10 & 11 and the existing SDG&E EPS 138 kV switchyard.

    ii. The 4,000 foot-long 230 kV gen tie line between the proposed 230 kV switchyards for CTG Units 6, 7, 8 & 9 and a dead-end pole near the northeast corner of the existing EPS 138 kV switchyard, to where the transmission line transitions into an underground (UG) line to maintain electrical clearance.

    iii. The proposed 230 kV UG cable line between the above dead-end overhead pole and the existing EPS 230 kV switchyard.

Response: As requested, Project Owner provides an enlarged transmission line depiction that is split into 2 segments, which are shown on Figures DR23-1 and DR23-2. Project Owner will own the transmission lines and structures between the Amended CECP facility and SDG&E's switchyards. As depicted in the accompanying Figures, the Amended Project will not include construction of a new switchyard. Power will be transmitted to the applicable SDG&E switchyard in the manner described below. All land over which these lines will pass is and will continue to be owned by private parties. Any future right of way that Project Owner determines is necessary for these lines will be at least 125 feet wide, depending upon spatial constraints at the Project site.

Description of each line segment.

i. As depicted in Figure DR22-1, the 138kV overhead transmission line will start at the takeoff structure at Units 10 and 11 heading east, and will intersect with the 138kV/230kV double dead-end pole located at the top of the adjacent berm. The 138kV transmission line will then continue south another 200 ft until it turns west. The line will continue west approximately 850 feet until it reaches a 138kV/230kV double circuit structure, where the line will then turn west by northwest. The overhead line travels to a 138kV/230kV double dead-end structure located outside of the north east corner of the SDG&E 138kV/230kV switchyard. From there, the 138kV overhead transmission line will continue to bay position 1 in the 138kV SDG&E switchyard.

ii. The 230 kV transmission line will start from the takeoff structure at units 6 and 7 and will run east to the adjacent 230kV dead-end pole situated on top of the berm. This 230kV line will continue south until it intersects with a dead-end pole located on top of the berm east of units 8 and 9. This pole will also receive transmission lines from units 8 and 9. The 230kV transmission line will continue south until it intersects with the 138/230kV double dead-end pole located at the top of the berm east of units 10 and 11. The 230 kV transmission line will then continue south another 200 feet, to a 138kV/230kV double dead-end pole where it turns west. The line will continue west approximately 850 feet until it reaches a 138kV/230kV double circuit structure where it will turn west by northwest. The overhead line travels to a 138kV/230kV double dead-end structure located outside of the northeast corner of the SDGE 138/230kV switchyard. There, the 230kV overhead line will transition to a riser structure and continue underground.

iii. The overhead line will transition from an overhead structure to underground on a transition structure located near the northeast corner of the SDG&E 138kV/230kV switchyard, west of the railroad tracks. The line will then continue traveling southward underground, parallel to the SDG&E switchyard, for approximately 450 feet before it turns west and enters the SDG&E switchyard underground.

BACKGROUND: TRANSMISSION POLES

The submitted pole design diagrams are incomplete (PTA section 3.2.3 and 3.2.4, pages 3-3 and 3-4). Depictions of the poles (that could help identify their characteristics and type) also vary in the Visual Resources section, most notably Figures 5.13-2A and Figures 5.13-2B and C.

DATA REQUEST

24. Resubmit 138 kV single line dead-end pole diagram (Figure 3.1-5) and 230/138 kV double circuit tangent and dead-end pole diagrams (Figures 3.1-6 & 3.1-7) design diagrams stating type of the pole(s) (steel or wood or any other), length of the insulators, and size & type of overhead conductors. Please show the height of the poles below and above the ground level, conductor-position measurements for the 230 kV and/or 138 kV side of the pole, and between conductors of both sides. Also show and describe any ground conductors, including their size, and provide the ground clearance distance from the lowest conductor on the pole.

Response: As noted in Project Owner's objection to this Data Request, 138kV single line deadend poles are not used in the current design of transmission line. Instead, Project Owner will employ 138kv/230kV double dead-end poles.

Project Owner hereby submits revised versions of the pole drawings that were submitted in the PTA , containing additional information. These are Figures DR24-1 (corresponding to PTA Figure 3.1-5), DR24-2 (PTA Figure3.1-6), and DR24-3 (PTA Figure 3.1-7). Overhead conductor sizes are shown on Figure DR22-2.

Ground conductors for these transmission lines are sized based on the larger voltage (230kV), and will be ½" E.H.S. Steel – 7 strand.

DATA REQUEST

25. Submit a 138 kV single line tangent pole design diagram stating type of the pole and showing configuration of the insulators and conductors with their respective position measurements on the pole, including ground clearance from the lowest conductor point, height of the pole above and below ground level, and the ground conductors, if any, with size and type description.

Response: As noted in Project Owner's objection to this Data Request, 138 kV single line tangent poles are not required in the current design of the transmission line and diagrams of them will not be submitted. 138kV/230kV double-circuit poles will be used instead, and Project Owner has included a diagram of this pole type as Figures DR24-2 and DR24-3 below.

DATA REQUEST

26. Provide the length, type, size, and ampere-rating of the proposed single-core UG 230 kV cable line. Submit a design drawing diagram of the proposed UG 230 kV single-core cable line termination on the 230 kV overhead dead-end pole structure showing position of the rising cable line on the pole, distances between cable terminating insulators and jumper cables to the overhead line. Also describe with a diagram how the cable line would be terminated at the SDG&E 230 kV switchyard.

Response: A drawing with the data for a typical 230kV cable line has been included as Figure DR26-1. A diagram showing the transition structure from overhead to underground has been included, Figure DR26-2. A diagram showing the cable termination in the SDG&E 230kV switchyard is included as Figure DR26-3.

DATA REQUEST

27. For the 230 kV UG single-core cable line, submit a drawing for typical Duck Bank type construction embedded in concrete showing its width and height, and four PVC cable conduits with sizes suitable for drawing the selected three single-core UG cable lines with a spare one and an additional smaller conduit grounding and

communication cables. Provide the vertical and horizontal distances between the conduits and the ground surface including depth and type of backfill.

Response: A typical duct bank drawing is included, Figure DR27-1.

BACKGROUND: ELECTRICAL ONE-LINE DIAGRAMS

The PTA does not include pre and post-project electrical one-line diagrams and physical layout drawings of the SDG&E EPS 230 kV and 138 kV switchyards (PTA, sections 3.2.3 and 3.2.4).

DATA REQUEST

28. Submit pre and post-project electrical one-line diagrams of the existing SDG&E EPS 138 kV and 230 kV switchyards showing configuration of switchyard buses and switching bays (with SB nos.) with breakers and associated disconnect switches with their respective sizes and/or ratings in amperes along with all transmission outlets showing the modifications in the switchyard for interconnection of the overhead 138 kV and the UG 230 kV gen tie lines. In addition, provide post-project electrical one-line diagrams of the SDG&E 138 kV and 230 kV switchyards after the decommissioning of the Encina Power Station (EPS), and disconnection of the existing EPS Units as scheduled in 2017. Fully describe and detail any and all measures proposed to insure transmission infrastructure integrity and the during the EPS demolition activities sought by the in the PTA. Moreover, describe any and all transmission measures and details planned for the seamless and timely transition from EPS Unit electrical generation to that of the Amended CECP.

Response: Electrical one line drawings of the existing SDG&E EPS 138 kV and 230 kV switchyards are included below as Figures DR28-1 and DR28-2, respectively. Project Owner has requested the post-project electrical one line drawings from SDGE and will furnish them to the CEC upon receipt from SDG&E. As these drawings may not arrive until mid-September, Project Owner requested additional time to provide them in Project Owner's objections and time extension request letter to the Commission dated August 5, 2014.

Maintaining integrity of the Encina Switchyard is critical during the demolition of EPS. Project Owner has designed the demolition procedure and has selected demolition methods that account for the switchyard's relative proximity to the stack and power house. Several approaches can be utilized and these have varying degrees of risk as well as impact on the project's schedule and budget. Removing the stack prior to the power house structure may prove fruitful in freeing up space for further demolition activity. The stack demolition methods that are most likely to be employed are described above in Response 3. After removing all hazardous materials, the power house structure will be demolished using controlled explosives. Remaining structures can then be brought to grade with high-reach machines. This type of careful demolition is designed to protect the adjacent switchyard from damage.

To ensure a seamless and timely transition from EPS electrical generation to that of the Amended CECP in the Encina Switchyard, before the 138kV commissioning of the Amended CECP begins, EPS Unit 1 would cease operation. Then, EPS Unit 1 will be disconnected from Bay Position 2, and SDG&E will move an outgoing line from Bay Position 1 to Bay Position 2, thereby opening up Bay Position 1 for the new CECP 138kV connection. As for the licensed CECP, this is the only position that requires these procedural steps. In the 230kV portion of the Encina Switchyard, SDG&E will take necessary actions to ensure that a breaker position is available for the new 230kV line from the Amended CECP, thereby preventing interference with existing EPS unit connections. In addition, the transmission lines leaving the Encina Switchyard limit the switchyard's overall capacity, and therefore would not be able to support full, simultaneous 230kV power generation from both EPS and CECP. As new generation is brought on from the Amended CECP, it will displace generation from the EPS facility.

DATA REQUEST

29. Provide pre and post-project physical layout drawings of the SDG&E EPS 230 kV and 138 kV switchyards, with all transmission outlets.

Response: Drawings of the preconstruction physical layout of both the SDG&E EPS 230kV and 138kV switchyards are included in this the submittal as Figure DR29-1. The post-project physical layouts of the SDG&E EPS 230kV and 138kV have been requested from SDG&E and will be submitted to the CEC after receipt of those Figures from SDG&E.

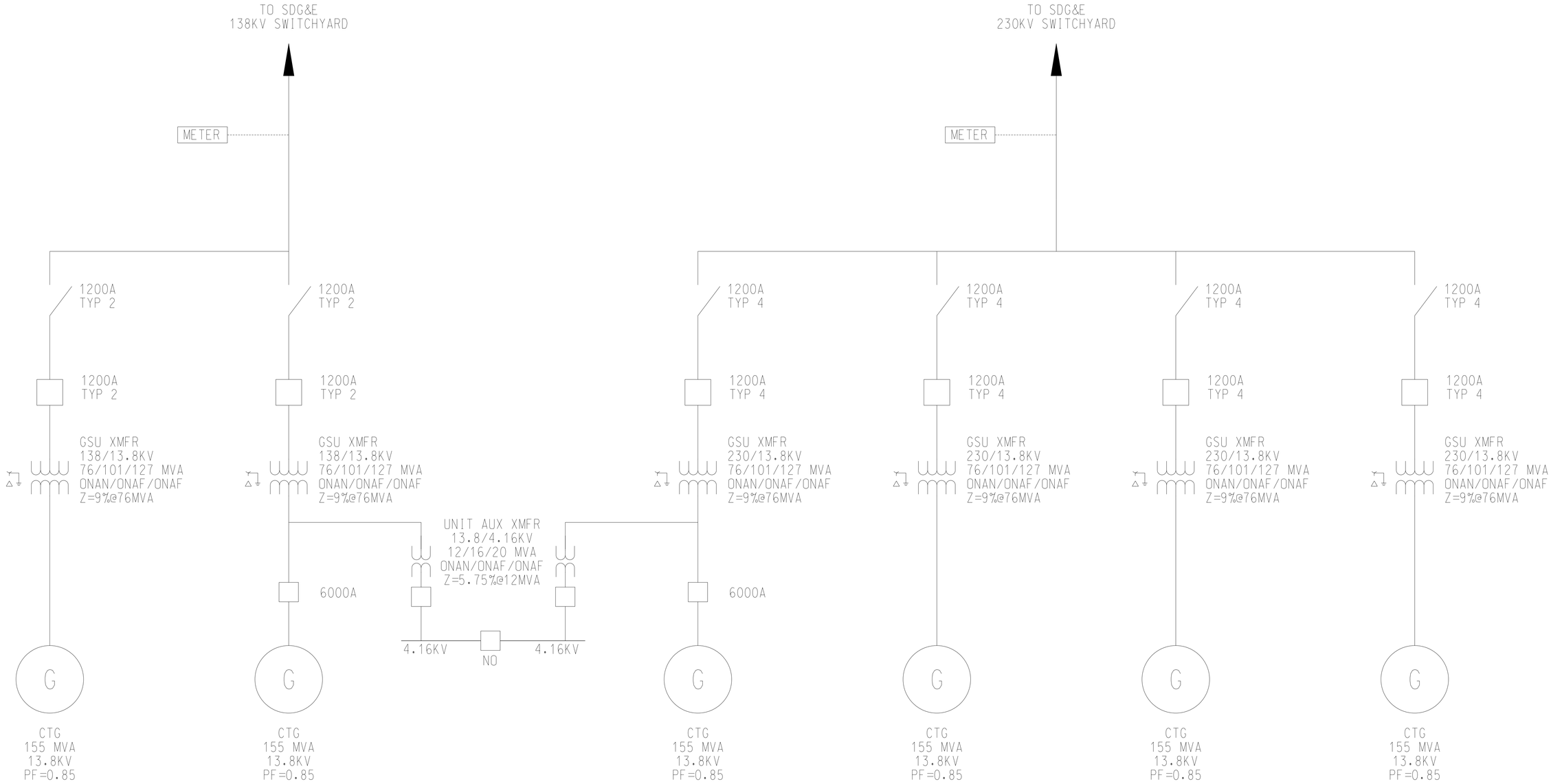
BACKGROUND: INTERCONNECTION REASSESSMENT STUDY

Since the October 22, 2013, California ISO "Interconnection Reassessment Study Report" with Individual Project Reports are not consistent with the May 2, 2014 CECP Petition to Amend (PTA), the Petitioner needs to submit a current Interconnection Reassessment Study Report by the California ISO for the proposed CECP 632 MW project (PTA, sections 3.2.5).

DATA REQUEST

30. Submit a current Interconnection Reassessment Study Report along with the Individual Reports performed by the California ISO, in accordance with the May 2, 2014 "Petition to Amend" the Carlsbad Energy Center Project (CECP), given proposed modifications to the 540 MW Licensed CECP would result in a 632 MW Amended CECP.

Response: Project Owner has requested additional time until September 19, 2014 to supply this Reassessment Study for the 640MW Amended facility. The restudy is in progress. After it is finalized, the report will be available and furnished to the CEC.

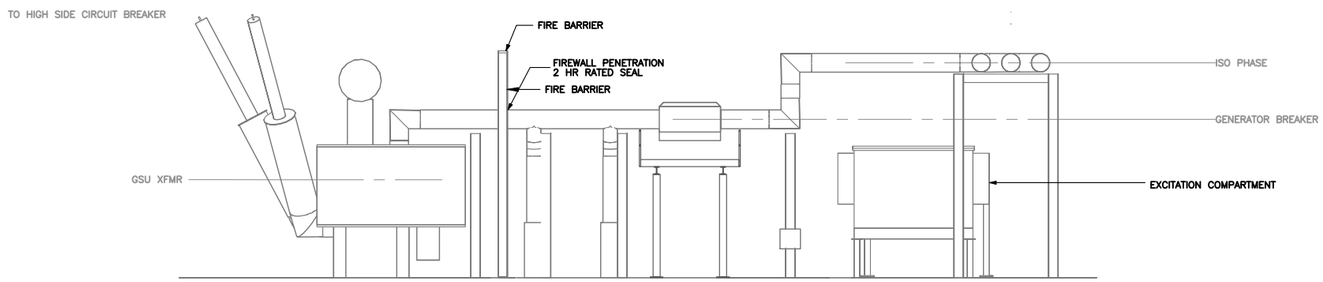


Note:

1. The 138kV transmission line and the 230kV transmission line will each be equipped with a set of metering equipment.
2. Ratings and equipment configuration shown are preliminary and will be finalized during detail design.

CECP
CONCEPTUAL ONE-LINE DIAGRAM

ESK-CECP-0001
7-30-2014, REV C



230kV GENERATOR TO GSU CONNECTIONS (TYP)

138kV GENERATOR TO GSU CONNECTIONS (SIMILAR)

SOURCE: CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC.

0 4' 8' 16' 24'

SCALE: 1/8"=1'-0"

NO	DATE	ISSUE DESCRIPTION	BY	CHKD	DISCP	APPR
0		PRELIMINARY				

CLIENT

TITLE

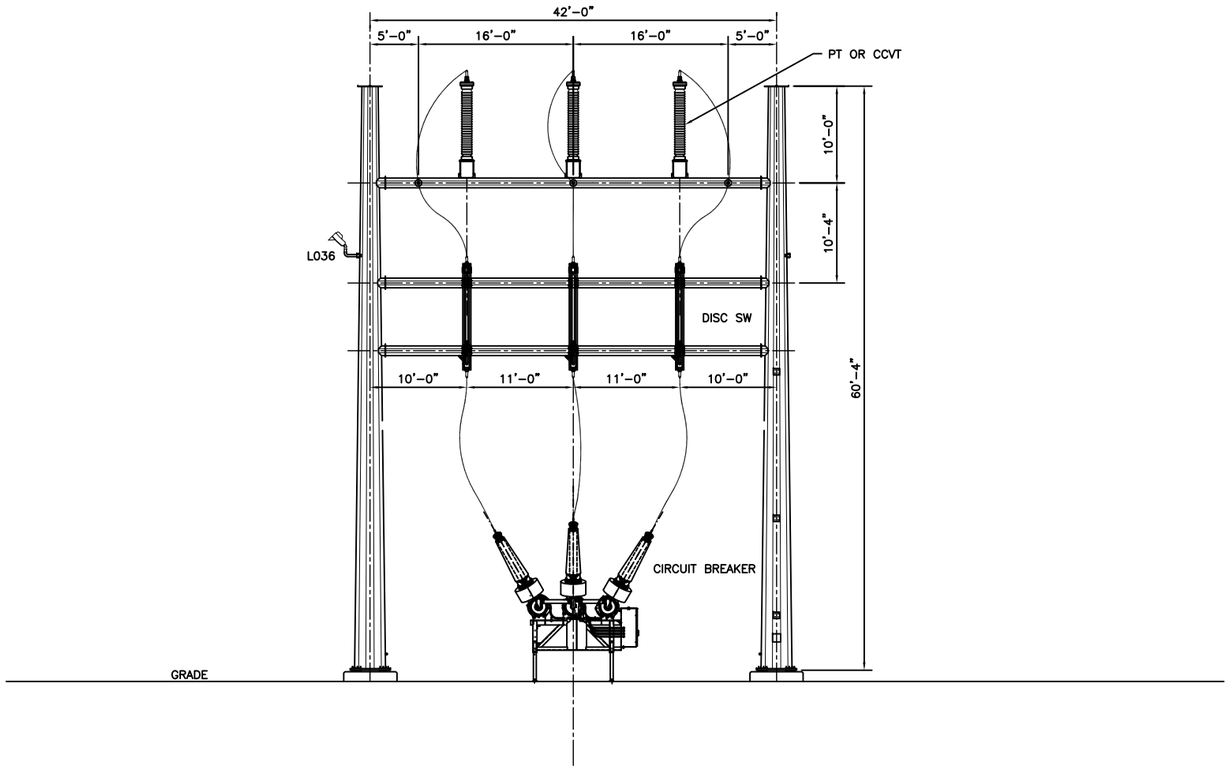
ELECTRICAL ARRANGEMENT
GENERATOR TO GSU
SECTIONS AND ELEVATIONS

DESIGNED BY | DRAWN BY | CHECKED BY

RESP. ENGR.

SCALE	CLIENT JOB NUMBER	DATE
1/8" = 1'-0"		

JOB NUMBER	DRAWING NUMBER	REV NO
		0



ELEVATION
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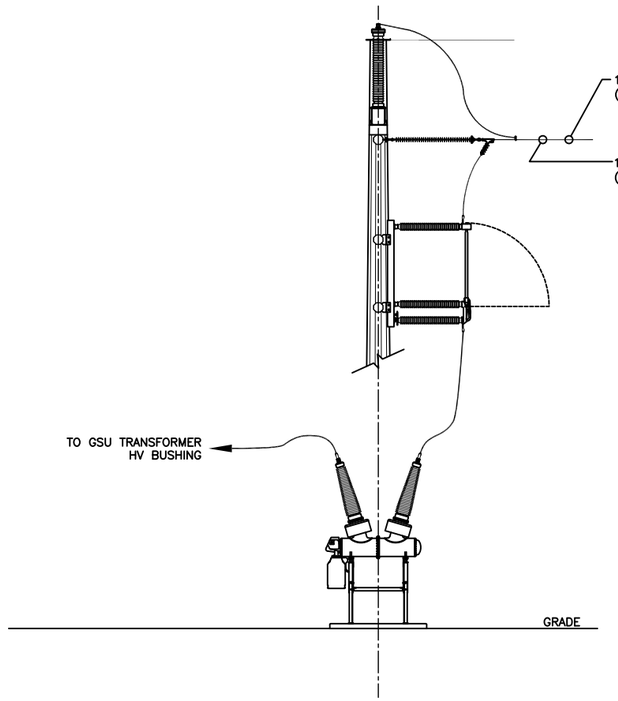


SECTION
SCALE: 1/8"=1'-0"

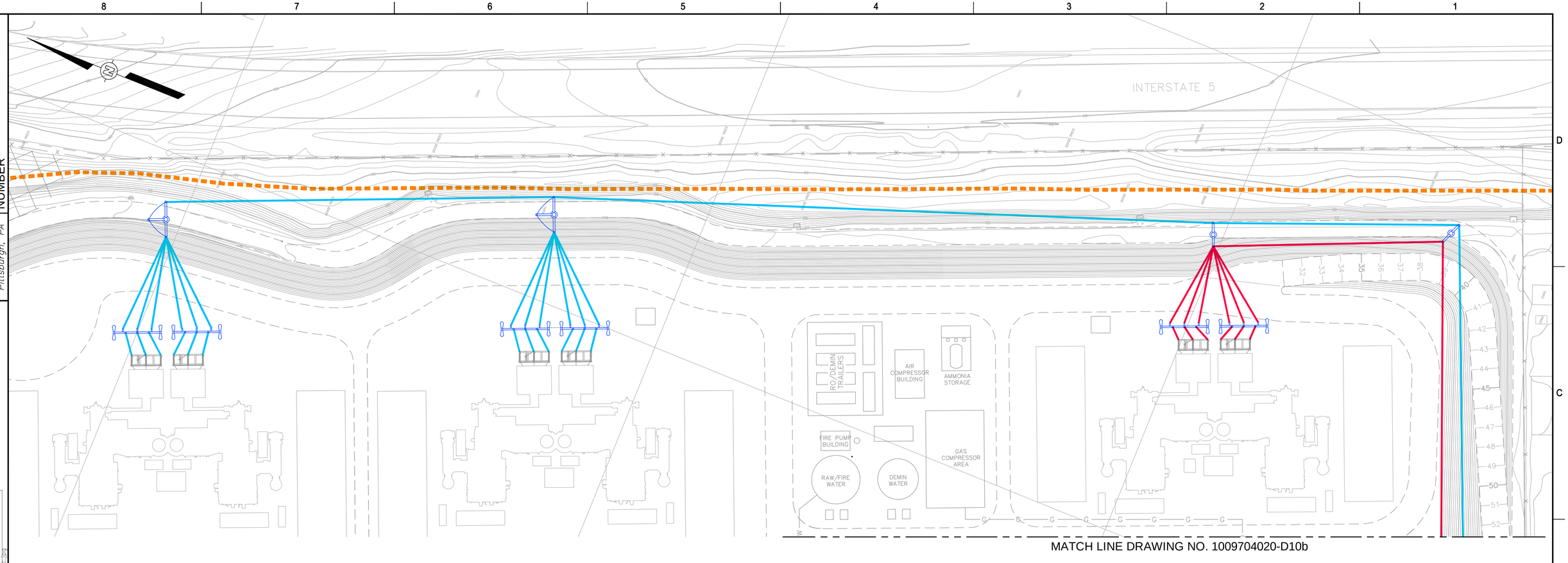
230kV TAKEOFF STRUCTURE (TYP)

138kV TAKEOFF STRUCTURE (SIMILAR)

SOURCE: CBI ENVIRONMENTAL & INFRASTRUCTURE, INC.

OFFICE
Pittsburgh, PA

DRAWING NUMBER
1009704020-D10a



LEGEND:

- TRANSMISSION TOWER
- 230 kV TRANSMISSION LINE
- 138 kV TRANSMISSION LINE
- 12kV EASEMENT TO POSEIDON
- LOCATION OF POSEIDON DESAL PLANT
- I-5 PARTIAL RIGHT OF WAY TAKE BOUNDARY

SOURCE:

CB&I ENVIRONMENTAL & INFRASTRUCTURE

APPROXIMATE SCALE
0 50 100 150 FEET

VERIFY SCALE 0 1"

DRAFT

REV	DESCRIPTION / ISSUE	DATE	APPROVED
A	ISSUED FOR REVIEW	1/31/14	ELH
B	UPDATED EQUIPMENT AND POLE LOCATIONS	2/20/14	
C	UPDATED POLES AND GAS LINE	2/26/14	
D	UPDATED LAYDOWN AREAS, ADDED RIGHT OF WAY, POSIDEN AREA	2/27/14	
E	REMOVED TREE LINE	3/12/14	
F	DASHED UNDERGROUND LINE , CHANGED TITLE CHANGED EXPANSION BOUNDARY	3/14/14	
G	UPDATED POWER POLE, TRACKS, POSEIDON, RIGHT OF WAY	3/27/14	
H	UPDATED POWER POLES	4/7/14	

CB&I
4 Park Plaza
Irvine, CA 92614

DESIGNED BY: *DD*	nrg	CARLSBAD ENERGY CENTER PROJECT CARLSBAD, CALIFORNIA		
DRAWN BY: *GSJ*	ENCINA POWER STATION CECP TRANSMISSION LINES CARLSBAD ENERGY CENTER PROJECT CARLSBAD, CALIFORNIA			
CHECKED BY: *--*				
APPROVED BY: *ELH*	DATE: 1/31/14	SCALE: AS SHOWN	DRAWING NO. 1009704020-D10a	SHEET NO. --

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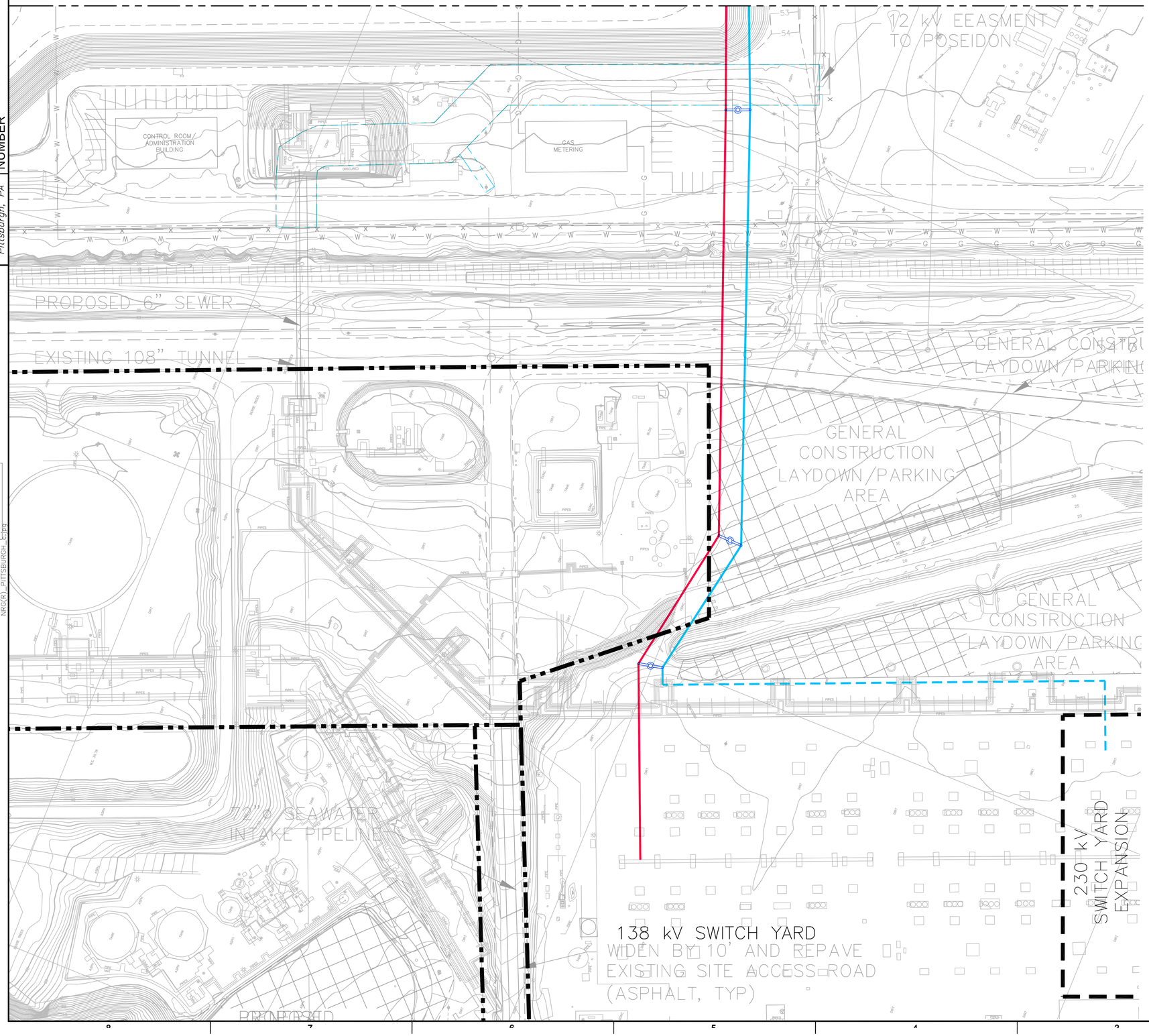
Plotted By: greg.jones

MATCH LINE DRAWING NO. 1009704020-D10a



LEGEND:

- TRANSMISSION TOWER
- 230 kV TRANSMISSION LINE
- 138 kV TRANSMISSION LINE
- 12kV EASEMENT TO POSEIDON
- LOCATION OF POSEIDON DESAL PLANT
- I-5 PARTIAL RIGHT OF WAY TAKE BOUNDARY

SOURCE:

CB&I ENVIRONMENTAL & INFRASTRUCTURE

DRAFT

APPROXIMATE SCALE
0 50 100 150 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED
A	ISSUED FOR REVIEW	1/31/14	ELH
B	UPDATED EQUIPMENT AND POLE LOCATIONS	2/20/14	
C	UPDATED POLES AND GAS LINE	2/26/14	
D	UPDATED LAYDOWN AREAS, ADDED RIGHT OF WAY, POSIDEN AREA	2/27/14	
E	REMOVED TREE LINE	3/12/14	
F	DASHED UNDERGROUND LINE , CHANGED TITLE CHANGED EXPANSION BOUNDARY	3/14/14	
G	UPDATED POWER POLE, TRACKS, POSEIDON, RIGHT OF WAY	3/27/14	
H	UPDATED POWER POLES	4/7/14	

CB&I

4 Park Plaza
Irvine, CA 92614

DESIGNED BY:	DD
DRAWN BY:	GSJ
CHECKED BY:	--
APPROVED BY:	ELH
DATE:	1/31/14
SCALE:	AS SHOWN
DRAWING NO.	1009704020-D10b
SHEET NO.	--

nrg

CARLSBAD ENERGY CENTER PROJECT
CARLSBAD, CALIFORNIA

ENCINA POWER STATION
CECP TRANSMISSION LINES
CARLSBAD ENERGY CENTER PROJECT
CARLSBAD, CALIFORNIA

OFFICE Pittsburgh, PA
DRAWING NUMBER 1009704020-D10b

VERIFY SCALE 0 1"

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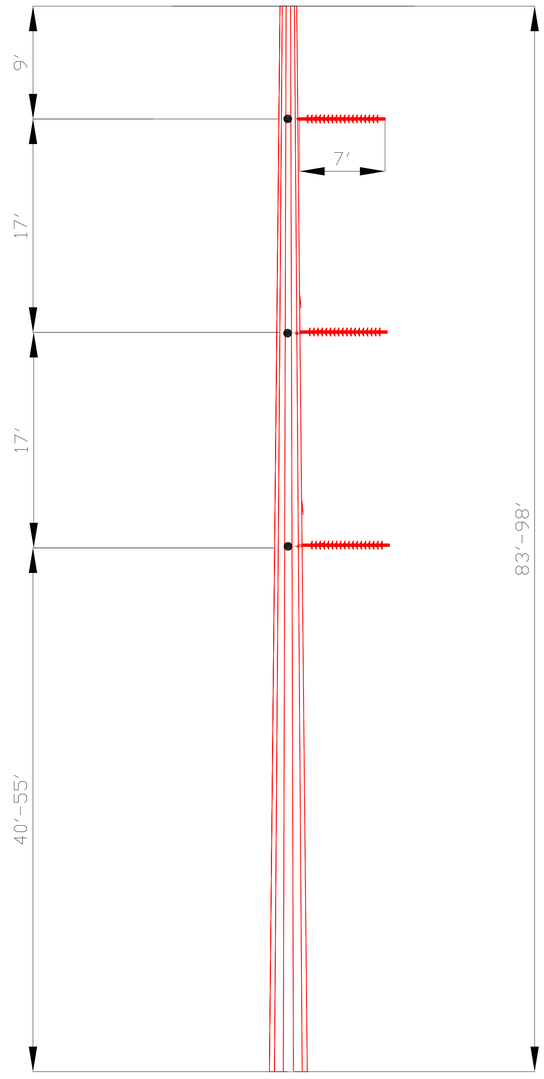
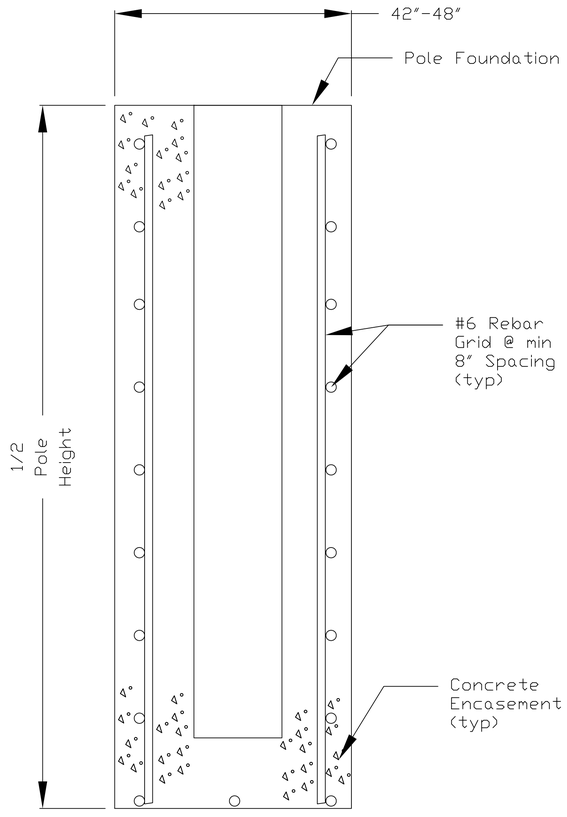
Plot Date/Time: Aug 11, 2014 - 2:06pm
Plotted By: greg.jones

OFFICE
Centennial, CO

DRAWING NUMBER FIGURE TSE1c-2



230kV Line Pole Cross-section
Deadend Steel Pole



Typical Caisson Concrete Embedment
Cross- Section
N.T.S.

NOTE:

SOURCE: CBI ENVIRONMENTAL AND INFRASTRUCTURE, INC.

EQUIPMENT CONFIGURATION & RATINGS ARE PRELIMINARY.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

NRG Energy, Inc

Shaw Stone & Webster, Inc.

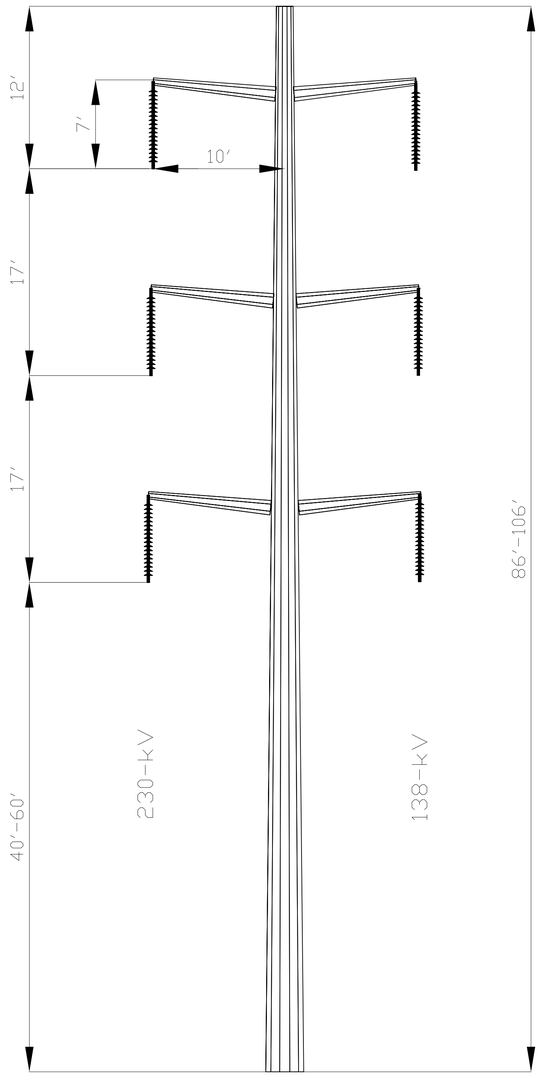
DESIGNED BY: DOP	CARLSBAD ENERGY CENTER PROJECT CARLSBAD, CA
DRAWN BY: DOP	ENCINA POWER STATION FIGURE TSE1c-2 T-LINE POLE CROSS SECTIONS
CHECKED BY: --	

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	REV. NO.
--	10/16/07	NTS	FIGURE TSE1c-2	A

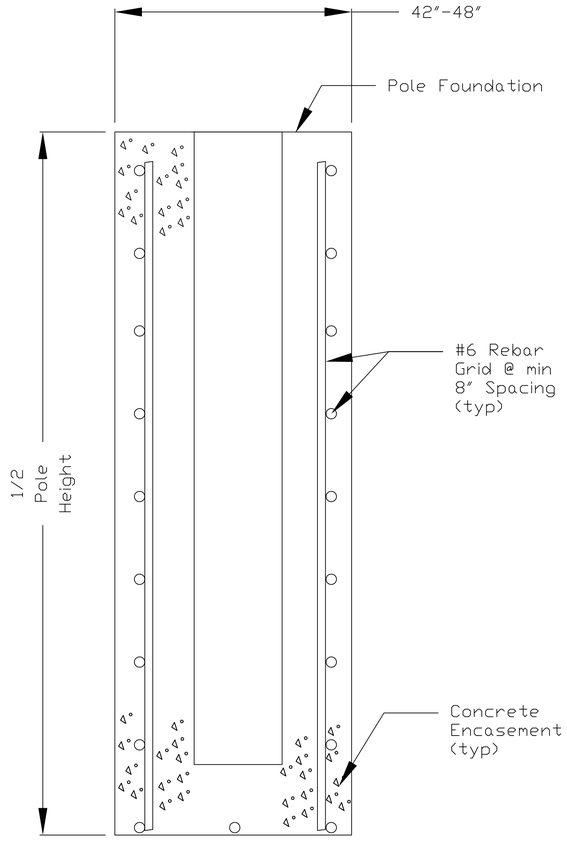
OFFICE Centennial, CO

DRAWING NUMBER FIGURE TSE1c-4

A



138 & 230kV Line Pole Cross-section
Double Circuit Configuration - Steel Pole



Typical Caisson Concrete Embedment
Cross- Section
N.T.S.

NOTE:

EQUIPMENT CONFIGURATION & RATINGS ARE PRELIMINARY.

SOURCE: CBI ENVIRONMENTAL AND INFRASTRUCTURE, INC.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

NRG Energy, Inc

Shaw® Stone & Webster, Inc.

DESIGNED BY: DOP	CARLSBAD ENERGY CENTER PROJECT CARLSBAD, CA			
DRAWN BY: DOP	ENCINA POWER STATION FIGURE TSE1c-4 T-LINE POLE CROSS SECTION			
CHECKED BY: --				
APPROVED BY: --	DATE: 10/16/07	SCALE: NTS	DRAWING NO. FIGURE TSE1c-4	REV. NO. A

OFFICE Centennial, CO

DRAWING NUMBER FIGURE TSE1c-5

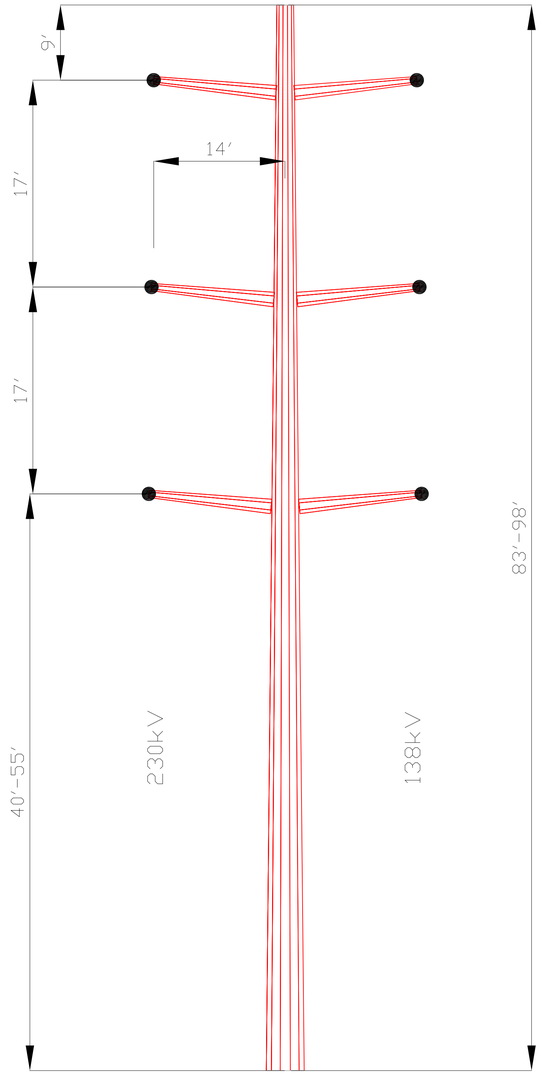
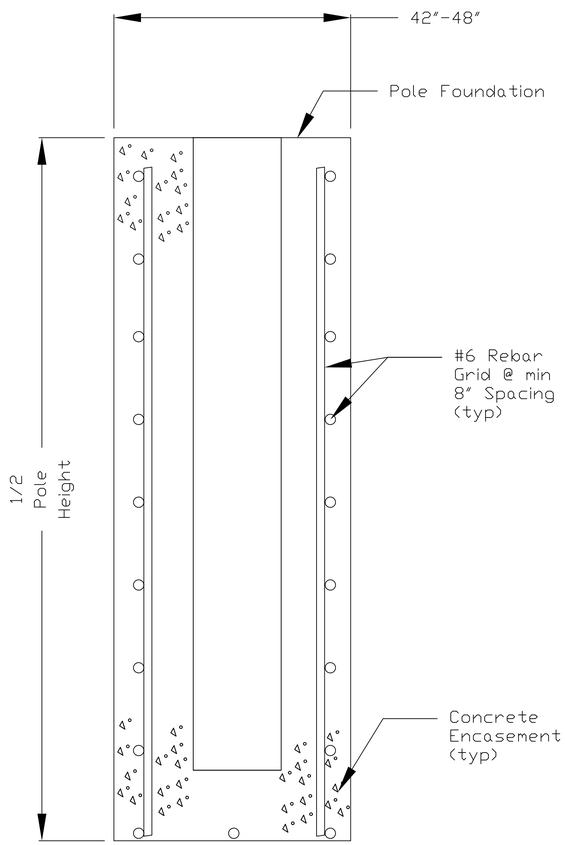


FIGURE TSE1c-5
138 & 230kV Line Pole Cross-section
Double Circuit Deadend Configuration
Line Divergence Point



Typical Caisson Concrete Embedment
Cross- Section
N.T.S.

NOTE:

EQUIPMENT CONFIGURATION & RATINGS ARE PRELIMINARY.

SOURCE: CBI ENVIRONMENTAL AND INFRASTRUCTURE, INC.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

NRG Energy, Inc

Shaw Stone & Webster, Inc.

DESIGNED BY: DOP	CARLSBAD ENERGY CENTER PROJECT CARLSBAD, CA			
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CHECKED BY: --				
APPROVED BY: --	DATE: 10/16/07	SCALE: NTS	DRAWING NO. FIGURE TSE1c-5	REV. NO. A

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
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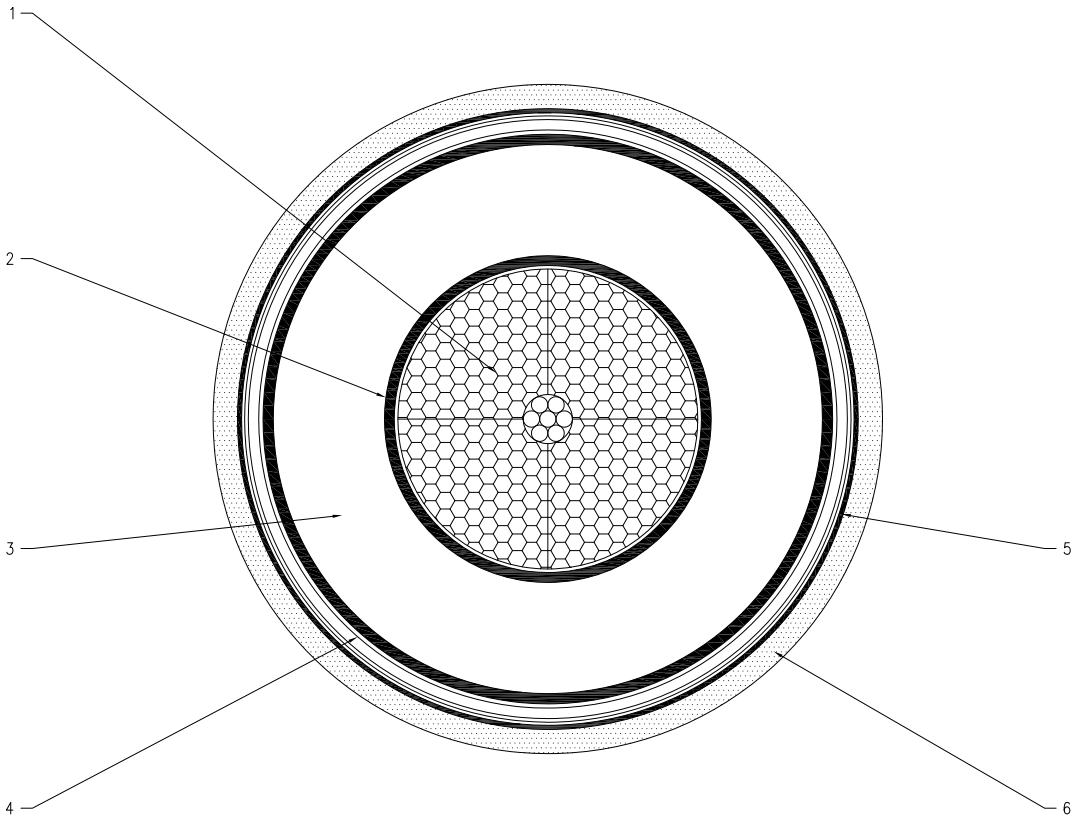


NO.	DESCRIPTION	MATERIAL	Thickness Nominal, mil	Diameter Approx., inch
1	CONDUCTOR	2500 kcmil Copper Segmented*	–	1.76
2	CONDUCTOR SCREEN	Semi-conductive compound	100	1.96
3	INSULATION	Cross-linked polyethylene (XLPE)	850	3.66
4	INSULATION SCREEN	Semi-conductive compound	70	3.8
5	METALLIC SHEATH	PE Laminated Copper tape with drain	135	4.07
6	OUTER JACKET	Black HDPE with Graphite coating	160	Approx. 4.39

* THE 2500 kcmil COPPER CABLE IS CAPABLE OF 1130 AMPS BASED ON THE FOLLOWING CRITERIA:
- AMBIENT AIR TEMPERATURE OF 30°C
- SOIL THERMAL RESISTIVITY OF 120°C-cm/W
- ENCASEMENT THERMAL RESISTIVITY OF 60°C-cm/W
- BACKFILL THERMAL RESISTIVITY OF 90°C-cm/W
- BURIAL DEPTH OF 3 FEET TOP OF CONCRETE (TOC)

NOTE: FINAL CABLE SIZE WILL BE DETERMINED DURING DETAILED ENGINEERING

Cable_Cut_Sheet.dwg

REFERENCE DRAWINGS

DSGN	DM	08/01/2014
DRN	BJA	08/01/2014
CKD		

SCALE: NTS

FOR 8.5x11 DWG ONLY

POWER ENGINEERS

POWER ENGINEERS

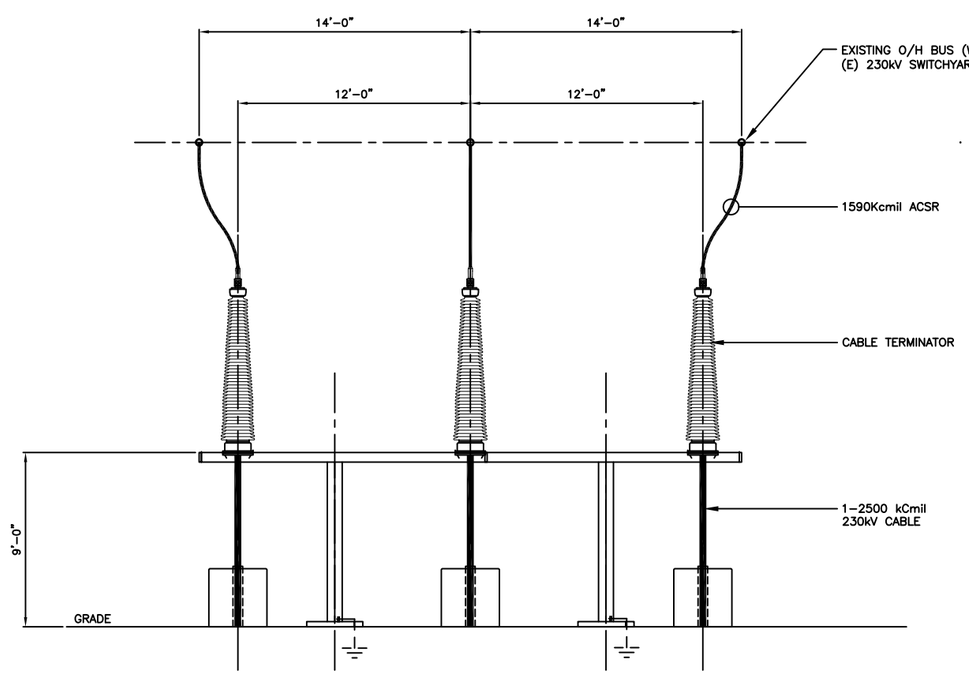
TYPICAL DETAILS

230kV XLPE CABLE CROSS SECTION

JOB NUMBER

REV B

DRAWING NUMBER U3-1



230KV CABLE RISER STRUCTURE

SCALE: $\frac{1}{4}$"=1'-0"

NOTE:

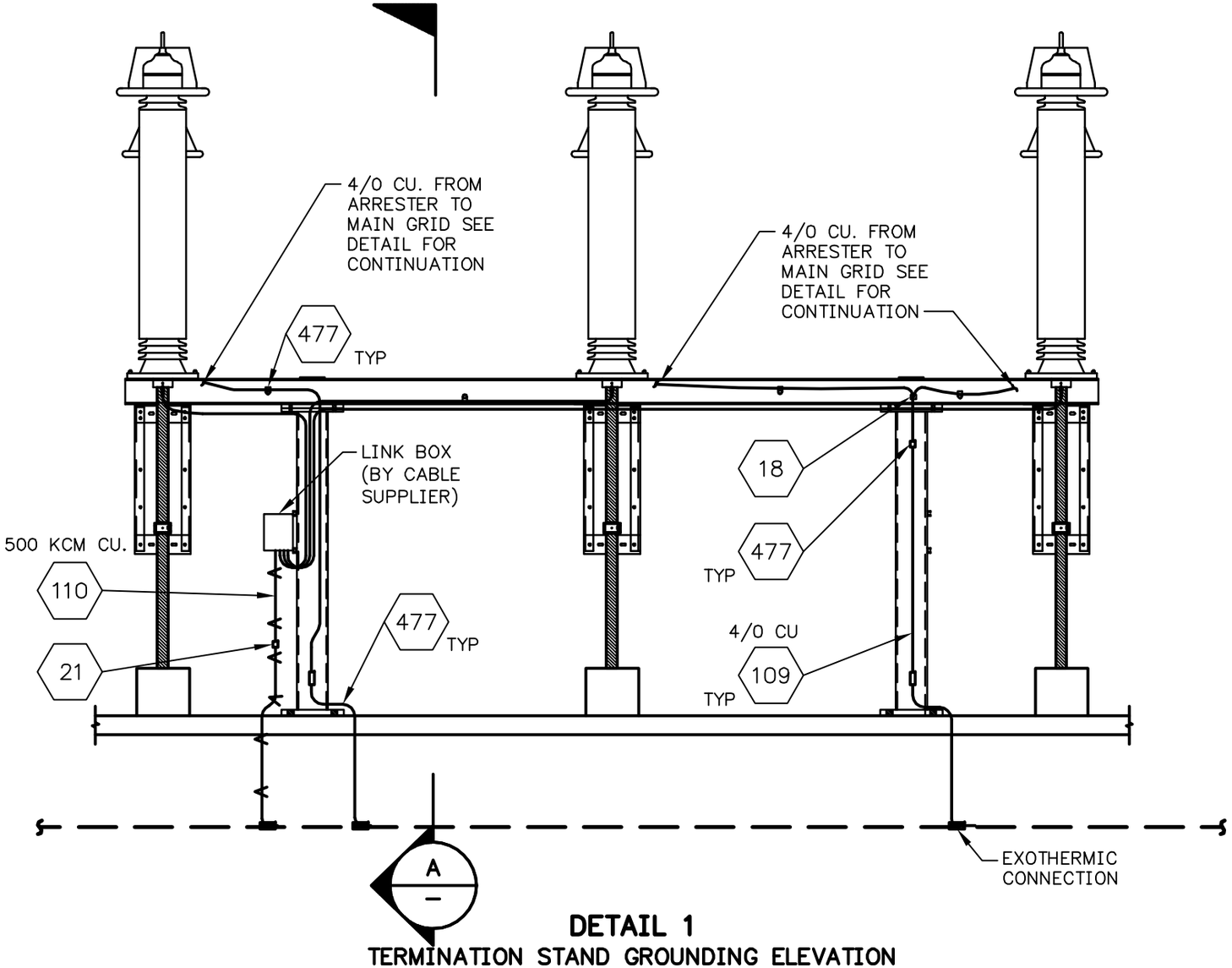
EQUIPMENT CONFIGURATION & RATINGS ARE PRELIMINARY.

LEGEND:
(E) – EXISTING

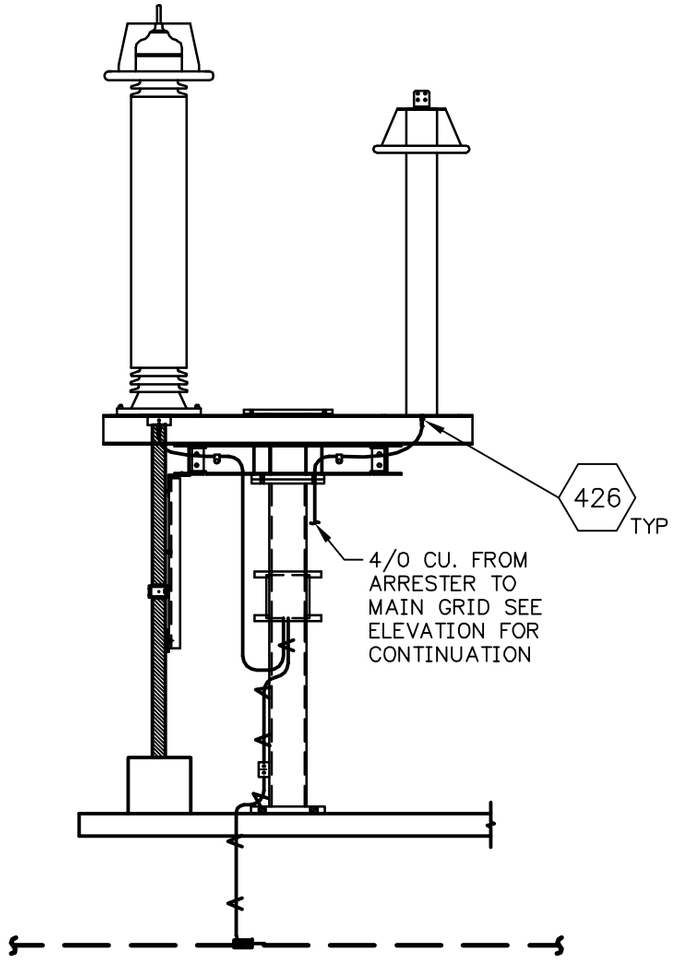
SOURCE: CBI ENVIRONMENTAL & INFRASTRUCTURE, INC.

FIGURE TSE1C-10 WITH REVISED CONDUCTOR SIZE
8/12/14

ENCINA POWER STATION
230kV CABLE RISER
FIGURE TSE1c-10

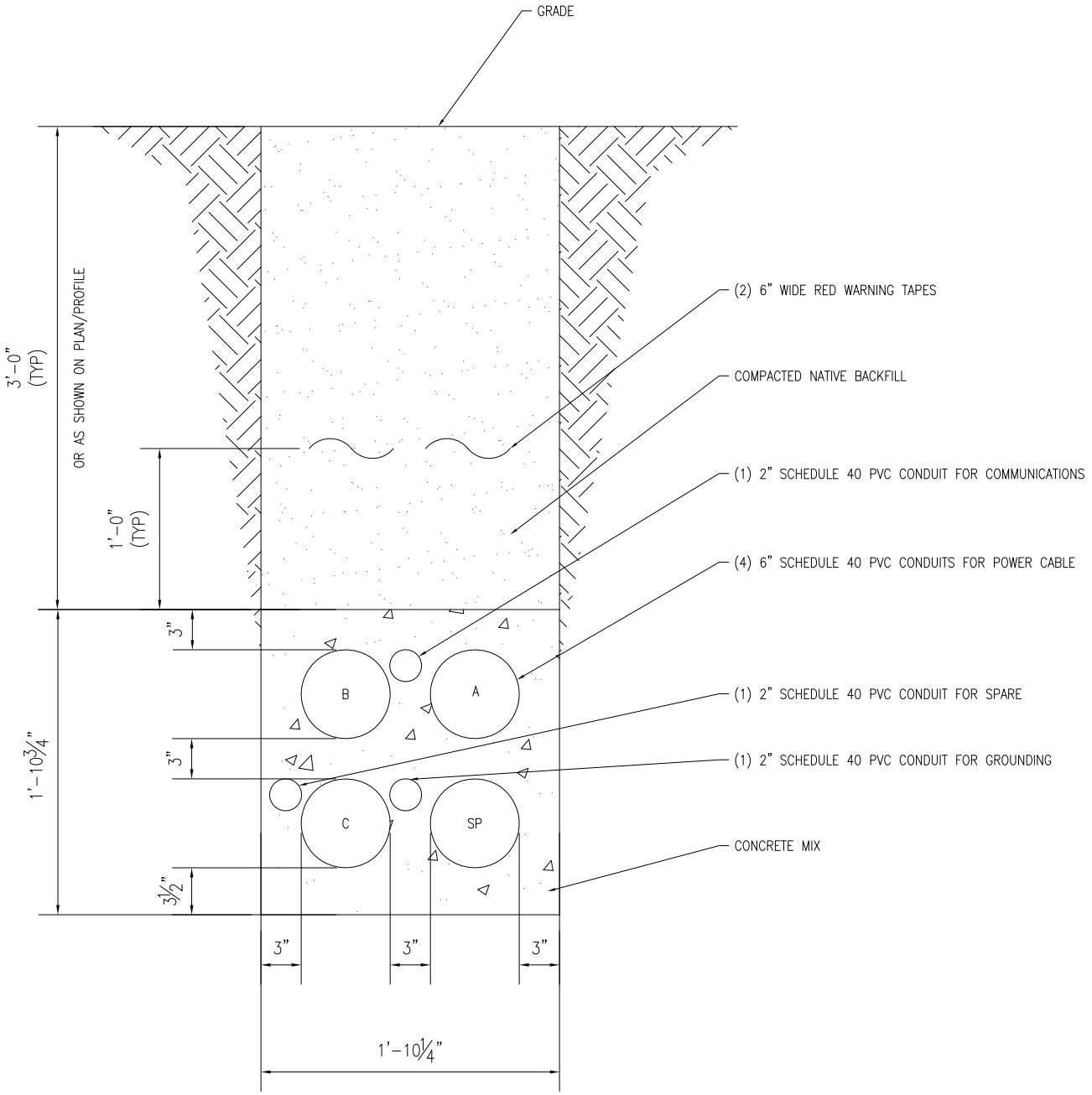


DETAIL 1
TERMINATION STAND GROUNDING ELEVATION



SECTION VIEW A–A

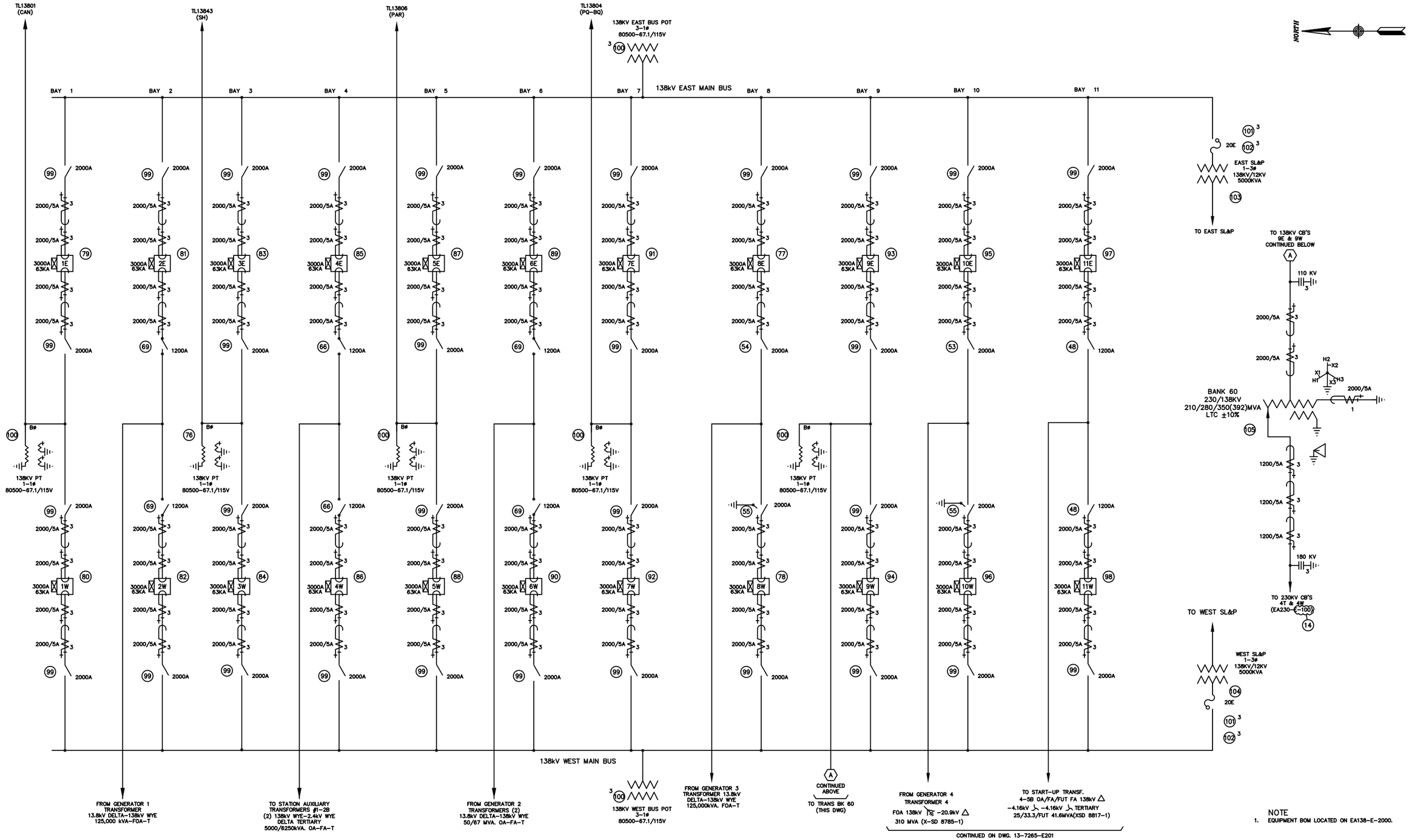
REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
B	ISSUED FOR REVIEW	08/04/2014	BJA	DM		
A	ISSUED FOR REVIEW	08/01/2014	BJA	DM		



Trench_Detail_2X2.dwg

REFERENCE DRAWINGS					
		DSGN	DM	08/01/2014	POWER ENGINEERS
		DRN	BJA	08/01/2014	TYPICAL DETAILS
		CKD			TYPICAL 2 X 2 DUCT BANK
		SCALE: NTS			
		FOR 8.5x11 DWG ONLY			

JOB NUMBER	REV
	B
DRAWING NUMBER	
U0-1	



NOTE
1. EQUIPMENT BOM LOCATED ON EA138-E-2000.

REVISIONS

NO.	WORK DONE	DATE:	BY:	APP'D:
13	REPLACED ALL 138KV CB'S, BUS, PTS, 32 BUS DISCONNECTS, ADDED COVT'S W.O. 5984545	1/4/11	FEK	
	TO BAY 1,3,5,7,9; REMOVED BUS DISCONNECTS & BUS COVTS, RELOCATED TL13806 FROM			
	BAY 8 TO BAY 5, RELOCATED TL13804 FROM BAY 10 TO BAY 7, RELOCATED UNIT 3			
	TRANSFORMER FROM BAY 9 TO BAY 8, RELOCATED UNIT 4 TRANSFORMER FROM BAY 11			
	TO BAY 10, RELOCATED 4-5B AUX TRANSFORMER FROM BAY 13 TO BAY 11, ADDED			
	BK 60 TO BAY 9 (B&V)			
14	REVISED DWG REFERENCE (B&V) W.O. 5984545	9/12/11	AJO	

NO.	WORK DONE	DATE:	BY:	APP'D:
11	REMD TL 13807 INCLUDING 138KV CB 14E & 14W AS WELL AS THE W.O. 5984492	7/25/08	PEH	
	ASSOCIATED DISCONNECT SWITCHES AND BUSWORK (B&V)			
12	REPLACED 138KV CB'S 3E, 8E & 8W. ADD PT'S TO B# OF BAYS 3 & 8 (B&V) W.O. 5985333	10/26/09	AJO	

NO.	WORK DONE	DATE:	BY:	APP'D:
6	CONVERTED TO CADD; REDRAWN FROM DWG. E-30, REV.#5; REMOVED BILL OF MAT'L. & ADD/REVISE EXIST. BM: EA-E-2000 TO INCLUDE EXISTING ITEMS W.O. 5933800	8/14/97	PC/RGG	
7	REVISED PER FIELD MARKED PRINT W.O. 5980028	11/29/98	TC/DMS	MDK
8	REPLACED CB #4W W.O.5980200	6/8/99	GM/DDW	MDK
9	REM'D TL13802 & ADD C.B.#3E TO TL13801 W.O.5980293	5/9/01	GM/DDW	
10	REVISED TIE LINE REMOTE END NOMENCLATURE PER W.O.5984491	7/31/07	DAD	RWH

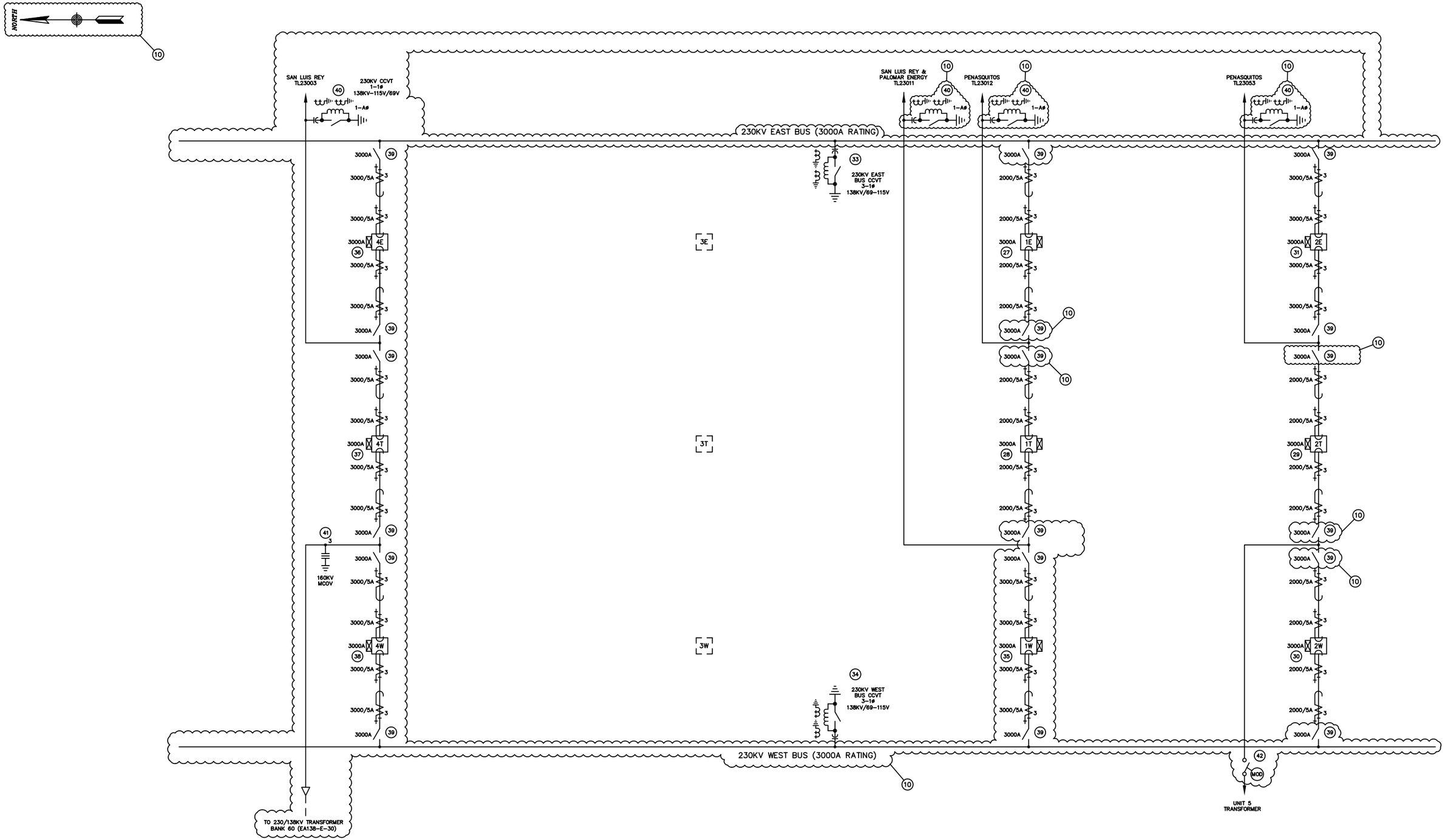
SAN DIEGO GAS & ELECTRIC COMPANY
SAN DIEGO, CALIFORNIA

ENCINA SUBSTATION
138kV SWITCHYARD ONE LINE DIAGRAM

DRAWN BY: RGG | DATE: 8/14/97 | SCALE: NONE | W.O.: 5980293 | REV.: 14
CHECKED BY: | DATE:
APPROVED BY: | DATE:
CAD NO.: EAE30 | PLOT SCALE: 1 = 1

EA138-E-30

Sept 12, 2011 - 15:39:39



REVISIONS

NO.	WORK DONE	DATE	BY:	APP'D:
8	REPLACED 230kV CB'S 1E, 1T, 2W, & 2T W.O. 5985141	10/24/08	pc/CKB	RWN
9	ADD 230KV CB 2E & MOVE TL23003 TO SOUTH END OF EAST MAIN BUS W.O. 5984492	7/22/08	PEH	
	TL23012 TO 1ET, TL23011 TO 1WT & ADD TL23053 TO 2ET, REPLACED 230KV BUS PT'S			
	W/ CCVT'S (B&V)			
10	REPLACED 9 DISCONNECT SWITCHES, ADDED CB 1W, 4E, 4T, 4W & W.O. 5984545	1/20/10	FEK	
	ASSOCIATED DISCONNECT SWITCHES, ADD TL23003 CCVT & REPLACED EXISTING CCVTS (B&V)			

NO.	WORK DONE	DATE	BY:	APP'D:
3	ADD UN. #5 230KV MOD ITEM #24 W.O. 5924960	4/25/85	RGP/WF	RDA
4	REMOVED ITEMS #5 & #6 AND REV'SD TL23012 DEST. FROM "OT" TO "PQ" W.O. 5926824	3/25/91	RWN	FJ
5	ADD COUP. CAPAC. TO TL23012 FOR SYNC. W.O. 5930330	3/7/94	DDW/RGG	CAK
6	SCANNED DWG. INTO TITLEBLOCK WITH BARCODE (WAS DWG. 13-EA-E100). W.O. 2556400	2/1/01	MN/ADR	
7	REV'D DEST. TL 23011 TO SAN LUIS REY & ESCONDIDO, REV'D TL 23010 TO TL 23003			
	FROM ENCINA TO SAN LUIS REY, REMOVED ITEM #17 & #22 & CHANGED OUT CCVT'S			
	W.O. 5980293	6/15/01	NW	MDK

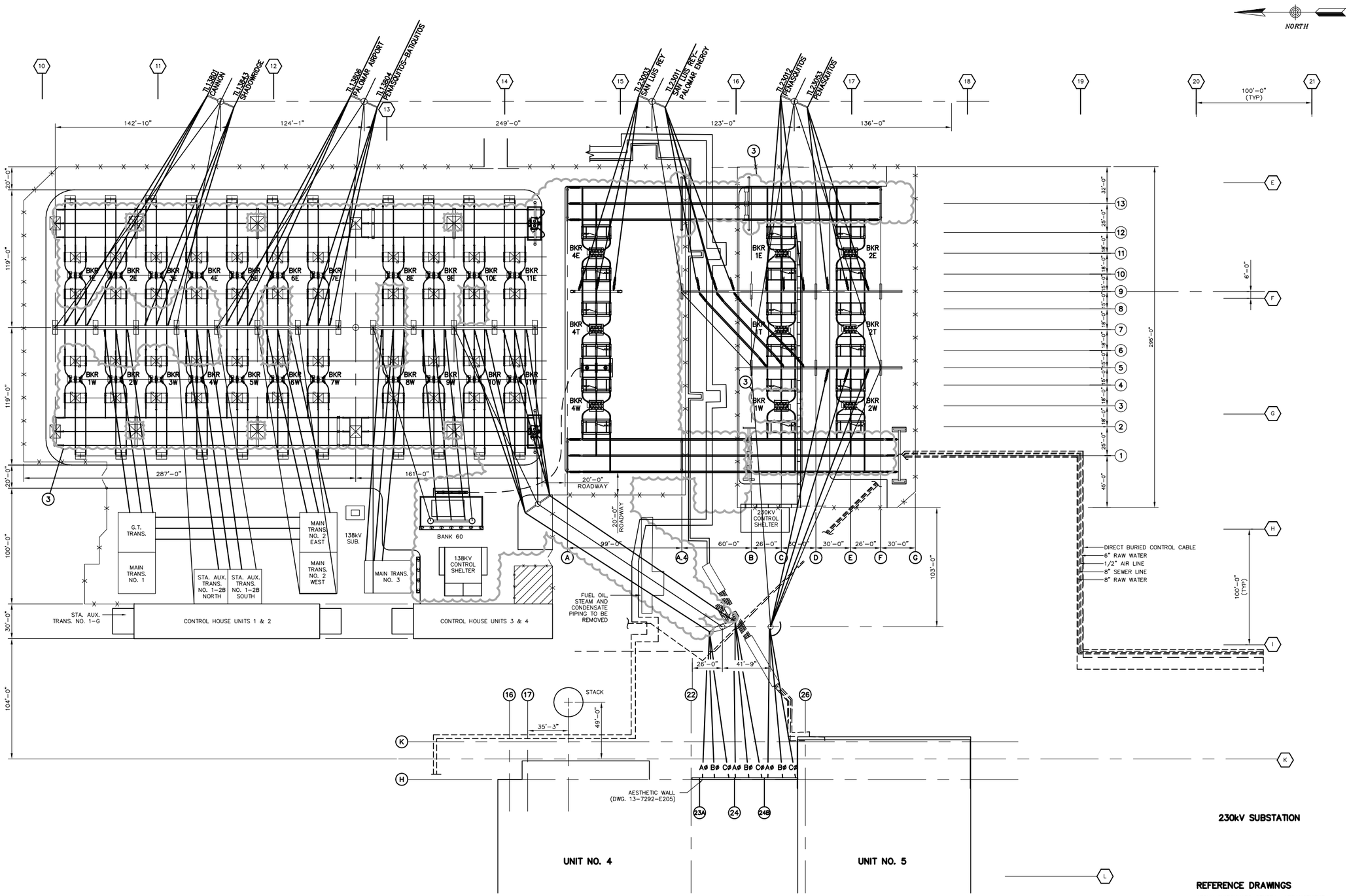
SAN DIEGO GAS & ELECTRIC COMPANY
SAN DIEGO, CALIFORNIA

ENCINA SUBSTATION
230kV ONE LINE DIAGRAM

DRAWN BY: DA | DATE: 8/21/74 | SCALE: NONE | W.O. 5980293 | REV. 10
CHECKED BY: JJT | DATE: 9/10/74
APPROVED BY: RTB | DATE: 9/12/74
CAD NO.: EA230E100 | PLOT SCALE: 1 = 1

EA230-E-100

Feb 28, 2012 - 07:16:40



REFERENCE DRAWINGS

138KV SWITCHYARD GENERAL ARRANGEMENT —— —— —— —— EA138-S-501
PLAN VIEW 230KV BAYS 1 & 2 —— —— —— —— —— EA230-S-502
PLAN VIEW 230KV BAYS 3 & 4 —— —— —— —— —— EA230-S-503

DWG. WAS: 13-EA-E400

REVISIONS

NO.	WORK DONE	DATE	BY:	APP'D:
3	ADDED 230KV BAY 4, ADDED BREAKER 1W, ADDED FUTURE 230KV EXPANSION SWAPPED OUT BREAKER AND SWITCHES IN 138 YARD, BUILT OUT BAYS 5 & 7. ADDED BANK 60. ADDED NEW 138KV CONTROL HOUSE, AND NEW TRANSMISSION POLE (B&V) W.O. 5984545	10/25/11	RCD	
2	ADD 230KV DEADEND & TERM STAND, IN EXISTING 138KV BAY 14, ADD W.O. 5984492	6/18/08	RJS	
1	SCANNED DWG. INTO TITLEBLOCK WITH BARCODE AND CHANGE DWG. # W.O. 5980293	11/12/02	MN/CJS	SCC
	TERM STAND TO SOUTHEAST END OF 230KV MAIN BUS UPDATED T-LINE LOCATIONS			
	ADD 230KV RISER, BREAKER 2E AND DISC SWITCH, REMD FUTURE 230KV BAY 3,			
	REMD TL 13807. REPLACED 230KV BUS PT'S WITH CCVT'S (B&V)			

SAN DIEGO GAS & ELECTRIC COMPANY
SAN DIEGO, CALIFORNIA

ENCINA SUBSTATION
GENERAL ARRANGEMENT

DRAWN BY: TJ	DATE: 10/3/74	SCALE: 1"=40'	W.O. 5984545	REV. 3	EA230-S-501
CHECKED BY:	DATE:				
APPROVED BY:	DATE:				
CAD NO.: EA230S501	PLOT SCALE: 1 = 1				

Nov 28, 2011 - 15:18:33