State of California

Energy Resources Conservation and Development Commission

In the Matter of:

The Application for Certification for the
Carlsbad Energy Center Project Docket No. 07-AFC-6

Terramar Testimony, Exhibits, Witness List, and Time Estimates for Testimony and Rebuttal for the December 12, 2011 Hearing

December 1, 2011

Introduction

Terramar wishes to provide its testimony, rebuttal testimony, exhibits, witness list and time estimates for testimony and rebuttal regarding the six topics suggested by the AFC Committee for the December 12, 2011 Hearing to be held in Carlsbad, Ca.

TESTIMONY & REBUTTAL TESTIMONY

1. The impact of the three new PPA projects on our cumulative impacts and alternatives analysis

Cumulative Impacts

Terramar presents the following facts (supported by exhibits) to the AFC Committee regarding the three new PPA projects:

Fact: The Application for Certification (AFC) for the Pio Pico Energy Center (PPEC) Power Project Docket Number 11-AFC-01 was accepted on 4/20/2011 as "data adequate" by the California Energy Commission. The project is under environmental review at the California Energy Commission (CEC).
Exhibit 390 (CEC Home Page for the Pio Pico Energy Center)

Fact: The AFC for the Quail Brush Generating Project (QBGP) Docket Number 2011-AFC-3 was accepted on 11/16/11 as "data adequate" by the California Energy Commission. The project is under environmental review at the CEC.
Exhibit 391 (CEC Home Page for the Quail Brush Generating Project)

Fact: The Escondido Energy Project (EEP), a 45 Mega Watt (MW) project, has been approved by the Planning Commission of the City of Escondido and due to

the size of the project does not require CEC licensing and "the proposed project has been analyzed for its compliance with the California Environmental Quality Act (CEQA) and a Notice of Exemption has been prepared".
Exhibit 392 (Minutes from the Escondido Planning Commission approving Modification to a Conditional Use Permit-PHG 11-0005)

These facts confirm the three PPA's as "probable future projects".

> Probable future projects include "not only approved projects under construction and approved related projects not yet under construction, but also unapproved projects currently under environmental review with related impacts or which result in significant cumulative impacts." (CEQA Guidelines, Discussion Following § 15130.)pages 2-5 of the Center for Biological Diversity's Comment on the Errata and New Motion for Evidentiary Hearing..

Each of these projects, (PPEC,QBGP, EEP), was offered a Power Purchase Agreement (PPA'(s)) from San Diego Gas and Electric (SDG&E) further confirming them as "probable future projects".

Testimony from SDG&E for each of these projects, (PPEC,QBGP, EEP), was presented to the California Public Utilities Commission May 19, 2011 for authority to enter into Purchase Power Tolling Agreements.

> City of Carlsbad Motion to Take Official Notice, Application of San Diego Gas & Electric Company (U 902 E) for Authority to Enter into Purchase Power Tolling Agreements with Escondido Energy Center, Pio Pico Energy Center and Quail Brush Power.

CEQA requires:

> "[A]ny future project where the applicant has devoted significant time and financial resources to prepare for any regulatory review should be considered as probable future projects for the purposes of cumulative impact."
> (*Gray v. County of Madera* (2008) 167 Cal.App.4th 1099, 1127-28.)
> pages 2-5 of the Center for Biological Diversity's Comment on the Errata and New Motion for Evidentiary Hearing..

The facts presented regarding each of these projects, (PPEC,QBGP, EEP), prove beyond a doubt that the applicants for each of these projects "has devoted significant time and financial resources to prepare for any regulatory review" and the three projects, (PPEC, QBGP, EEP) "should be considered as probable future projects for the purposes of cumulative impact(s)".

Therefore the 3 PPA's must be considered in the cumulative impacts analysis for the Carlsbad Energy Center Project (CECP) as they are per CEQA, "probable future project(s) producing related or cumulative impacts." (Cal. Code of Regs., tit. 14 § 15130(b)(1)(A).

CEC cannot ignore CEQA issues relating to cumulative emissions, excess capacity, and negative environmental impacts regarding the EEC, PPEC, and QBGP projects in the PMPD for CECP. Therefore, the cumulative impacts from the three PPA's must be included in the cumulative impacts analysis for the CECP.

> CEQA mandates a cumulative impacts analysis of a proposed project where its possible environmental effects are "individually limited but cumulatively considerable." (Pub. Res. Code § 21083(b)(2).) "[A]n agency may not . . . [treat] a project as an isolated 'single shot' venture in the face of persuasive evidence that it is but one of several substantially similar operations . . . . To ignore the prospective cumulative harm under such circumstances could be to risk ecological disaster." (*Whitman v. Board of Supervisors* (1979) 88 Cal.App.3d 397, 408 [quoting *NRDC v. Callaway* (1975) 524 F.2d 79, 88 [referring to NEPA]].)... "The only reason we can infer for the Commission's failure to consider and analyze this group of projects was that it was more expedient to ignore them. However, expediency should play no part in an agency's efforts to comply with CEQA." (151 Cal.App.3d at 74.)
> pages 2-5 of the Center for Biological Diversity's Comment on the Errata and New Motion for Evidentiary Hearing.. Posted June 29, 2011.

Alternatives Analysis

A CEQA analysis including the three PPA's has not been performed in the CECP-No Project Alternative by the CEC. All three PPA's are established as "probable" projects per CEQA as presented in the Cumulative Impact(s) section.

> The proposed Plants are sufficiently probable to require analysis under CEQA. (See *Mountain Lion*, 214 Cal.App.3d at 1048, 1050; see Center's Comments on the PMPD at 27-28 [discussing flaws in the No Project Alternative analysis].)
> pages 2-5 of the Center for Biological Diversity's Comment on the Errata and New Motion for Evidentiary Hearing.. Posted June 29, 2011.

Therefore, until the 3 PPA projects are included as part of the CECP-No Project Alternative analysis, the analysis is incomplete.

In addition, per the applicant's testimony in their "Carlsbad Energy Center LLC's Supplemental Testimony, Exhibits, Witness list, and Time estimates for examination of witnesses" (Nov. 18, 2011), page 6:

> *A PPA is the central document in the development and construction of independent (non utility owned) power plants and is a critical component to obtaining project financing.*

The 3 PPA projects have received this central document. The CECP has not received a PPA, the all important "central document of development and construction of independent power plants". The No Project Alternative for CECP must be analyzed using the 3 PPA projects. This analysis will ultimately show that the No Project Alternative is by far the superior alternative.

2. Conditions Land-2 and Land-3, their environmental impacts and appropriate modifications to address the financial concerns raised by the Applicant

As presented in Terramar's September 23, 2011 comments, the need for conditions Land-2 and Land-3 is required to maintain public, health and safety (so that CEC can avoid continuing and furthering Encina's declared condition of blight). The condition of blight at Encina was determined by the Carlsbad Redevelopment Agency, an authorized California state agency.

The CEC may not continue blight as the CEC is obligated to maintain the "public health and safety" as required by Cal. Code ***§ 25216.3,*** **§ 25511,** ***§ 25523.***.

> ***§ 25216.3. Design and operational standards; compilation; adoption; compliance***
> *(a) The commission shall compile relevant local, regional, state, and federal land use, public safety, environmental, and other standards to be met in designing, siting, and operating facilities in the state; except as provided in subdivision (d) of Section 25402, adopt standards, except for air and water quality, to be met* ***in designing or operating facilities to safeguard public health and safety****, which may be different from or more stringent than those adopted by local, regional, or other state agencies, or by any federal agency if permitted by federal law; and monitor compliance and ensure that all facilities are operated in accordance with this division.*
> **§ 25511. Safety and reliability factors; information required; analysis; findings** ...*The commission shall determine the adequacy of measures proposed by the applicant to* ***protect public health and safety,*** *and shall include its findings in the final report required by Section 25514*
> ***§ 25523. Written decision; contents***

The commission shall prepare a written decision after the public hearing on an application, which includes all of the following:
(a) Specific provisions relating to the manner in which the proposed facility is to be designed, sited, and operated in order to protect environmental quality and ***assure public health and safety.***

The increase and furtherance of blight is contrary to public health and safety as explained in the California Health and Safety Code.

33030. (a) It is found and declared that there exist in many communities blighted areas that constitute physical and economic liabilities, requiring redevelopment in the interest of the health, safety, and general welfare of the people of these communities and of the state.
33035. It is further found and declared that:
(a) The existence of blighted areas characterized by any or all of such conditions constitutes a serious and growing menace which is condemned as injurious and inimical to the public health, safety, and welfare of the people of the communities in which they exist and of the people of the State.
(b) Such blighted areas present difficulties and handicaps which are beyond remedy and control solely by regulatory processses in the exercise of police power.
(c) They contribute substantially and increasingly to the problems of, and necessitate excessive and disproportionate expenditures for, crime prevention, correction, prosecution, and punishment, the treatment of juvenile delinquency, the preservation of the public health and safety, and the maintaining of adequate police, fire, and accident protection and other public services and facilities.
(d) This menace is becoming increasingly direct and substantial in its significance and effect.
(e) The benefits which will result from the remedying of such conditions and the redevelopment of blighted areas will accrue to all the inhabitants and property owners of the communities in which they exist.
33037. For these reasons it is declared to be the policy of the State:
(a) To protect and promote the sound development and redevelopment of blighted areas and the general welfare of the inhabitants of the communities in which they exist by remedying such injurious conditions through the employment of all appropriate means.

a. Conditions of Land-2 and Land-3

Conditions of Land -2 and Land-3 were written and proposed by the applicant.

Following the Hearings and private discussions with the City of Carlsbad, the ***applicant*** *proposed conditions LAND-2 and LAND-3 providing for the*

planning, permitting, and financing of the removal of Units 1 – 5 once they are no longer needed to support the electricity system.
Page 30 Errata to the PMPD, Docketed June 15, 2011

Subsequent to the applicant's docketing of conditions Land-2 and Land-3 on June 3, 2011; they docketed "Applicant's Comments to the Errata to the Presiding Member's Proposed Decision for the Carlsbad Energy Center Project (07-AFC-6)" on June 27, 2011 stating their satisfaction with both the PMPD and the Errata.

Applicant is satisfied that the PMPD, together with the Errata, provides the Commission with a solid environmental analysis and all conditions of certification necessary to ensure CECP is built and operated in compliance with all laws, ordinances, regulations, and standards.
Applicants Comments to the Errata to the PMPD for the CECP, June 27, 2011
Page 1

Applicant's comments emphasized that they were satisfied with the Errata in full. This meant the applicant agreed with the fact that the AFC Committee "was not yet convinced that they (public purposes) rose to the "extraordinary" level".

In preparing the PMPD, the Carlsbad AFC Committee *found the purposes described by Staff compelling but* ***was*** *not yet convinced that they* ***rose*** *to the "extraordinary" level.* ***The Committee requested further evidence and proposals regarding the potential for speeding the removal of the existing plant's*** *massive boiler/turbine building and 400-foot stack* ***when they are no longer needed*** *to support the grid.*
Errata page 30

The applicant understood that the Errata further stated the Committee "requested further evidence and proposals regarding the potential for speeding the removal of the existing plant's....when they are no longer needed".

Land 2 and Land-3 were added to satisfy "extraordinary" purpose for the AFC Committee. "Extraordinary" public purpose is required by California Redevelopment Law as the CECP is located in a redevelopment zone. Per the Warren Alquist Act, LORS, including Redevelopment LORS, must be followed or an override must be made by the CEC.

The Committee requested further evidence and proposals regarding the potential for speeding the removal of the existing plant's massive boiler/turbine building and 400-foot stack when they are no longer needed to support the grid. During the May 19 and 20, 2011, re-opened Evidentiary Hearings and PMPD Comment Hearing, the question of whether CECP affords extraordinary public purpose was revisited. Following the Hearings and private discussions with the City of Carlsbad, the applicant proposed conditions LAND-2 and LAND-3 providing for the

planning, permitting, and financing of the removal of Units 1 – 5 once they are no longer needed to support the electricity system.
Errata, page 30

The docketing of conditions Land-2 and Land-3 occurred on June 3, 2011.

To that end, on June 3, 2011, Applicant docketed two proposed conditions of certification (LAND-2 and LAND-3), which it believes the City will support.
Carlsbad Energy Center Project (07-AFC-6) Applicant's Comments on the Presiding Member's Proposed Decision Page 6

More than three weeks later, on June 27, 2011 the applicant docketed their Errata comments to the CEC. Applicant had a very long time to review the conditions that they set for themselves in Land-2 and Land-3 yet they expressed satisfaction with the conditions.

Now Applicant is unwilling to follow through with the conditions that they proposed. In fact they are stating that the CECP receives no benefit from the Encina plant.

The facility that CECP would be required to pay to demolish is on a portion of the EPS property of which CECP has no contractual rights to utilize nor from which it derives any benefit.
Carlsbad Energy Center LLC's Supplemental Testimony, Exhibits, Witness List, and Time Estimates for Examination of Witnesses, page 7

Applicant if forgetting that in order to satisfy required conditions of the San Diego Air Pollution Control District's Final Determination of Compliance, they must shut down Encina Units 1-3 tying the two projects together.

Rule 20.1(c)(16), 40 CFR §52.21, and 40 CFR Appendix S to Part 51– Contemporaneous Emission Increase
Contemporaneous emission increase is defined in Rule 20.1 (c)(16) as the sum of emission increases from new or modified emission units occurring at a stationary source within the calendar year in which the subject emission units is expected to "commence operation" and the preceding four calendar years, including all other emission units with complete applications under District review and which are expected to commence operation within such calendar year. The emission increases for new units are based on the new units' potential to emit (PTE) as limited by the FDOC permit limits pursuant to Rule 20.1(d)(1)(i)(A). The emission increases may also be reduced by actual emission reductions at the facility. In this case, the Applicant is proposing to create actual emission reductions by shutting down three existing utilities boilers, Units 1, 2, and 3 with District permit Nos. 791, 792, and 793, respectively (the two other utility boilers, Units 4 and 5, will remain in operation).

> Final Determination of Compliance San Diego Air Pollution Control District, p 18

The FDOC requirement for the shutdown of Encina Units 1-3 joins Encina to the CECP. One cannot happen without the other. The CECP is reliant upon the shut down of Encina Units 1-3. The CECP is responsible for creating additional blight in a redevelopment area. The only way the CEC can solve the blight issue is with Land-2 and Land-3. Though the AFC Committee feels that the Encina removal will provide needed "extraordinary public purpose", Terramar still contends Land-2 and Land-3 are necessary simply to avoid the enhancement of blight and maintain the "public health and safety" as required by Cal Code **§ 25511, *§ 25523.. § 25216.3.*** Therefore, Terramar feels it is appropriate for the AFC Committee to expect the applicant to fulfill conditions Land-2 and Land-3 to eliminate the blight created by the shutdown of Encina Units 1-3 as required by California Health and Safety Code.

b. The Environmental Impacts of Conditions Land-2 and Land-3

The Conditions of Land-2 and Land-3 make the shutdown and removal of Encina an undeniable "probable future project".

> "[A]ny future project where the applicant has devoted significant time and financial resources to prepare for any regulatory review should be considered as probable future projects for the purposes of cumulative impact."
> (*Gray v. County of Madera* (2008) 167 Cal.App.4th 1099, 1127-28.)
> pages 2-5 of the Center for Biological Diversity's Comment on the Errata and New Motion for Evidentiary Hearing..

> Probable future projects include "not only approved projects under construction and approved related projects not yet under construction, but also unapproved projects currently under environmental review with related impacts or which result in significant cumulative impacts."
> (CEQA Guidelines, Discussion Following § 15130.)pages 2-5 of the Center for Biological Diversity's Comment on the Errata and New Motion for Evidentiary Hearing.

With the removal of Encina (a "probable future project"), the CECP becomes the tallest and most prominent structure in the City of Carlsbad. So far, CEC staff has ignored these impacts in the "view" analysis in the PMPD and Errata. In addition, with the widening of the I-5 (a "probable future project") cumulative "view" impacts are created that have not been analyzed by CEC staff.

With the removal of Encina (a "probable future project"), the CECP must be analyzed for negative noise impacts as the only power plant on site. The PMPD and Errata have ignored this analysis.

With the removal of Encina (a "probable future project") the CECP must have its own water discharge permit for the desalination plant. CECP would no longer be able to piggyback off the Encina permit. Once through-cooling will no longer be allowed as of 12-31-2017 and this issue has not been resolved in the PMPD or Errata. It has been pushed to the side as something that will be addressed in the future which is a violation of CEQA.

> *If, however, EPS Units 4 and 5 were to cease operation in the future and their existing service and auxiliary water pumps were no longer needed, the CECP could require intake water from the Lagoon. This would likely require actions under the Clean Water Act, section 316(b) and the federal and state endangered species acts. (Id.) To address this possibility we have, at Staff's suggestion (02/04/10 RT 266:24-267:6), included Condition* ***BIO-9*** *to emphasize the need for possible future joint review and coordination. If EPS Units 4 and 5 are in fact shut down in the future and this affects the CEC's intake water supply, the appropriate regulatory agencies will then assess the proper course of action to be taken. Intervenors, including Terramar and the City of Carlsbad, challenge this approach, largely on the ground that the shutdown of Units 4 and 5 is a certain, foreseeable event. Their reasoning is essentially that the CECP will need to withdraw water from the Agua Hedionda Lagoon, thus causing impingement, entrainment, and cumulative impacts, and may conflict with the State Water Resources Control Board's recently adopted policy on Once Through Cooling (OTC).4 (Terramar Opening Brief, pp. 7-15; City of Carlsbad's Opening Brief, pp. 2-3, 7, 28-29, 47, 72.) This matter is fully discussed in the* ***Soil and Water Resources*** *section. For present purposes, we note that the evidence establishes that the CECP is air cooled and will not use OTC or require additional water from the Lagoon, and that the potential shutdown of EPS Units 4 and 5 is a speculative matter, which is not part of the present project. (02/24/10 RT 266:17-23; Exs. 145; 200, pp. 4.2- 16 to 17, 4.2-29; Staff Opening Brief, pp. 7-8; Staff Reply Brief, pp. 3-7.) We are thus persuaded that the CECP will not create significant impacts on biological resources.*
>
> PMPD, Biological Resources, Page 8-9

CEQA requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. Increasing unmitigated negative impacts violates CEQA.

Cumulative negative impacts must be mitigated "to a point where clearly no significant effect on the environment would occur and there is no substantial evidence in light of the whole record" CEQA 15064(f)(2).

Therefore, PMPD and Errata can no longer ignore the negative and cumulative negative impacts that will be created by the CECP as a stand alone power plant once Encina is removed.

c. Appropriate modifications to address the financial concerns raised by the Applicant.

In order to address financial concerns raised by the applicant, Terramar thinks that it is very important to review comments by Mr. Valentino, Development Director for NRG West from the Committee Conference, Sept. 13, 2011, transcript pages 37-39:

> *I think we have all stated, everything has to pay for itself. In other words, you know, we don't know how long Units 4 and 5 will be needed for reliability. When they're no longer needed, any future project on that portion, on that side of the property west of the tracks, has to justify the demolition of the building. Without that the building will remain in place and any future land use has to contemplate the cost of removing that. You know, we represent -- we're a public company, we represent shareholders here. We obviously cannot make commitments that actually are going to be NPV negative. In other words, obligations that were never contemplated and that have no, have no positive return. If at some point in the future those units are able to come down and the building is able to come down it will depend upon, ultimately, future redevelopment scenarios on the site. It really has nothing to do with what we're proposing on the east side of the railroad tracks. I think, you know, one of the things from a larger, land use perspective. We have a lot of aspects that will impact that project going forward, including transmission infrastructure that is on the west side of the tracks that may or may not go away. That has a cost. As well as the Poseidon desalination facility that's going to be built on the west side of the tracks. So I think our concern is primarily around mixing two different decisions here. What ultimately happens with the portion of that property and, you know, lack -- and our inability to make commitments until we have further clarification around it.*
> Pages 37-39 of the Transcript from the Sept. 13, 2011 Committee Conference

The Applicant has presented no relevant facts to support financial concerns regarding the removal and demolition of Encina. The Applicant only submitted removal and demolition costs for the South Bay Power Plant expecting the AFC Committee and interveners to somehow extrapolate those costs in a relevant way to the Encina project. The AFC Committee is left to make a decision based on little to no information. As interveners, we have no information with which to object or agree.

NRG purchased the Encina site with the knowledge that the aging plant was nearing the end. The valuable Encina site is enormous and located on the Southern California coastline near shopping, Legoland, restaurants and the I-5. There is extraordinary value in this site. NRG was well aware of these facts when they chose to purchased this incredible piece of property.

Terramar suggests that the AFC Committee leave Conditions Land-2 and Land-3 "as is" in the CECP project and allow NRG to perform their own due diligence for removal and demolition, just as they performed their due diligence when they purchased the site. They can work with the Carlsbad Redevelopment Agency if they choose to do so.

It is not the responsibility of the AFC Committee to make the best financial decisions for the stockholders of NRG.

3. Grid reliability issues raised by the comments from CAISO during the June 30, 2011, Energy Commission Business Meeting.

a. Balancing the Grid – (Mr. Peters' "issue" one)

> *the electric generating characteristics of the proposed Carlsbad Energy Center will help the ISO balance the grid as the State of California works to meet its 33 percent renewable portfolio standard".*
> June 30, 2011 Energy Commission Business Meeting, Pages 58-60

This "issue" is a requirement of any applicant to the CEC and is not specific to the CECP as stated in the "Application Proceeding; Purpose and Objectives". Therefore the 3 PPA's offered SDG&E contracts will assist the ISO in balancing the grid.

> *The purpose of an application proceeding is to ensure that any sites and related facilities certified provide a reliable supply of electrical energy at a level consistent with the need for such energy,"*
> "Title 20, Chapter 5, Article 3,§ 1741. Application Proceeding; Purpose and Objectives.

b. Once Through-Cooling Compliance for Encina Units 1-3- (Mr. Peters' "issue" two)

> *Second, the proposed Carlsbad Energy Center represents a significant step to bring the existing Encina facility into compliance with California's policy regarding the use of coastal waters for power plant cooling. So under the statewide policy adopted by the State Water Resources Control Board, Encina must come into compliance by the end of 2017. The cooling technology of the proposed Carlsbad Energy Center is consistent with the policy and will permit Encina Units 1 to 3 to cease using coastal waters for cooling purposes. I would just note, too, that in the existing OTC policy the policy could allow the plant to operate after 2017 if needed for reliability. So again, just to achieve its water use goals, my second point is*

that California will need facilities such as the Carlsbad Energy Center Project.
June 30, 2011 Energy Commission Business Meeting pages 58-60

The 3 PPA's have the same abilities as the CECP to "bring the existing Encina facility into compliance with California's policy regarding the use of coastal waters for power plant cooling".

In fact, NRG stated that they would retire Encina Units 1-3 by December 31, 2017 whether or not the CECP was completed in their "Implementation Plan for Compliance with the California Policy on the Use of Coastal Estuarine Waters for Power Plant Cooling.

A Decision from the California Energy Commission (CEC) of the CECP has not been issued. Under the Policy, EPS must be in compliance no later than December 31, 2017 (Compliance Date). CECP anticipates that the repowering will be approved resulting in the retirement of Units 1-3, the associated shutdown of approximately 225 MGD and the replacement of Units 1-3 with highly efficient, fast start combined cycle generation prior to the Compliance Date. In the event that the repowering of CECP is not completed by the Compliance Date, Cabrillo will retire Units 1-3 and cease withdrawing approximately 225 MGD of seawater.
Implementation Plan for Compliance with the California Policy on the Use of Coastal Estuarine Waters for Power Plant Cooling, Page 32
Exhibit 393

Also, SDG&E has been planning the retirement of Encina Units 1-3. In their testimony to the PUC regarding the approval of the 3 PPA's, SDG&E plans to retire Encina Units 1-3 by 2013, ahead of the 2017 deadline. SDG&E's plan does not include the CECP to accomplish this task.

... subsequent to the Commission's resource need determination for SDG&E, the State Water Resources Control Board adopted an OTC policy that is intended to phase out or greatly reduce the use of coastal and estuarine waters for power plant cooling. This regulation policy dictated that the Encina Power Plant (960 MW) must meet this new obligation by December 31, 2017. Accordingly, SDG&E believes it is prudent, if not necessary, to plan for Encina's existing capacity to be retired in anticipation of this date. For this Application, SDG&E recommends that the Commission assess not only SDG&E's need in 2015 but also through 2018 on the reasonable assumption that the Encina Power Plant will be retired in full at the end of 2017. SDG&E assumes the retirement of Encina units 1, 2 and 3, representing a total of 320 MW by 2013, with the remaining capacity to be retired in 2017.
Prepared Direct Testimony of San Diego Gas & Electric Company In Support of Application for Authority to Enter Into Purchase Power

Agreements with Escondido Energy Center, Pio Pico Energy Center and Quail Brush Power, Page 10

(A quote from the Independent Evaluator's report is included to support SDG&E testimony also addresses the issue of Encina Units 1-3 and their closure.)

The Once Through Cooling (OTC) policy adopted by the state Water Resources Control Board to phase out or greatly reduce the use of coastal and estuarine waters for power plant cooling.9 The Encina Power Plant (960 MW) must meet this relatively new obligation by December 31, 2017. Hence, to estimate need, SDG&E now assumes the retirement of Encina units 1, 2 and 3, or a total of 320 MW by 2013, with the remaining Encina capacity to be retired in 2017.
Page 7 of the Independent Evaluators Report Product 2: New Local Generation and SDG&E's June 9, 2009 RFO for Demand Response and Supply Resources

SDG&E's testimony (along with that of the Independent Evaluator's) presents a clear picture that with the addition of the 3 PPA's, the shutdown of Encina Units 1-3 becomes possible in 2013. Both ending OTC from Encina 1-3 and maintaining grid reliability are accomplished without the CECP.

c. Reliability in the San Diego Region- (Mr. Peters' "third" issue was)

And finally, as the PMPD recognizes, the greater San Diego area requires a certain amount of local generation resources. The ISO assesses how much local generation is needed pursuant to federal reliability standards under which the ISO must plan system operations. And with regard to the Errata to the PMPD, we would agree that revision to Item No. 12 on page four is consistent with the ISO's analysis completed in the 2013 to 2015 local capacity technical analysis. So the proposed Carlsbad Energy Center would help insure a more reliable electric system in the San Diego area. And based on current supply and load forecasts, ISO believes that the PMPD correctly concludes that without construction of the Carlsbad Energy Center Project retirement of Encina Units 1 to 3 may be difficult to accomplish.
June 30, 2011 Energy Commission Business Meeting, Pages 58-60

At this time, Terramar would like to enter into the record a copy of :

California Independent System Operator and San Diego Gas & Electric Company Reliability Standards Agreement
Exhibit 394

This document is a series of agreements between the two parties. The documents clearly delineate the responsibilities, schedules, etc. of each party. Terramar would like to stress the importance of these documents because they identify the extensive duties that CAISO has contracted to SDG&E to perform in the San Diego region to maintain grid reliability. Offering PPA contracts is just one way that SDG&E performs their tasks of maintaining grid reliability. CAISO decides the need for the region and SDG&E contracts for the power to maintain the grid reliability.

Mr. McIntosh, Director at CAISO clearly pointed out at the Carlsbad Hearing that the utilities decide what projects receive contracts "to meet the needs" of the region.

> "*We determine the need, that's correct, and the utilities contract for the power.*"
> Testimony from Carlsbad Hearing Feb. 3, 2011, p. 213

Mr. Layton, manager of the engineering office of the CEC, offered further testimony that if a project doesn't get a power purchase agreement that it would not operate.

> *Again, if they are needed, they will get a power purchase agreement and they will operate. If they are not needed, they may not get a power purchase agreement and they will not operate.*"
> Testimony from Carlsbad Hearing Feb. 3, 2011, p. 258

Mr. Vidaver, CEC Electricity Generation Systems Specialist, offered more clarification that the regional grid support could come from any location in the San Diego area.

> *"The ability to provide dispatchable or dependable capacity in the San Diego local reliability area, and thereby retiring the existing units at Encina can be accomplished, as far as I know, by any replacement capacity located anywhere in the San Diego area. So to say that the Carlsbad energy project is critical is setting -- at the very least it's setting a standard that's not possible to meet."*
> Testimony from Carlsbad Hearing Feb. 3, 2011, page 325

SDG&E plays a critical role in supporting grid reliability for the San Diego area. This role was given to SDG&E by CAISO through contractual agreement. One of those responsibilities is to fill the need for power in order to support grid reliability. SDG&E has accomplished this responsibility by offering PPA's to the three projects- EEC, PPEC, and QBGP therefore, solving the "regional need" concern indicated by Mr. Peters June 30, 2011.

4. The federal PSD permit that the project will require in order to operate.

At this time, Terramar wants to introduce email communications between Terramar and Shaheerah Kelly, Air Division, US EPA, Region 9. Exhibit 395

According to Ms. Kelly, the EPA has received no communication from NRG regarding the CECP. It has now been five months since NRG lost their PSD determination.

Terramar asked EPA if the CECP would be analyzed the same way as Palmdale. Ms. Kelly said she could not answer that question until she received communication from NRG. Therefore, it is impossible to know if the Palmdale project offers any valuable information to the AFC Committee until EPA receives communication from NRG.

Terramar wonders if NRG is pursuing the CEC license to make their property more valuable on the market for their stockholders but don't really intend to build CECP since they have made no attempt to contact the EPA.

5. Recent City land use LORS amendments contained in Resolution 2011-230 And Ordinance CS-158:

Terramar supports testimony from the City of Carlsbad and Carlsbad Redevelopment Agency as well as Power of Vision on this topic. We reserve the right to rebut testimony of any witnesses on this subject.

In addition, Terramar quotes from the Energy Commission Staff Response:

> ***Resolution Number 2011-230*** *(General Plan Amendment 11-06 and Local Coastal Plan Amendment 11-06): Staff believes that the general plan amendment, though confusingly worded, restricts "public utilities" use to areas outside the coastal zone. This revision would make CECP inconsistent with provisions in the City's general plan. The Local Coastal Plan amendment would appear to have a similar effect, but is not effective until approved by the California Coastal Commission. Thus, CECP is not inconsistent with this provision unless and until it is approved by that agency.*
> *Staff is interested in hearing what the applicant and City have to say on these consistency issues. If Staff is correct regarding the inconsistency of the LORS specified above with the CECP project, the Commission will be required to make the findings specified in Public Resources Code Section 25525 if it is to license the project.*
> ENERGY COMMISSION STAFF RESPONSE TO COMMITTEE ORDER Pages 6-7

It is abundantly clear that the CEC staff realizes that CECP violates the Carlsbad General Plan and either an override must be made or the CECP must be denied.

To override LORS the CEC would need to prove that- the facility is required for public convenience and necessity; and there are not more prudent and feasible means of achieving such public convenience and necessity. (Pub Resource Code §25525).

The 3 PPA's make this override virtually impossible to support, as they fulfill the public convenience and necessity. Therefore, the CEC can only deny the project.

6. Additional evidence, not previously presented, regarding whether it is appropriate to override either unmitigated environmental impacts or noncompliance with state or local LORS.

Terramar is waiting for a response from Ms. Mata from the San Diego Regional Quality Control Board. Terramar is also waiting for a response from Dr. Moore from the San Diego Air Pollution Control Board. We reserve the right to submit these responses as evidence received from these two resources in our rebuttal testimony.

Terramar supports testimony from the City of Carlsbad, Carlsbad Redevelopment Agency and POV on this topic. We reserve the right to rebut testimony of any witnesses on this subject.

Terramar Witness List, Testimony Time Estimates, Rebuttal Time Estimates, and Exhibit List

Topic	Witness	Testimony Time	Rebuttal Time
PPA Impacts	Kerry Siekmann	10 min	10 min
Land 2 & 3	Kerry Siekmann	10 min	10 min
Grid Reliability	Kerry Siekmann	10 min	10 min
PSD	Kerry Siekmann	5 min	10 min
	*Steve Moore	10 min	
City LORS			5 min
Overrides			10 min

Exhibit List

390 CEC Home Page for Pio Pico energy Center Power Project, 11-AFC-01

391 CEC Home Page for Quail Brush Generating Project, 2011-AFC-03

392 Minutes from July 12, 2011 Escondido Planning Commission-Modification to A Conditional Use Permit – PHG 11-0005 approving a "peaker" generating facility.

393 5 pages of email communications between Kerry Siekmann and Shaheerah Kelly, Air Division, US EPA Region 9 regarding CECP PSD communication.

394 Implementation Plan for Compliance with California Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling, Encina Power Station, March, 2011

395 California Independent System Operator and San Diego Gas & Electric Company Reliability Standards Agreement

The California ENERGY COMMISSION

Pio Pico Energy Center Power ProjectDocket Number:

11-AFC-01
(Application For Certification)

Committee Overseeing This Case:

Carla Peterman, Commissioner
Presiding Member

Karen Douglas, Commissioner
Associate Member

Hearing Officer: Raoul Renaud

Key Dates

- 2/9/2011 - Application for Certification (AFC) filed
- 4/20/2011 - Commission accepts AFC as "data adequate."

General Description Of Project

On February 9, 2011 Pio Pico Energy Center LLC submitted an Application for Certification (AFC) to the California Energy Commission seeking permission to to construct and operate a power generation facility, the Pio Pico Energy Center (PPEC), in the County of San Diego, adjacent to the existing Otay Mesa Generating Project.

The Pio Pico Energy Center is a proposed simple-cycle power generation project that consists of three General Electric LMS100 natural gas-fired combustion turbine generators. The total net generating capacity would be 300 megawatts, with each CTG capable of generating 100 megawatts.

Energy Commission Facility Certification Process

The California Energy Commission is the lead agency (for licensing thermal power plants 50 megawatts and larger) under the California Environmental Quality Act (CEQA) and has a certified regulatory program under CEQA. Under its certified program, the Energy Commission is exempt from having to prepare an environmental impact report. Its certified program, however, does require environmental analysis of the project, including an analysis of alternatives and mitigation measures to minimize any significant adverse effect the project may have on the environment.

For Questions About This Siting Case Contact:

Eric K. Solorio
Project Manager
Siting, Transmission and Environmental Protection (STEP) Division
California Energy Commission
1516 Ninth Street, MS-2000
Sacramento, CA 95814
Phone: 916-651-0966
Fax: 916-654-3882
E-mail: ESolorio@energy.state.ca.us

For Questions About Participation In Siting Cases Contact:

Public Adviser
California Energy Commission

1516 Ninth Street, MS-12 Sacramento, CA 95814
Phone: 916-654-4489
Toll-Free in California: 1-800-822-6228
E-mail: PublicAdviser@energy.state.ca.us

News Media Please Contact:

Media & Public Communications Office
Phone: 916-654-4989
E-mail: mediaoffice@energy.state.ca.us

Last Modified: 04/29/11

The California ENERGY COMMISSION

Quail Brush Generating Project

Docket Number: **2011-AFC-3**
(Application For Certification)

Committee Overseeing This Case:

Karen Douglas, Commissioner
Presiding Member

Carla Peterman, Commissioner
Associate Member

Hearing Officer: Raoul Renaud

Key Dates

- 8/29/2011 - Application for Certification (AFC) filed
- 11/16/2011 - Commission accepts AFC as "data adequate."

GENERAL DESCRIPTION OF PROJECT

The proposed Quail Brush Generation Project (Project) is a nominal 100-megawatt (MW) intermediate/peaking load electrical generating facility. It would consist of a set of eleven (11) natural gas-fired reciprocating Wartsila engine generators. The proposed project has a long-term Power Purchase Tolling Agreement (PPA) with SDG&E as a result of a 2009 Request for Offers (RFO). The Project would support SDG&E's efforts to increase reliance on wind, solar and other renewable energy resources. It would also provide peaking and load-shaping power to the grid, along with several ancillary services intended to assure system reliability within the SDG&E service area.

The Project is proposed to be located in the City of San Diego, California, west of the City of Santee, south of the Sycamore Landfill and north of State Route 52. The portion of the Project where the power plant (plant) is proposed to be constructed is approximately 11 acres and is located within a 21.6- acre privately owned parcel optioned by Development Land Holdings, LLC. The Project company Quail Brush Genco, LLC (Applicant), and Development Land Holdings are wholly owned subsidiaries of Cogentrix Energy, LLC. Additional Project components located beyond the plant site would include a 230 kilovolt (kV) generation tie-line (gen tie), utility switchyard, and natural gas pipeline lateral.

Energy Commission Facility Certification Process

The California Energy Commission is the lead agency (for licensing thermal power plants 50 megawatts and larger) under the California Environmental Quality Act (CEQA) and has a certified regulatory program under CEQA. Under its certified program, the Energy Commission is exempt from having to prepare an environmental impact report. Its certified program, however, does require environmental analysis of the project, including an analysis of alternatives and mitigation measures to minimize any significant adverse effect the project may have on the environment.

For Questions About This Siting Case Contact:

Eric K. Solorio
Project Manager
Siting, Transmission and Environmental Protection (STEP) Division
California Energy Commission
1516 Ninth Street, MS-2000
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Phone: 916-654-4489
Toll-Free in California: 1-800-822-6228
E-mail: PublicAdviser@energy.state.ca.us

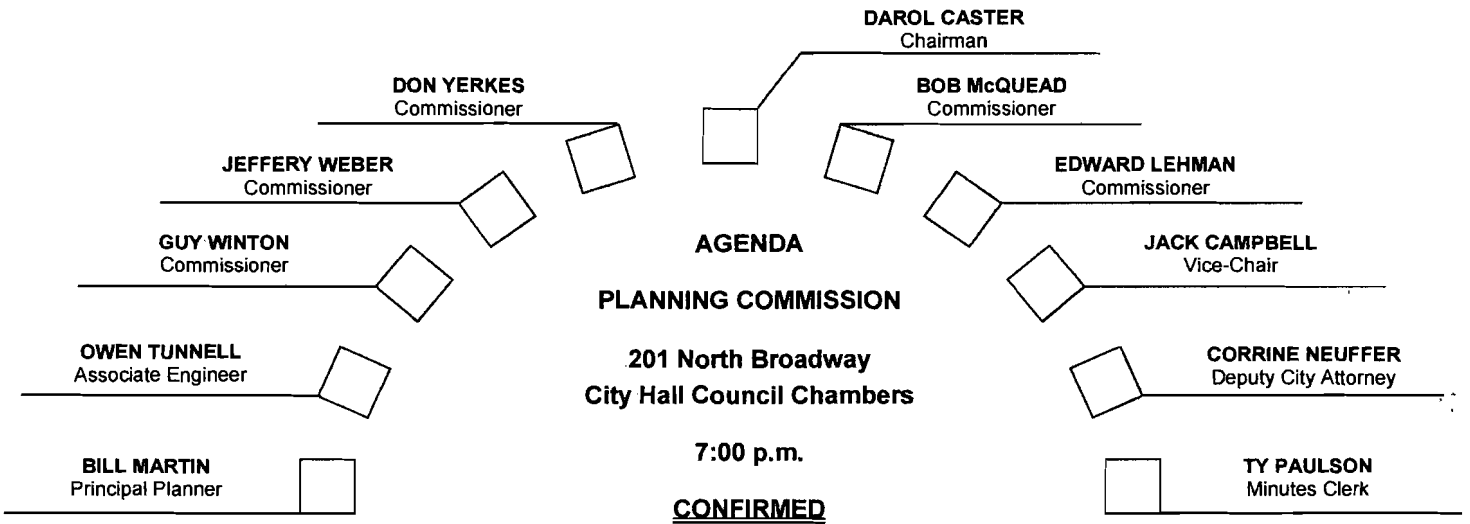
News Media Please Contact:

Media & Public Communications Office
Phone: 916-654-4989
E-mail: mediaoffice@energy.state.ca.us

Last Modified: 11/16/11

CITY OF ESCONDIDO

Planning Commission and Staff Seating



AGENDA

PLANNING COMMISSION

201 North Broadway
City Hall Council Chambers

7:00 p.m.

CONFIRMED
July 12, 2011

A. CALL TO ORDER: 7:00 p.m.

B. FLAG SALUTE

C. ROLL CALL: PRESENT: Campbell, Caster, McQuead, Weber, Winton and Yerkes
ABSENT: Lehman

D. MINUTES: June 28, 2011 APPROVED 6-0-0 (Lehman was absent)

The Brown Act provides an opportunity for members of the public to directly address the Planning Commission on any item of interest to the public before or during the Planning Commission's consideration of the item. If you wish to speak regarding an agenda item, please fill out a speaker's slip and give it to the minutes clerk who will forward it to the chairman.

Electronic Media: Electronic media which members of the public wish to be used during any public comment period should be submitted to the Planning Division at least 24 hours prior to the meeting at which it is to be shown.

The electronic media will be subject to a virus scan and must be compatible with the City's existing system. The media must be labeled with the name of the speaker, the comment period during which the media is to be played and contact information for the person presenting the media.

The time necessary to present any electronic media is considered part of the maximum time limit provided to speakers. City staff will queue the electronic information when the public member is called upon to speak. Materials shown to the Commission during the meeting are part of the public record and may be retained by the City.

The City of Escondido is not responsible for the content of any material presented, and the presentation and content of electronic media shall be subject to the same responsibilities regarding decorum and presentation as are applicable to live presentations.

If you wish to speak concerning an item not on the agenda, you may do so under "Oral Communications" which is listed at the beginning and end of the agenda. All persons addressing the Planning Commission are asked to state their names for the public record.

Availability of supplemental materials after agenda posting: any supplemental writings or documents provided to the Planning Commission regarding any item on this agenda will be made available for public inspection in the Planning Division located at 201 N. Broadway during normal business hours, or in the Council Chambers while the meeting is in session.

The City of Escondido recognizes its obligation to provide equal access to public services for individuals with disabilities. Please contact the A.D.A. Coordinator, (760) 839-4641, with any requests for reasonable accommodation at least 24 hours prior to the meeting.

The Planning Division is the coordinating division for the Planning Commission.
For information, call (760) 839-4671.

E. WRITTEN COMMUNICATIONS:

"Under State law, all items under Written Communications can have no action, and will be referred to the staff for administrative action or scheduled on a subsequent agenda."

1. Future Neighborhood Meetings

F. ORAL COMMUNICATIONS:

"Under State law, all items under Oral Communications can have no action, and may be referred to the staff for administrative action or scheduled on a subsequent agenda."

This is the opportunity for members of the public to address the Commission on any item of business within the jurisdiction of the Commission.

G. PUBLIC HEARINGS:
Please try to limit your testimony to 2-5 minutes.

1. CONDITIONAL USE PERMIT – PHG 11-0026:

REQUEST: A modification to a previously approved Conditional Use Permit to remove the existing four AT&T wireless communication panel antennas located within an approximately 73-foot-high church steeple/cross at the New Life Presbyterian Church and install nine new antenna panels within the structure. The installation of the new panels would not require any exterior modifications to the existing church steeple/cross.

LOCATION: New Life Presbyterian Church, 615 W. Citracado Parkway (APN 238-110-37).

ENVIRONMENTAL STATUS: The proposal is exempt from the requirements of the California Environmental Quality Act (CEQA) in conformance with Section 15301, "Existing Facilities."

APPLICANT: AT&T

STAFF RECOMMENDATION: Continue to August 9, 2011

COMMISSION ACTION: **APPROVED 6-0-0 (Lehman was absent)**

PROJECTED COUNCIL HEARING DATE:

2. MODIFICATION TO A CONDITIONAL USE PERMIT – PHG 11-0005:

REQUEST: A proposed Modification to the previously approved Conditional Use Permit to allow an upgrade with more modern and efficient equipment to the existing "peaker" generating facility now owned by Escondido Energy Center, LLC. The improvements will include façade and equipment changes, a reduction in stack height and modifications to the footprints of the buildings as previously approved, an improvement in the present facility's air quality emissions, and a reduction in operating hours to 2900 hours per year. The 1.67 acre subject site is zoned M-2 (General Industrial) and is within the City's HCO (Hazardous Chemical Overlay).

PROPERTY LOCATION: Between Don Lee Place and Mission Road, east of Auto Park Way, addressed as 1968 Don Lee Place (APN 228-381-7800).

ENVIRONMENTAL STATUS: The proposed project has been analyzed for its compliance with the California Environmental Quality Act (CEQA) and a Notice of Exemption has been prepared.

APPLICANT: Escondido Energy Center, LLC

STAFF RECOMMENDATION: Approval

COMMISSION ACTION: **APPROVED 6-0-0 (Lehman was absent)**

PROJECTED COUNCIL HEARING DATE: **None.**
Reso. No. 5930

3. CONDITIONAL USE PERMIT – PHG 11-0014:

REQUEST: A Conditional Use Permit to install a wireless communication facility for Verizon Wireless consisting of 12 panel antennas attached to an approximately 71-foot-high church steeple/cross at the Grace Lutheran Church. The antennas would be installed behind RF transparent screens that would be textured and painted to match the existing steeple structure. A 240 square foot equipment building would be installed on the roof of a building adjacent to the sanctuary and would be designed to match an adjacent T-Mobile equipment building.

LOCATION: Grace Lutheran Church, 643 W. 13th Avenue.

ENVIRONMENTAL STATUS: The proposal is exempt from the requirements of the California Environmental Quality Act (CEQA) in conformance with Section 15301, "Existing Facilities."

APPLICANT: Verizon Wireless

STAFF RECOMMENDATION: Approval

COMMISSION ACTION: **APPROVED 6-0-0 (Lehman was absent)**

PROJECTED COUNCIL HEARING DATE: **None.**
Reso. No. 5932

H. CURRENT BUSINESS:

Note: Current Business items are those which under state law and local ordinances do not require either public notice or public hearings. Public comments will be limited to a maximum time of three minutes per person.

I. ORAL COMMUNICATIONS:

"Under State law, all items under Oral Communications can have no action and may be referred to staff for administrative action or scheduled on a subsequent agenda."

This is the opportunity for members of the public to address the Commission on any item of business within the jurisdiction of the Commission.

J. PLANNING COMMISSIONERS

K. ADJOURNMENT at 7:31 p.m. to the next regularly scheduled Planning Commission meeting to be held at 7:00 p.m. on Tuesday, July 26, 2011 in the City Council Chambers, 201 N. Broadway, Escondido, CA 92025.

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From: Kelly.Shaheerah@epamail.epa.gov (Kelly.Shaheerah@epamail.epa.gov)
To: siekmann1@att.net;
Date: Tue, November 29, 2011 4:27:28 PM
Cc:
Subject: Re: Carlsbad Energy Center

Kerry,

I have no new updates on CECP. Until we receive something, it is difficult to say how it will be analyzed.

****
Shaheerah Kelly
Air Division (AIR-3)
U S EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105
Phone: 415-947-4156
Fax: 415-947-3579
email: kelly.shaheerah@epa.gov

From: Kerry Siekmann <siekmann1@att.net>
To: Shaheerah Kelly/R9/USEPA/US@EPA
Date: 11/29/2011 01:52 PM
Subject: Re: Carlsbad Energy Center

Shaheerah,
My testimony is due to the CEC on Thursday, so I am just checking to see if you have received anything anything regarding the CECP project since Nov. 16.

Also, NRG has placed the PSD Permit information for the Palmdale Hybrid Power Project into the record. record. NRG is submitting the Palmdale's PSD evaluation as comparable to CECP and therefore CECP will will be able to get their PSD if it is required by the EPA. My question to you is "Just because Palmdale was Palmdale was analysed a certain way for PSD by the EPA, does that mean that the CECP will be analysed analysed the same way?"
I will most likely submit your answer as part of my testimony.
Thank You,
Kerry Siekmann

From: "Kelly.Shaheerah@epamail.epa.gov" <Kelly.Shaheerah@epamail.epa.gov>
To: Kerry Siekmann <siekmann1@att.net>
Sent: Wed, November 16, 2011 1:34:20 PM
Subject: Re: Carlsbad Energy Center

Ms. Siekmann,

To date, my office (Air Permits Office) has not received anything from NRG regarding the CECP project.

****
Shaheerah Kelly
Air Division (AIR-3)

U S EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105
Phone: 415-947-4156
Fax: 415-947-3579
email: kelly.shaheerah@epa.gov

From: Kerry Siekmann <siekmann1@att.net>
To: Shaheerah Kelly/R9/USEPA/US@EPA
Date: 11/16/2011 01:23 PM
Subject: Re: Carlsbad Energy Center

Shaheerah
Please let me know if you have heard anything from NRG regarding the CECP project in Carlsbad, Ca. We We have to have our testimony submitted to the Ca. Energy Comm. soon and I need to know if anything anything has happened.

Thank you,
Kerry Siekmann

From: Kerry Siekmann <siekmann1@att.net>
To: Kelly.Shaheerah@epamail.epa.gov
Sent: Fri, November 11, 2011 10:50:51 AM
Subject: Re: Carlsbad Energy Center

Shaheerah
Have you received anything from the Carlsbad Energy Center Project? We are going to have another hearing with the Ca. Energy Commission and one of the topics of discussion is PSD permit for the project. project.
Look forward to your answer,
Kerry Siekmann

From: "Kelly.Shaheerah@epamail.epa.gov" <Kelly.Shaheerah@epamail.epa.gov>
To: Kerry Siekmann <siekmann1@att.net>
Sent: Mon, September 12, 2011 12:03:51 PM
Subject: Re: Carlsbad Energy Center

Kerry,

To my knowledge, my office has not received anything regarding the Carlsbad Energy Center.

****

Shaheerah Kelly
Air Division (AIR-3)
U S EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105
Phone: 415-947-4156
Fax: 415-947-3579
email: kelly.shaheerah@epa.gov

From: Kerry Siekmann <siekmann1@att.net>
To: Shaheerah Kelly/R9/USEPA/US@EPA
Date: 09/12/2011 09:06 AM
Subject: Re: Carlsbad Energy Center

Shaheerah
Have you received anything from NRG regarding the Carlsbad Energy Center Project? Tomorrow is the day I go to Sacramento to meet with the California Energy Commission and it is important for me to know know this information (per our conversation).
Thank you for your help.
Kerry Siekmann

From: "Kelly.Shaheerah@epamail.epa.gov" <Kelly.Shaheerah@epamail.epa.gov>
To: Kerry Siekmann <siekmann1@att.net>
Sent: Thu, August 4, 2011 4:42:37 PM
Subject: Re: Carlsbad Energy Center

I have not received another request from NRG.

****

Shaheerah Kelly
Environmental Engineer
Permits Office, Air Division
U. S. Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, CA 94105
Phone: 415-947-4156
Fax: 415-947-3579
email: kelly.shaheerah@epa.gov

From: Kerry Siekmann <siekmann1@att.net>
To: Shaheerah Kelly/R9/USEPA/US@EPA
Date: 08/04/2011 03:58 PM
Subject: Re: Carlsbad Energy Center

Ms. Kelly
Have you received an applicability request from NRG regarding the Carlsbad Energy Center Project yet? yet?
Kerry Siekmann

From: Shaheerah Kelly <Kelly.Shaheerah@epamail.epa.gov>

To: Kerry Siekmann <siekmann1@att.net>
Sent: Tue, July 19, 2011 5:17:12 PM
Subject: Re: Carlsbad Energy Center

Ms. Siekmann,

Thank you for your interest. Applicability determinations are case-specific. EPA has not received another applicability request from NRG. We notified interested persons of the letter recently issued regarding the Carlsbad Energy Center project.

****

Shaheerah Kelly
Environmental Engineer
Permits Office, Air Division
U. S. Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, CA 94105
Phone: 415-947-4156
Fax: 415-947-3579
email: kelly.shaheerah@epa.gov

From:	Kerry Siekmann <siekmann1@att.net>
To:	Shaheerah Kelly/R9/USEPA/US@EPA
Date:	07/19/2011 12:29 PM
Subject:	Re: Carlsbad Energy Center

Ms. Kelly,
One more question that I forgot to add to my email.

How does public involvement happen after the order is out? I am keenly interested in the process.

Thank you again.
Kerry Siekmann

From: Kerry Siekmann <siekmann1@att.net>
To: Shaheerah Kelly <Kelly.Shaheerah@epamail.epa.gov>
Sent: Tue, July 19, 2011 12:27:21 PM
Subject: Re: Carlsbad Energy Center

Ms. Kelly,

Thank you for forwarding the EPA letter regarding the Carlsbad Energy Center Project. I do have a couple couple of questions.

Am I correct in assuming that the baseline years used for the new determination will be more recent (within (within five years of start of construction)?

Where can I go to find out the guidelines that will be used by the EPA for the new determination based on based on the criteria pollutants and GHG's?
Thank you and I look forward to your answers.
Kerry Siekmann

From: Shaheerah Kelly <Kelly.Shaheerah@epamail.epa.gov>
To: siekmann1@att.net
Cc: Kelly.Shaheerah@epa.gov
Sent: Mon, July 18, 2011 4:32:28 PM
Subject: Carlsbad Energy Center

Dear Ms. Siekmann,

EPA issued the attached letter regarding the Carlsbad Energy Center project. Please contact me if you have any questions.

Sincerely,
Shaheerah Kelly

****

Shaheerah Kelly
Environmental Engineer
Permits Office, Air Division
U. S. Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, CA 94105
Phone: 415-947-4156
Fax: 415-947-3579
email: kelly.shaheerah@epa.gov

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Implementation Plan for Compliance with California Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling

Cabrillo Power I LLC

Encina Power Station

March 2011

Figures

Attachments

Executive Summary

The Implementation Plan for Compliance (Implementation Plan) with the Statewide Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling (Policy) prepared for Cabrillo Power I LLC (Cabrillo) will identify how the Encina Power Station (EPS) will achieve compliance (final compliance date December 31, 2017 [Compliance Date]) in response to the California State Water Resource Control Board (SWRCB) Policy which became effective on October 1, 2010. The Policy offers two alternatives for compliance. Track 1 requires the reduction of the intake flow rate to a level corresponding to a closed-cycle wet cooling system; through screen intake velocity must not exceed 0.5 foot per second (fps); or installation of closed cycle dry cooling systems meets the intent and minimum reduction requirements. If demonstration of compliance with Track 1 is not feasible, the Track 2 alternative requires that impingement mortality and entrainment (IM&E) of marine life for the facility must be reduced to a level comparable to that achievable under Track 1, using operational or structural controls, or both.

Encina Power Station Design

EPS is a fossil fuel steam electric power generating station located in Carlsbad, California that withdraws cooling water from the Pacific Ocean via the adjacent Agua Hedionda Lagoon (AHL). The EPS cooling water system uses ocean water to cool the plant's steam condensers in each of the five steam electric generating units. In full operation, the cooling water flow through the plant is 595,200 gallons per minute (gpm) or 857 million gallons per day (MGD). Seawater enters a single cooling water intake structure (CWIS), supplying all five steam-generating units, passing through metal trash racks with vertical bars that are spaced approximately 3.5 inches (in) apart which prevent large debris from entering the system. At mean sea level the calculated approach velocity is 2.9 fps at maximum flow volume. Vertical traveling water screens consisting of a continuous vertical belt of wire mesh panels (Units 1 through 4 = ⅜ in mesh; Unit 5 = ⅝ in mesh) prevent fish and debris from entering the cooling water system. Both trash racks and screen panels are periodically cleaned to remove debris.

The cooling water discharge is regulated under the National Pollutant Discharge Elimination System (NPDES) Permit No. CA0001350. The temperature of the discharge is regulated under the effluent limits of the NPDES Permit, and shall not average more than 20 degrees Fahrenheit (°F) above that of the incoming water during any 24-hour period, nor exceed the incoming lagoon water temperature by more than 25 °F. Biofouling from microfauna and macrofauna too small to be filtered can decrease plant efficiency and impede water flow through the condensers. To ensure plant efficiency, chlorination is conducted on

an as needed basis to prevent microfauna biofouling. Heat treatments of 105 °F have been conducted in the intake tunnels every five to eight weeks to prevent macrofauna biofouling. During heat treatment under NPDES Permit effluent limits, heat added to the cooling water shall not cause the temperature of the combined discharge to the ocean to exceed 120 °F for more than two hours. Additionally, EPS routinely dewaters tunnels to manually clean biofouling from the tunnel walls and floor. Condensers are manually cleaned when they become plugged with biota. EPS has opted to perform more frequent manual cleaning than heat treatments in an effort to reduce IM.

Entrainment and Impingement Studies

Two IM&E studies have been conducted at EPS; the first from 1979-1980 and the second during 2004-2005 (See Attachment 1). The 1979-1980 entrainment and source water study entailed collection of monthly plankton samples offshore and in the Inner Lagoon, every two weeks in the Outer Lagoon and every two weeks in front of intakes during daylight hours. The average composition of source and entrainment collections were similar; anchovies (*Engraulidae* spp.) were the most abundant larval fish in both collections, more goby (*Gobiidae* spp.) larvae were collected in entrainment samples, and more kelp and sand bass (*Serranidae* spp.) larvae were collected in source water samples. The 2004-2005 study entailed collection of 13 total monthly surveys at a single station in front of the intake structure. All water in front of the intakes was assumed to have been entrained considering the narrow lagoon construction and constant current flow. Gobies and blennies (*Hypsoblennius* spp.), small fishes that inhabit the mud bottom, and rock and fouling habitats, respectively, in the lagoon accounted for the majority of the larvae collected from the entrainment samples.

The 1979-1980 impingement studies entailed measurement of daily fish and shellfish abundance and weights over 336 days at 12-hour periods. The highest number of fish impinged included open water schooling fish (e.g., queenfish [*Seriphus politus*]), with the greatest numbers being collected in the tunnels during heat treatments in winter. Most shellfish impinged included the commercially valuable yellow crab (*Cancer anthonyi*) and market squid (*Loligo opalescens*). The 2004-2005 impingement studies measured fish and shellfish abundance, weights and lengths during normal operations from 24-hour samples collected weekly and during six heat treatments at night. About 70 percent of impingement occurred during normal operations. Open water fish, such as queenfish and topsmelt (*Atherinops affinis*), comprised most of the species impinged.

The composition of the fish larvae collected from the two studies was similar and impingement biomass was also comparable. Overall fish abundance has increased between the two studies, likely due to changes in available habitats within AHL.

Recent Permits

On June 14, 1976, the San Diego Regional Water Quality Control Board (SDRWQCB) adopted Order No. 76-22, NPDES Permit No. CA0001350 for EPS. Numerous additional orders have been issued to EPS, the most recent being R9-2006-0043. EPS has submitted the permit renewal application for a new order to replace R9-2006-0043, which expires on October 1, 2011 (See Attachment 2).

Poseidon Resources Corporation (Poseidon) proposed to construct and operate the Carlsbad Desalination Project (CDP) on the site of EPS and use a portion of the EPS cooling water effluent for seawater desalination treatment. Cabrillo is not affiliated with Poseidon, who is the lessee. In 2006 Poseidon applied for and was issued an NPDES Permit (No. CA0109223) to allow discharge up to 254 MGD (57 MGD of wastewater and 197 MGD of dilution water). Under Order No. R9-2006-0065, Poseidon submitted a Flow, Entrainment and Impingement Minimization Plan (Minimization Plan) which was approved on May 13, 2009 (Order No. R9-2009-0038). The Minimization Plan identified "mitigation measures to minimize the impacts to marine organisms when the CDP intake requirements exceed the volume of water being discharged by the EPS."

Compliance Alternatives

Carlsbad Energy Center, LLC filed an Application for Certification (AFC) to develop a natural gas-fired generating facility which would use air cooled condensers, equivalent to dry cooling towers. In turn, EPS Units 1-3 would shut down and cease withdrawing seawater. Upon successful commercial operation of the Carlsbad Energy Center Project (CECP), but no later than December 31, 2017, EPS Units 1-3 will be retired and the seawater withdrawal associated with the once through cooling (OTC) water and service water systems for these units will cease. This will result in the complete elimination of approximately 225 millions of gallons per day (MGD). Through the retirement of Units 1-3 and repowering with dry cooling, Units 1-3 will comply with the requirements of the Policy under Track 1.

As demonstrated in Section 3.1, compliance with Track 1 for EPS Units 4 and 5 is not feasible as defined in the Policy and these units must comply with Track 2 or otherwise shutdown. A detailed analysis demonstrates that site space

constraints preclude the retrofit of EPS Units 4 and 5 with cooling towers. At EPS, plume abatement for wet cooling towers is considered necessary due to the site's close proximity to residences, roads (US I-5 and Carlsbad Boulevard), the beach, railroad tracks and agricultural roads. For Unit 4, an array of 14 cells that, depending on the arrangement, would require a total footprint of 550 to 1,010 feet (ft) in length (east-west direction) and 160 to 220 ft in width (north-south direction). A similar amount of space would be required for Unit 5. Even if space were available, permitting of these towers would be extremely difficult due to state and local permitting requirements and likely public opposition as evident by the City of Carlsbad's, Terramar's (community nearby to EPS), and Power of Vision's (local interest group) intervention into the current CECP permitting process. If only cooling tower makeup water is required for Units 4 and 5, additional water will be required to provide the 304 MGD required for CDP.

From review of prior impingement studies, more fish have been found to be impinged with an increased withdrawal rate and with an increase in heat treatments. To help comply with Track 2 impingement requirements for Units 4 and 5, less water withdrawn and less heat treatment will result in reduced impingement. EPS has recently reduced heat treatment frequency in an effort to reduce impingement mortality. Operational controls that can reduce withdrawal rates are also being considered.

To comply with Track 2 entrainment requirements, EPS will use the Equivalent Adult Modeling (EAM) approach to evaluate the effectiveness of screening technologies. The model uses natural mortality rates to account for all life stages of fishes potentially impacted by entrainment and standardizes an equivalent number of adults lost and life stages that would survive in the absence of impacts. Cabrillo will evaluate several control technologies and operational measures to reduce IM&E. Required mesh sizes for entrainment reduction will initially be selected based on a comparison of the larvae lengths from the 2004-2005 entrainment study, and length and head capsule dimensions of the highest recorded numbers of those entrained in California coastal power plants. Larvae entrained at EPS will be compared to proportions of those excluded by different mesh sizes accounting for varying lengths and head capsules for each life stage.

Alternate intake technologies have been considered for EPS and evaluated in previous 316(b) submittals. These technologies included fine and coarse mesh traveling screens, wedge-wire screens, barrier nets and microfiltration barriers. Behavioral devices included an offshore intake with velocity cap. Considering the Policy requirements for reduced IM&E, most options are not feasible or practical for EPS compliance.

A listing of the control technologies and operational measures that appear feasible after a preliminary review and will be further evaluated consists of:

- Fine Mesh Dual Flow Screens in Existing Intake
- New Fine Mesh Screening Structure
- Cylindrical Wedge-Wire Screens With Fine Slot Width
- C-Water AquaSweep™ (See Attachment 3)
- Flow Reductions

In considering options for reduction of IM&E impacts, a balance must be achieved to ensure the quality of AHL is maintained. Cabrillo is the owner of EPS as well as AHL. The ecology of the lagoon benefits directly from the flow resulting from the EPS cooling water intake system. With the current EPS operation, the inlet and the lagoon are periodically dredged to maintain the flow. Without the flow from EPS, sediment accretion would accelerate, potentially resulting in inadequate flow through the inlet and a decrease in water quality that would substantially affect the multiple beneficial uses of the lagoon, such as water recreation in the Inner lagoon and the aquaculture operations in the Outer Lagoon, including the white sea bass (*Atractoscion nobilis*) restoration program at the Hubbs Sea World Research Institute. The benefit to water quality in AHL can be seen from a similar situation in Alamitos Bay when the operation of Alamitos Generating Station (AGS) was reduced due to lower energy demand in recent years. As a result of the reduced flow from AGS, concern was expressed over odor problems and bacteria in the Los Cerritos Wetlands. AGS was contacted with a request to discuss options for maintaining flow in the channel in order to maintain the health of the Los Cerritos Wetlands even during times when cooling water is not needed by the plant.

Immediate/Interim Requirements

Large organism exclusion devices are not required at EPS since intakes are not located offshore and intake trash racks exclude large organisms. To mitigate for interim IM&E impacts, Cabrillo proposes to provide three dollars ($3.00) for every one million gallons withdrawn by each generating unit to the California Coastal Conservancy from October 1, 2015 and continuing up to and until final compliance (December 31, 2017).

Cabrillo is also interested in discussing potential credit towards the interim mitigation payments for the periodic maintenance dredging conducted by EPS

for maintaining tidal flow to AHL. A precedent for this credit is the permit conditions for the restoration of the San Dieguito wetlands being funded by Southern California Edison for the impacts of the San Onofre Nuclear Generating Station (SONGS) that provides for up to 35 acres of enhancement credit for the, continuous maintenance of tidal flows through the system by dredging the channel out to the ocean.

Monitoring Plan

No additional monitoring is proposed at EPS until studies are required to prove installed technologies are providing necessary reductions under the new Policy. Until then, data from the 2004-2005 study remains as the appropriate baseline IM&E data, as the data for that study were collected using the same standard sampling techniques used for studies at other coastal power plants in recent years including the use of 335 micron mesh net for the entrainment sampling as specified in Section 4.B. (1) on Track 2 Monitoring Provisions in the Policy. The quality of the data collected during the 2004–2005 study is reflected in the fact that it has been used for recent California permits for the Poseidon CDP at EPS which have been reviewed and approved by several state and federal resource agencies. With the exception of species abundance, impinged and entrained species composition should not be expected to change unless habitats change drastically near AHL. Cabrillo will propose an appropriate monitoring plan once a technology has been pilot tested and determined adequate for meeting the IM&E criteria contained in the Policy.

Compliance Schedule

Below is the proposed schedule for EPS to comply with the Policy:

- April 1, 2011: Submit Implementation Plan to outline Track 1 and/or Track 2 compliance with IM&E.
- October 1, 2011: Verify Policy requirement that no greater than 9 in spacing between bars for the intake structure is in compliance with the large organism exclusion devices. This requirement has been satisfied as the distance between the trash rack bars in front of the intake structure are 3.5 in.
- October 31, 2011: Potential SWRCB approval of the Implementation Plan.
- December 31, 2011: Develop engineering and biological assessment of proposed technologies and develop pilot testing program.

- July 2012: Install approved pilot technology to assess IM&E reduction.
- July 2012 - April 2014: Perform quantitative study to evaluate IM&E reductions by pilot technology.
- October 2015: Initiate full scale installation and deployment of approved technology.
- October 2015 - May 2017: Implement an approved quantitative study to demonstrate compliance with IM&E objectives in the Policy from full scale deployment of technology.
- October 1, 2015 - December 31, 2017: Apply Interim Mitigation fee of $3.00/million gallons based on actual flow to the California Coastal Conservancy. The fee will be paid on an annual basis. Interim mitigation fee will be canceled if demonstration of Policy compliance is achieved prior to or after October 2015, but before the Compliance Date.
- December 31, 2017 (on or before): Demonstrate compliance with Policy.

1. Introduction

1.1 California Statewide Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling

On May 4, 2010 the California State Water Resources Control Board (SWRCB) adopted a Statewide Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling (Policy) which became effective on October 1, 2010. The intent of the Policy is:

> *...to ensure that the beneficial uses of the State's coastal and estuarine waters are protected while also ensuring that the electrical power needs essential for the welfare of the citizens of the State are met.*

The Policy allows two compliance alternatives which must be approached serially.

Track 1 requires:

- Reduction of the intake flow rate at each unit, at a minimum, to a level commensurate to a closed-cycle wet cooling system (minimum 93 percent intake flow rate reduction for each unit compared to the unit's design intake flow rate)
- Through screen intake velocity must not exceed 0.5 foot per second (fps)
- Installation of closed cycle dry cooling systems meets the intent and minimum reduction requirements

If it can be demonstrated to the satisfaction of the SWRCB that compliance with Track 1 is not feasible, impingement mortality and entrainment (IM&E) of marine life for the facility must be reduced on a unit-by-unit basis to a level comparable to that achievable under Track 1, using operational or structural controls, or both.

For impingement, Track 2 requires:

- Demonstration that through-screen intake velocities are ≤ 0.5 fps

  or

- Monitored impingement mortality reductions of at least 90 percent of the reduction in impingement mortality required under Track 1 (i.e., at least 84 percent [90 percent of 93 percent])

For entrainment, Track 2 requires:

- If relying solely on reductions in flow, by recording and reporting a minimum of 93 percent reduction in monthly flow as compared to the average actual flow for the corresponding months from 2000 to 2005

  or

- Installation of other control technologies (e.g., including, but not limited to, screens or re-location of intake structures), in whole or in part which would reduce monitored entrainment at least 90 percent of the reduction required under Track 1 (i.e., at least 84 percent [90 percent of 93 percent])

Technology-based improvements that are specifically designed to reduce impingement mortality and/or entrainment and were implemented prior to October 1, 2010 may be counted towards meeting Track 2 requirements.

Immediate and interim requirements and their due dates applicable to the Encina Power Station (EPS) are:

- Implementation Plan: April 1, 2010
- Large mammal exclusion devices that meet 9-inch (in) minimum bar spacing: October 1, 2011
- Interim IM&E Impacts Mitigation: October 1, 2015 through the final compliance

The Policy requires final compliance for EPS by December 31, 2017.

The purpose of this Implementation Plan for Compliance (Implementation Plan) with the Policy is to identify how EPS will achieve compliance through the evaluation of alternative operational or structural controls, or both, potential general designs, construction or operational measures that will be undertaken to implement the alternative, and propose a realistic schedule for implementing these measures that is as short as possible. The Implementation Plan will also discuss the proposed repowering of Units 1-3 (permit anticipated in 2011) and to eliminate reliance upon once through cooling (OTC) at those units. The Implementation Plan shall describe possible time periods when generating power is infeasible and describe measures taken to coordinate this activity through the appropriate electrical system balancing authority's maintenance scheduling process. The Implementation Plan will also describe the proposed IM&E monitoring program.

1.2 USEPA 316(b) Regulatory History

The Federal Water Pollution Control Act was initially passed in 1972 (33 U.S.C. §1251 et seq.). This legislation, *inter alia*, addressed the issue of the environmental effects of the use of surface water for cooling, including fish losses involved with the cooling water system. The legislation resulted in regulations under §316(b) (40 CFR 125).

In the mid-1970s, the United States Environmental Protection Agency (USEPA) published 316(b) regulations and guidance which were declared invalid on procedural grounds in 1976 (Appalachian Power Company v. Train, 566 F.2d 451 [4th Cir. 1977]) and formally withdrawn by USEPA in 1979. Section 316(b) decisions were made based on a case-by-case best professional judgment (BPJ) of the permit writer.

In 1993, Riverkeeper, Inc. and a coalition of environmental organizations sued USEPA in order to require the promulgation of new cooling water intake regulations (Riverkeeper, Inc., *et al.* v. Whitman, U.S.D.C) resulting in a consent decree (1995 and revised in 2000). USEPA promulgated rules in 2001 (Phase I – new electric generating facilities, 40 CFR 125, Subpart I), 2004 (Phase II – large existing electric generating facilities, 40 CFR 125, Subpart J) and 2006 (Phase III – existing electric generating facilities, all other industrial facilities, 40 CFR 125, Subpart N [SIC listed] and new offshore and coastal oil and gas extraction facilities [specifically excluded in the Phase I Rules]).

The Phase II regulations were challenged and on January 25, 2007 the United States Second Circuit Court of Appeals decision remanded back to USEPA the following sections of the regulations:

- Best Technology Available determination
- Cost-cost variance
- Technology Implementation and Operational Plan
- Performance standards (60 to 90 percent for entrainment and 80 to 95 percent for impingement)
- Restoration
- Cost-benefit variance

Subsequently the USEPA withdrew the remaining portions of the rule (72 Fed. Reg. 130, pp. 37107 to 37109, July 9, 2007).

This decision was appealed and the United States Supreme Court (Court) granted certiorari on April 14, 2008. The Court only considered whether USEPA could undertake a cost-benefit analysis regarding Phase II facilities. The Court decided in favor of allowing USEPA to consider cost-benefit analysis in setting standards for cooling water intake structures (CWIS).

On November 22, 2010, USEPA signed a settlement agreement regarding rulemaking dates for USEPA to set technology standards for existing facilities. The proposed Phase II rule was released for public comment on March 28, 2011 with the intent to finalize by July 27, 2012.

2. Encina Power Station Description

2.1 Location

EPS is located in the City of Carlsbad, California, adjacent to the Agua Hedionda Lagoon (AHL) on the Pacific Ocean, approximately 30 miles north of the City of San Diego.

2.2 Source Water Body Description

AHL is a coastal lagoon system consisting of three interconnected segments situated at the seaward end of the Agua Hedionda Creek drainage. It is located within the city limits of Carlsbad, California. It is one of several lagoons that are located along the coast of southern California. The coastal region of AHL is part of the Southern California Bight (SCB) whose nearshore is punctuated by headlands and submarine canyons. The SCB extends from Point Conception south to Cabo Colonet in Baja California about 120 miles south of the United States-Mexico border. Historically, AHL was a natural, seasonal estuary characterized by frequent closings of the lagoon mouth, especially during summer months. Wet and dry time periods play an important role in opening and closing southern California coastal lagoons (Elwany et al. 1999). Under normal conditions, floods control the opening of these lagoons. After large floods, lagoons stay open from one to three years. In the absence of floods, the lagoons will remain closed unless their inlets are excavated. According to Bradshaw et al. (1976), AHL was first dredged from 1952 to 1954 in order to increase the lagoon volume to provide a cooling water source for EPS, thereby establishing a permanent opening and tidal connection with the nearshore coastal waters. In 1954, two rip-rap lined channels were completed that provided permanent connection with the ocean: a northernmost entrance channel over 300 feet (ft) long with a depth of 5 ft below mean lower low water (MLLW), and a southern channel used to discharge water from EPS.

The present lagoon system consists of three segments: the Outer, Middle and Inner Lagoons (Figure 2-1). The Outer Lagoon is connected to the Pacific Ocean through an inlet channel formed by two jetties. The jetties are located west of the Coast Highway Bridge and have lengths of about 350 ft and 368 ft, north and south respectively. The distance between the centerline of the two jetties is about 243 ft. The lengths of the north and south discharge channel jetties are about 327 ft and 376 ft, respectively. The absolute distance that the jetties extend from the shoreline varies somewhat with the changing location of the shoreline due to seasonal erosion and accretion of sand.

The Outer Lagoon basin is periodically maintenance dredged in compliance with the San Diego Regional Water Quality Control Board (SDRWQCB) General Waste Discharge Requirements for Maintenance Dredge/Fill Projects conducted in Navigable Waters within the San Diego Region, Order No. 96-32. The dredging process removes accumulated sand and sediment which would impede the OTC flow to EPS.

Additional detail concerning the Source Waterbody can be found in the *Clean Water Act Section 316(b) Impingement Mortality and Entrainment Characterization Study* dated January 2008 submitted by Cabrillo Power I LLC (Cabrillo; Tenera Environmental [Tenera] 2008).

2.3 Station Description

EPS is a fossil-fueled steam electric power generating station that began operation in 1954. It has been owned and operated by Cabrillo since May 22, 1999 and was previously owned by San Diego Gas and Electric Company (SDG&E). Figure 2-2 depicts the location of the facility and the cooling water intake and discharge points relative to the shoreline. Cooling water is withdrawn from the Pacific Ocean via AHL and circulated through the EPS Cooling Water System to condense steam used in power production. The combined cooling and service water design flow is 857 million gallons per day (MGD) at full operating capacity. After passing through the plant, the heated seawater is discharged to the ocean through a shoreline conveyance channel.

EPS consists of five steam turbine generating units and a small gas turbine unit. The steam turbine units are fueled by natural gas. Net generating capacity of the individual steam turbine units ranges from 104 megawatts (MW) to 330 MW (Table 2-1). The gas turbine has a net generating capacity of 16 MW which does not use OTC. Units 1-3 began operating in 1954, 1956 and 1958, respectively, the gas turbine was added in 1968, and Units 4 and 5 went on line in 1973 and 1978, respectively.

Table 2-1. Encina Power Station generation capacity and cooling water flow volume

Unit	Net Generating Capacity (MWe)	Circulating Water Flow (gpm [MGD])	Service Water Flow (gpm [MGD])	Daily Flow (gpm [MGD][1])

1	107	48,000 [69]	3,000 [4]	51,000 [73]
2	104	48,000 [69]	3,000 [4]	51,000 [73]
3	110	48,000 [69]	6,000 [9]	54,000 [78]
4	300	200,000 [288]	13,000 [19]	213,000 [307]
5	330	208,000 [300]	18,200 [26]	226,200 [326]
Gas Turbine[2]	16	---	---	---
Total	***939***	***552,000 [795]***	***53,200 [77]***	***595,200 [857]***

1 = Capacity; 2 = Operation; MWe = megawatt electrical; gpm = gallons per minute; MGD = million gallons per day

2.4 Cooling Water System Design

Cooling water for each of the five steam electric generating units is supplied by two circulating water pumps (CWPs) that range in capacity from 24,000 to 104,000 gallons per minute (gpm) (35 to 150 MGD) depending on the units in operation and the associated cooling requirements (Table 2-1). This water is primarily used to cool the plant's steam condensers, where steam is condensed back to water as part of the power production cycle. Each unit is also equipped with a number of smaller saltwater service pumps (SWSPs) that supply water for a variety of purposes (i.e., cooling of small capacity heat exchangers, lubrication of rotating equipment, etc.). With all units in full operation, the cooling water flow through the plant is 595,200 gpm, or 857 MGD, based on the manufacturer ratings for the CWPs and SWSPs (Table 2-1).

2.4.1 Cooling Water Intake Structure

Cooling water for all five steam electric generating units is supplied through a common intake structure located at the southern end of the Outer Lagoon of AHL, approximately 3,000 ft from the opening of the lagoon to the ocean (Figure 2-1). Seawater entering the cooling water system passes through metal trash racks on the intake structure, with vertical bars that are spaced about 3.5 in apart. The bars prevent large debris that could potentially clog or damage plant equipment from entering the system. The trash racks are cleaned periodically to remove debris. Water velocity approaching the trash racks varies with the number of pumps that are in operation and water depth (tide level).

Approach velocity is measured annually as required by the EPS National Pollutant Discharge Elimination System (NPDES) Permit (No. CA0001350). Most recently, the approach velocity was measured on December 20, 2010. Average approach velocity at this time was 1.0 fps. Tidal level was 6.4 ft above MLLW at the time the measurements were made and two of the ten CWPs were in operation. The trash racks were cleaned less than 60 minutes prior to velocity measurement. Using the measured velocity and adjusting the flow volume to simulate maximum flow (all CWPs and SWSPs in operation) yields a calculated maximum approach velocity of 2.2 fps at the same tide height. Adjusting the tide height to mean sea level (MSL) provides a calculated approach velocity of 2.9 fps at maximum flow volume.

2.4.2 Cooling Water Screens

Behind the trash racks, the intake tapers into two 12 ft wide tunnels that further split into four 6 ft wide inlet tunnels (Figure 2-4). Inlet tunnels 1 and 2 provide cooling water for Units 1-3, while inlet tunnels 3 and 4 supply cooling water for Units 4 and 5, respectively. Vertical traveling water screens are positioned immediately upstream of the CWPs and SWSPs to prevent fish and debris from entering the cooling water system (CWS) and potentially clogging the condensers. There are two traveling water screens for Units 1-3, two traveling water screens for Unit 4, and three traveling water screens for Unit 5.

Each traveling water screen consists of a continuous vertical belt of wire mesh panels through which the cooling water flows (Figure 2-5). The mesh size of the screens for Units 1 through 4 is $^{3}/_{8}$ in while mesh size for the Unit 5 screens is $^{5}/_{8}$ in. Debris larger than the mesh is removed from the cooling water flow and held on the screen panels until the traveling water screen is washed. The screens can be operated manually or activated automatically when a specified pressure differential is detected across the screens due to the accumulation of debris. When the specified pressure is detected, the traveling water screens rotate upward and the material on the screen is lifted out of the cooling water flow. A screen wash system (70 to 100 pounds per square inch [psi]), located at the head of the traveling water screen, washes the debris from each screen panel into a trough which discharges through Discharge Point 001.

2.4.3 Cooling Water Discharge

After passing through the traveling water screens, the cooling water flows through the condensers of the individual units. At the condensers, heat is transferred from the steam exiting the plant's turbines (passing over the outside of the condenser tubes) to the seawater (passing through the inside of the condenser tubes), condensing the steam back to water. Units 1-3 have dual-

pass condensers (U-shaped tubes that pass through the condenser twice) made up of numerous aluminum-brass condenser tubes, each with an inside diameter (ID) of about ⅞ in. Units 4 and 5 have single-pass condensers with 1 in ID tubes made of copper-nickel alloy.

The cooling water exiting the condensers flows into a common discharge conduit that empties into an open discharge pond located to the west of the intake structure (Figure 2-4). Water flows from the discharge pond through a culvert under Carlsbad Boulevard and a discharge canal that leads across the beach and into the ocean. The temperature of the cooling water discharged from EPS is regulated under the NPDES Permit effluent limits. The permit places effluent limits on certain chemical constituents and thermal characteristics of the plant's discharge. The terms of the permit specify that the temperature of the combined discharge shall not average more than 20 degrees Fahrenheit (°F) above that of the incoming water during any 24-hour period, and the combined discharge shall not, at any time, exceed 25 °F above that of the incoming lagoon water. A special provision to these discharge limitations is made to accommodate the higher discharge temperatures that occur during heat treatment of the cooling water intake conduits (Section 2.4.4 – *Biofouling Control*). The NPDES Permit specifies that during heat treatment, heat added to the cooling water shall not cause the temperature of the combined discharge to the ocean to exceed 120 °F for more than two hours.

2.4.4 Biofouling Control

Cooling water entering EPS contains a myriad of planktonic organisms that are too small to be filtered from the water flow by either the trash racks or the traveling water screens. Some of these organisms can cause plant operational problems. These organisms can be divided into two major groups: microfouling organisms, such as bacteria, fungi and algae, and larger macrofouling organisms including barnacles, mussels (and other bivalves) and other organisms.

The primary problem caused by the microfouling organisms is the formation of an insulating slime layer in the condenser tubes decreasing plant efficiency. EPS uses periodic injections of sodium hypochlorite (chlorine bleach) to control slime in the condenser tubes. The sodium hypochlorite solution is manufactured on site using intake cooling water. The sodium hypochlorite solution is injected, on an as needed basis, into the cooling water conduit immediately upstream of the CWP and SWSP suctions for each unit. Chlorination is conducted each day on a timed cycle for about five minutes per hour per operating unit. This method of chlorination results in minimal residual chlorine in the cooling water being discharged to the ocean.

Larger macrofouling organisms usually enter the CWS as larvae. Included within this group are a number of encrusting species, including barnacles and mussels that can attach themselves to the walls of the cooling water conduits and grow. If left unchecked, this biofouling layer can impede water flow within the system and interfere with the operation of pumps, valves and other plant apparatus. In addition, the force of the cooling water flow on their shells can detach the biofouling layer from the walls and carry them downstream to the condenser. Mussel and barnacle shells that are between the intake screens and the condensers and exceed the ⅞ to 1 in diameter of the condenser tubes can become lodged at the inlet ends of the tubes thereby blocking water flow through the tubes. As the number of clogged tubes increases, condenser performance decreases and, as a result, condenser operating temperatures and the temperatures of the discharged cooling water also increases. If the influx of tube-clogging debris continues, the condenser must be removed from service and cleaned.

Chlorination used at the concentration and duration applied by EPS to control microfouling organisms is ineffective in the control of macrofouling organisms. Macrofouling organisms tend to be much more tolerant of chlorine than microfouling organisms. Mussels also have the ability to tightly close their shells if they detect harmful substances in the water and can remain closed for hours or days. Chlorination at higher doses and/or applied continuously can effectively eliminate macrofouling organisms but presents serious regulatory and environmental problems if the chlorine is not subsequently removed or deactivated prior to its discharge into the ocean.

As an alternative to chemical treatment, EPS uses heat treatments to control macrofouling. A targeted heat treatment is performed by restricting the inlet cooling water flow and recirculating the condenser discharge water through the conveyance tunnels and condensers until the inlet water temperature increases to the targeted treatment temperature. Recirculation of the cooling water is accomplished through a cross-over tunnel located approximately 120 ft from the discharge, adjacent to the intake channel. The temperature is raised to 105 °F in the intake tunnels and then maintained for approximately two hours. This proved to be adequate in killing the encrusting macrofouling organisms.

Each time the cooling water passes through the condensers it picks up additional heat rejected from the steam cycle. Because the cooling water continues to circulate and the generating units continue to operate, the temperature in the discharge channel is limited by permit limits to a maximum of 120 °F and cannot be maintained for more than two hours. To maintain the targeted treatment temperature at 105 °F during the heat treatment, and to prevent the continued build-up of heat in the system, additional lagoon water is blended into the recirculating flow as a corresponding volume of heated water is discharged to the Pacific Ocean. The targeted heat treatment duration is two

hours while maintaining a treatment temperature of at least 105 °F in the intake conduits. This excludes the time required to reach the target temperature and the time required to return to a normal operating configuration. The total time required for the heat treatment procedure, including temperature buildup and cool-down, is approximately seven to nine hours. Because the input of cooling water is reduced during heat treatment due to recirculation, the plant's discharge flow rate is likewise reduced to approximately 7 to 45 percent of the maximum volume discharged during normal operation.

Following the targeted heat treatment some shells of the dead encrusting organisms begin to detach from the walls of the conduits and are carried downstream. Most mussels lose their attachment over a period of days following treatment, but barnacle shells can take weeks or months to deteriorate and break away from the conduit walls. Shells smaller than the condenser tube diameter pass through the system and are discharged into the ocean. Larger shells might be retained and removed by the traveling screens or, as in the case of fouling that occurs between the traveling water screens and the condensers, shells may end up in the condensers where they are subsequently removed by cleaning. To reduce the need for condenser cleaning, heat treatments were optimally performed every five to eight weeks. This short growth period prevents most macrofouling organisms from attaining a size that would allow them to plug the condensers.

Additionally, EPS routinely dewaters the tunnels to manually clean biofouling from the tunnel walls and floor. Condensers are manually cleaned when they become plugged with biota. EPS has opted to perform more frequent manual cleaning than heat treatments in an effort to reduce the quantity of IM&E.

2.5 Encina Power Station Impingement and Entrainment Study (2005-2006)

2.5.1 Background

Cooling water for EPS is withdrawn from the Pacific Ocean via AHL (Figure 2-1). The aquatic environment surrounding EPS consists of AHL and its seasonal tributaries, and the open coastal waters of the Pacific Ocean.

2.5.2 Impingement and Entrainment Studies at Encina Power Station

Previous 316(b) IM&E studies were done at EPS in 1979-1980 (SDG&E 1980). Because IM&E had not been studied for 25 years and pursuant to the Section 316(b) Phase II regulations (40CFR 125 Subpart J), a study plan for new IM&E studies was developed and submitted to the SDRWQCB in September 2004. The sampling plan was approved by the SDRWQCB and IM&E sampling was conducted from June 2004-June 2005. A copy of the report for this study

(Tenera 2008), including a summary of the 1979-1980 monitoring program, is contained in the attached CD (Attachment 1). This section provides a summary of the results of the 1979-1980 and the 2004-2005 IM&E studies. The two studies are compared in Section 2.5.3.

2.5.2.1 Entrainment and Source Water Study

2.5.2.1.1 1979-1980 Entrainment and Source Water Study

A one-year entrainment and source water characterization study was conducted beginning in 1979 as part of the 316(b) demonstration studies at EPS. Plankton samples were collected monthly at five offshore stations using 0.020 and 0.013 in mesh nets attached to a 2 ft diameter bongo net system. Collections were also made monthly in the Middle and Inner Lagoon segments and every two weeks in the Outer Lagoon segment using 1.6 ft diameter nets (0.020 and 0.013 in mesh size). Entrainment samples were collected every two weeks using a plankton pumping system in front of the intakes. Although most samples were collected during daylight hours, some samples were occasionally taken in the evening or early morning hours.

Anchovies (*Engraulidae* spp.; primarily deep body and northern) were the most abundant larval fishes in both source water and entrainment samples, followed by croakers (*Sciaenidae* spp.) and sanddabs (*Citharichthys* spp.) (Table 2-2). There were more goby (*Gobiidae* spp.) larvae in the entrainment samples whereas kelp and sand bass (*Serranidae* spp.) larvae were substantially more abundant in the combined source water samples from AHL and offshore. Overall the average composition between the entrainment and source water data sets were very similar for the ten most abundant taxa. Only English sole (*Parophrys vetulus*) larvae were among the top ten entrainment taxa not represented in the top ten source water taxa.

Table 2-2. Average annual densities during 1979-1980 of the ten most abundant larval fish taxa in source water and entrainment collections (0.013 in mesh nets)

Common Name	Taxon	Source Water Concentration (mean per 264,000 gal)	Entrainment Concentration (mean per 264,000 gal)
Anchovies	*Engraulidae*	9,527.6	8,552.2
Croakers	*Sciaenidae*	3,417.0	4,005.9
Sanddabs	*Citharichthys*	732.7	827.2

Table 2-2. Average annual densities during 1979-1980 of the ten most abundant larval fish taxa in source water and entrainment collections (0.013 in mesh nets)

Common Name	Taxon	Source Water Concentration (mean per 264,000 gal)	Entrainment Concentration (mean per 264,000 gal)
	spp.		
Gobies	*Gobiidae*	292.8	429.8
Silversides	*Atherinopsidae*	83.5	109.0
Wrasses	*Labridae*	64.5	40.2
Combtooth blennies	*Hypsoblennius* spp.	61.3	57.4
Sea basses	*Serranidae*	51.1	9.1
Rockfishes	*Sebastes* spp.	28.6	25.7
English sole	*Parophrys vetulus*	0	18.6

2.5.2.1.2 2004-2005 Entrainment and Source Water Sampling

Entrainment and source water studies were designed to measure monthly variation in the species composition and abundance of larval fishes, cancer crabs (*Cancer* spp.) and spiny lobsters (*Panulirus interruptus*) entrained by EPS. The source water sampling was done to estimate the source water populations at risk of entrainment.

Entrainment and source water sampling was conducted monthly from June 2004-May 2005, with the exception of two surveys separated by a two-week interval that were done in June 2004. The 13 surveys provided a complete year of seasonal data for 2004-2005. The entire set of entrainment and source water stations (Figure 2-6) was sampled during each of the 13 surveys.

Entrainment samples were collected from a single station (Station E1; Figure 2-6) located in front of the EPS intakes. They were collected using a bongo frame with paired 2.33 ft diameter openings each equipped with 0.013 in mesh plankton nets and codends. The sampling platform was a 24-ft research vessel (*R/V M-REP*) with a side-mounted davit positioned for towing the nets. The start

of each tow began approximately 98 ft in front of the intake structure and proceeded in a northwesterly direction against the prevailing intake current, ending approximately 492 ft from the intake structure. Because of the narrow constriction of the lagoon near the intakes there was a constant current flow toward the intake structure when pumps were operational and it was assumed that all of the water sampled at the entrainment station would have been drawn through the EPS CWS. Samples were collected over a 24-hour period divided into four 6-hour cycles. Two replicate tows were conducted at the entrainment station during each cycle. The total time of each tow was approximately two minutes at a speed of approximately 1 knot. A combined volume of approximately 16,000 gallons of water was filtered through both nets. The water volume filtered was measured by calibrated flow meters mounted in the openings of the nets.

Once the nets were retrieved from the water, all of the collected material was rinsed into the end of the net (codend). The contents of both nets were combined into one sample immediately after collection. Samples from the paired nets were not kept separate because they were not statistically independent samples and could not be used as replicates for analysis. The use of a bongo frame design minimizes disturbance from the tow bridle compared to a three-point attachment design and allows each net to collect an unobstructed sample. The combined sample was placed into a labeled jar and preserved in 10 percent formalin. Each sample was given a unique serial number based on the location, date, time and depth of collection, and all information was recorded on a sequentially numbered data sheet. The serial number was used to track the sample through the laboratory processing, data analysis and reporting phases.

Laboratory processing consisted of sorting (removing), identifying and enumerating all larval fishes, megalopal stages of cancer crabs and spiny lobster larvae (puerulus and phyllosome stages) from the samples. Juvenile specimens (not susceptible to entrainment) that were collected incidentally in the plankton sampling were separated in the laboratory from the samples but not included in the entrainment analysis because it was assumed that these larger fish would be able to avoid being drawn into the intake and were larger than the ⅜ in mesh of the traveling screens.

The highest entrainment occurred for larvae of lagoon species (Table 2-3). Gobies and blennies (*Hypsoblennius* spp.), both small bottom-dwelling forms common in southern California lagoons, comprised over 91 percent of the total entrainment, with anchovy larvae the third most abundant taxon at approximately 4 percent. Gobies and blennies primarily inhabit the sheltered waters inside AHL.

Table 2-3. Average concentrations during June 2004-May 2005 of the most abundant larval fishes and target shellfishes in entrainment samples collected in Agua Hedionda Lagoon (Station E1)

Common Name	Taxon	Average Concentration (mean per 264,000 gal)	Total Count	Percentage of Total	Cumulative Percentage
Gobies	*Gobiidae* (CIQ complex)	2,222.93	12,763	61.95	61.95
Blennies	*Hypsoblennius* spp.	1,107.67	5,838	28.34	90.29
Anchovies	*Engraulidae*	134.29	819	3.98	94.27
Garibaldi	*Hypsypops rubicundus*	40.99	188	0.91	95.90
Blind goby	*Typhlogobius californiensis*	24.65	148	0.72	96.51
Clinid kelpfishes	*Gibbonsia* spp.	22.45	125	0.61	96.90
Labrisomid kelpfishes	*Labrisomidae*	17.65	81	0.39	97.30
Pipefishes	*Syngnathidae*	16.06	83	0.40	97.72
Yellowfin goby	*Acanthogobius flavimanus*	14.41	87	0.42	98.00
Unidentified larval fishes	Larvae, unidentified fish fragment	9.65	56	0.27	100.00
All other species			413	2.0	---
Total			**20,601**	---	---
Cancer crabs	*Cancer* spp. (megalops)	0.17	1	---	---

2.5.2.2 Impingement

EPS has one intake structure that withdraws water from AHL. Seawater entering the CWS passes through metal trash racks (bar racks) on the intake structure. Behind the trash racks, the intake tapers into two and then four tunnels, which provide cooling water for five steam-generating units (Units 1 through 5). The seawater then goes through vertical traveling screens. Units 1 through 4 each have two traveling screens with a mesh size of ⅜ in, and Unit 5 has three screens with a mesh size of ⅝ in.

All material that passed through the bar racks but was larger than the traveling screen mesh was impinged and was subsequently rinsed from the screens

when the screens were rotated for cleaning. A high-pressure wash system (70 to 100 psi) located at the head of the screens was used to wash the material into a sluiceway that emptied into metal collection baskets, where the material accumulated until disposal. The traveling screens were operated either manually or automatically when a specified pressure differential was detected across the screens due to the accumulation of debris.

2.5.2.2.1 1979-1980 Impingement Study

Impingement of fishes and shellfishes on the traveling screens and bar rack system of EPS were monitored daily during normal operations for 336 consecutive days in 1979. The main method was to obtain abundance and weights from samples accumulated over two 12-hour periods (daylight and night) each day for all three screening systems at EPS. The six highest-ranking fishes by numbers impinged were queenfish (*Seriphus politus*), deepbody anchovy (*Anchoa compressa*), topsmelt (*Atherinops affinis*), California grunion (*Leuresthes tenuis*), northern anchovy (*Engraulis mordax*) and shiner surfperch (*Cymatogaster aggregata*) (Table 2-4) – all open water schooling fishes. These six species represented 82 percent of all fishes impinged. Over 90 percent of the fishes collected consisted of nine species: deepbody anchovy, topsmelt, northern anchovy, shiner surfperch, California grunion, walleye surfperch (*Hyperprosopon argenteum*), queenfish, round stingray (*Urolophus hallen*) and giant kelpfish (*Heterostichus rostratus*). The greatest number of fishes residing in the tunnels during heat treatments occurred during winter surveys. Shellfishes that ranked high in the total numbers impinged included yellow crab (*Cancer anthonyi*) with 2,540 individuals, swimming crab (*Portunus xantusii*) with 884 individuals, lined shore crab (*Pachygrapsus crassipes*) with 866 individuals, and market squid (*Loligo opalescens*) with 522 individuals. The yellow crab and market squid both have commercial fishery value whereas the other two species are small and are not fished commercially. California spiny lobster, the most valuable invertebrate in the local commercial fishery, was rare in the samples with only two individuals impinged during the entire year-long study period.

Table 2-4. Number and weight (grams) of the 'critical fish species' collected during normal operations and seven heat treatment surveys at EPS, February 1979-January 1980 (from SDG&E 1980)

Common Name	Scientific Name	Normal Operations		Heat Treatments	
		No. Impinged	Weight Impinged (grams)	No. Impinged	Weight Impinged (grams)
Queenfish	*Seriphus politus*	18,681	91,314	3,485	96,320
Deepbody anchovy	*Anchoa compressa*	13,299	64,323	23,142	182,179

Table 2-4. Number and weight (grams) of the 'critical fish species' collected during normal operations and seven heat treatment surveys at EPS, February 1979-January 1980 (from SDG&E 1980)

Common Name	Scientific Name	Normal Operations		Heat Treatments	
		No. Impinged	Weight Impinged (grams)	No. Impinged	Weight Impinged (grams)
Topsmelt	*Atherinops affinis*	10,915	112,340	21,788	166,058
California grunion	*Leuresthes tenuis*	8,583	33,770	9,671	81,708
Northern anchovy	*Engraulis mordax*	7,434	14,573	19,567	93,981
Shiner surfperch	*Cymatogaster aggregate*	6,545	53,258	12,326	272,549
Walleye surfperch	*Hyperprosopon argenteum*	1,877	50,405	8,305	522,797
Slough anchovy	*Anchoa delicatissima*	1,758	4,106	464	1,405
White surfperch	*Phanerodon furcatus*	1,751	16,991	604	8,609
Round stingray	*Urolophus halleri*	1,626	185,896	1,685	404,237
California halibut	*Paralichthys californicus*	1,215	57,128	329	52,995
Giant kepfish	*Heterostichus rostratus*	1,046	14,912	1,421	36,212
Salema	*Xenistius californiensis*	538	2,244	161	1,389
Barred sand bass	*Paralabrax nebulifer*	189	15,309	518	26,724
California corbina	*Menticirrhus undulates*	117	9,263	29	4,634
Barred surfperch	*Amphistichus argenteus*	83	1,853	166	15,946
Striped mullet	*Mugil cephalus*	73	44,730	10	5,593
Spotted sand bass	*Paralabrax maculatofasciatus*	73	10,857	616	87,360
Kelp bass	*Paralabrax clathratus*	34	502	568	38,505
White sea bass	*Cynoscion nobilis*	25	226	13	833
Pacific	*Citharichthys*	---	---	---	---

Table 2-4. Number and weight (grams) of the 'critical fish species' collected during normal operations and seven heat treatment surveys at EPS, February 1979-January 1980 (from SDG&E 1980)

Common Name	Scientific Name	Normal Operations		Heat Treatments	
		No. Impinged	Weight Impinged (grams)	No. Impinged	Weight Impinged (grams)
sanddab	*sordidus*				
California sheephead	*Semicossyphus pulchra*	---	---	---	---
Hornyhead turbot	*Pleuronichthys verticalis*	---	---	---	---
Total Above Fishes		***75,862***	***784,000***	***104,868***	***2,103,034***
Total Other Fishes		*3,800*	*611,200*	*3,610*	*322,517*
Total Invertebrates		*6,281*	*153,200*	*1,682*	*49,884**

*only includes weights of counted invertebrates

2.5.2.2.2 2004-2005 Impingement Study

Impingement sampling at EPS was conducted during a 24-hour period one day each week from June 24, 2004-June 15, 2005. Each sampling period was divided into six approximately 4-hour cycles. Before each weekly sampling effort, all of the traveling screens were rotated and rinsed clean of any impinged material. Nets (¼ in mesh size) were placed into each metal basket during impingement sampling for ease of retrieving the impinged material.

During each cycle, the traveling screens remained stationary for a period of approximately 3.5 hours. Traveling screens for Units 1 through 4 were rotated and rinsed for 35 minutes and screens for Unit 5 were rotated and rinsed for 30 minutes (approximate time for one complete revolution of the screens). This rinse period allowed the entire traveling screen to be rinsed of all material that had been impinged since the last screen wash cycle. In a few instances during impingement collections, the screen wash system started automatically due to a high differential pressure prior to the end of the cycle. The material that was rinsed from the screens during the automatic screen washes was combined with the material collected at the end of that cycle. All debris and organisms rinsed from each set of traveling screens were kept separate.

All fishes and selected shellfishes collected at the end of each 4-hour cycle were removed from the debris and then identified and counted. Individual weights and lengths of bony fishes, sharks and rays were recorded (standard length [SL] for the bony fishes, total length [TL] for the sharks and disc width [DW] for the rays).

Carapace width was measured for crabs, total length was measured for shrimps and mantle length was measured for cephalopod mollusks. Weight was also recorded for these shellfishes. Other macroinvertebrates, including hydroids, anemones, sea jellies, barnacles, worms, brittlestars, bryozoans, tunicates, gastropods and bivalves, were not enumerated or weighed but were only recorded as "present" when found in the impinged material.

Impingement sampling was also conducted during heat treatment operations. Procedures for heat treatment involved clearing and rinsing the traveling screens prior to the start of the heat treatment procedure. At the end of the heat treatment procedure, normal pump operation was resumed and the traveling screens were rinsed until no more fishes were collected on the screens and fishes were found in the collected debris. Processing of the samples followed the same procedures used for normal impingement sampling. Six heat treatments were performed during the one-year study and sampling occurred during all.

The highest impingement rates were for open-water fish species and lowest impingement rates were for bottom-dwelling species. A total of 101 species of fishes, sharks and rays was impinged. The numerically most abundant fishes collected during normal operations impingement sampling included topsmelt, shiner surfperch, deepbody anchovy, queenfish, salema (*Xenistius californiensis*) and slough anchovy (*Anchoa delicatissima*) (Table 2-5). These six species comprised about 70 percent of all the fishes impinged during normal operations. Round stingray, bat ray (*Myliobatis californica*) and California butterfly ray (*Gymnura marmorata*) were not abundant compared to other impinged species, comprising approximately 1 percent of the individuals collected, but they accounted for nearly 30 percent of the biomass due to their large individual size. Impingement rates for most species were generally higher during nighttime. The top five species by weight were California butterfly ray, topsmelt, shiner surfperch, round stingray and white sea bass (*Atractoscion nobilis*).

Table 2-5. Number and weight of fishes, sharks and rays impinged during normal operation and heat treatment surveys at EPS from June 2004-June 2005

Common Name	Scientific Name	Normal Operations		Heat Treatments	
		Sample Count	Sample Weight (grams)	Sample Count	Sample Weight (grams)
Topsmelt	*Atherinops affinis*	5,242	42,299	15,696	67,497
Shiner surfperch	*Cymatogaster aggregata*	2,827	28,374	18,361	196,568
Deepbody	*Anchoa*	2,079	11,606	23,356	254,266

Table 2-5. Number and weight of fishes, sharks and rays impinged during normal operation and heat treatment surveys at EPS from June 2004-June 2005

Common Name	Scientific Name	Normal Operations		Heat Treatments	
		Sample Count	Sample Weight (grams)	Sample Count	Sample Weight (grams)
anchovy	*compressa*				
Queenfish	*Seriphus politus*	1,304	7,499	929	21,390
Salema	*Xenistius californiensis*	1,061	2,390	1,577	6,154
Slough anchovy	*Anchoa delicatissima*	1,056	3,144	7	10
Silverside	Atherinopsidae	999	4,454	2,105	8,661
Walleye surfperch	*Hyperprosopon argenteum*	605	23,962	2,547	125,434
Northern anchovy	*Engraulis mordax*	537	786	92	374
California grunion	*Leuresthes tenuis*	489	2,280	7,067	40,849
Giant kelpfish	*Heterostichus rostratus*	344	2,612	908	9,088
Spotted sand bass	*Paralabrax maculatofasciatus*	303	4,604	1,536	107,563
Pacific sardine	*Sardinops sagax*	268	1,480	6,578	26,266
Spotfin croaker	*Roncador steamsii*	182	8,354	106	17,160
Barred sand bass	*Paralabrax nebulifer*	151	1,541	1,993	32,759
California butterfly ray	*Gymnura marmorata*	146	60,629	70	36,821
White surfperch	*Phanerodon furcatus*	144	4,686	53	823
California needlefish	*Strongylura exilis*	135	6,025	158	11,899
Kelp bass	*Paralabrax clathratus*	111	680	976	13,279
Specklefin midshipman	*Porichthys myriaster*	103	28,189	218	66,860
Unidentified chub	unidentified chub	96	877	7	44
California	*Paralichthys*	95	1,729	21	4,769

Table 2-5. Number and weight of fishes, sharks and rays impinged during normal operation and heat treatment surveys at EPS from June 2004-June 2005

Common Name	Scientific Name	Normal Operations		Heat Treatments	
		Sample Count	Sample Weight (grams)	Sample Count	Sample Weight (grams)
halibut	*californicus*				
Sargo	*Anisotremus davidsoni*	94	1,662	963	68,528
All other fishes, sharks and rays		1,037	101,810	9,667	917,838
	Total	***19,408***	***351,672***	***94,991***	***2,034,900***

2.5.3 Comparison of 1979-1980 and 2004-2005 EPS Entrainment and Impingement Data

2.5.3.1 Entrainment

The most abundant fish larvae collected during the 1979-1980 and 2004-2005 entrainment studies were similar; however, the abundance of these taxa changed between studies. Gobies, blennies and anchovies were among the top ten species during both studies. Compared to the IM&E study at EPS conducted by SDG&E in 1979-1980, goby larvae were approximately five times more abundant in the recent entrainment samples while combtooth blenny (*Hypsoblennius* spp.) larvae were nearly twenty times more abundant in the recent entrainment samples (Tables 2-2 and 2-3). Anchovy and croaker larvae were significantly more abundant in the earlier study (Tables 2-2 and 2-3).

Although large variation in the abundances of fish larvae is expected among years, one explanation for the differences between the two studies are the changes in available habitats in AHL that have occurred over the past 25 years. For example, shallow mudflats in AHL, the habitat for gobies, have expanded due to watershed erosion and sedimentation has resulted in an overall reduction in total habitat in AHL due to infilling of the Middle and Inner Lagoons and development of sandbars at the western edge of the Inner Lagoon (MEC Analytical Systems [MEC] 1995). The habitat for blennies has also increased due to the addition of floats and barges for aquaculture operations that provide large surface area for fouling communities that are utilized by blennies for habitat – these structures did not exist during the 1979-1980 studies. The higher abundances of anchovy and croaker larvae in the 1979-1980 study are likely due to the cooler water climatic regime in the SCB that favored increased populations of these taxa.

2.5.3.2 Impingement

Results from the 1979-1980 and 2004-2005 impingement studies also show similar species composition including topsmelt, shiner surfperch, deepbody anchovy, queenfish and slough anchovy. One noticeable difference, however, was much higher numbers of salema in 2004-2005. Annual impingement fish biomass (normal operations and heat treatments) was similar in both studies – approximately 9,263 pounds (lbs) in 2004-2005 compared to approximately 8,421 lbs in 1979-1980.

Although the average losses measured during heat treatments were also similar between the two studies (Table 2-6), the results from normal operation impingement suggest that the total abundances of fishes in AHL that are subject to impingement have increased over the 25 years since the first study was done. Data on shellfishes were not compared because of the differences in sampling protocols for shellfishes between the two studies.

Table 2-6. Average daily abundances of fishes collected during normal operation (unadjusted for EPS flow) and heat treatment impingement surveys during the 1979-1980 and 2004-2005 surveys

Study Period	Average Daily Fish Abundance Normal Operations		Average Fish Abundance Heat Treatments	
	Numbers	Biomass (lbs)	Numbers	Biomass (lbs)
1979-1980	237	9.0	15,497	763.9
2004-2005	373	15.0	15,832	747.8

2.6 Poseidon Desalination Permit

Poseidon proposes to construct and operate the CDP on the site of EPS. Cabrillo is not affiliated with Poseidon who is the lessee. Poseidon originally applied for a NPDES Permit to discharge up to 64.5 MGD of wastewater. CDP will use a portion of the EPS cooling water effluent for seawater desalination treatment. Treatment processes at CDP will consist of pretreatment, reverse osmosis desalination, and disinfection and product water stabilization. CDP is allowed to discharge up to 57 MGD of reverse osmosis brine.

The total flow rate of source water needed to operate CDP at full production is 304 MGD, in order to produce 50 MGD of potable water, and will result in 57 MGD of wastewater with the remaining 197 MGD needed as dilution water to comply with the salinity requirements of the NPDES Permit. This results in a total discharge flow rate of 254 MGD (57 MGD of wastewater and 197 MGD of dilution water). The NPDES Permit (No. CA0109223) was issued on June 14, 2006 with an effective date of October 1, 2006 (California Regional Water Quality Control Board Region 9, San Diego Region; Order No. R9-2006-0065).

As required by Order No. R9-2006-0065, Poseidon submitted a Flow, Entrainment and Impingement Minimization Plan (Minimization Plan) that assesses the feasibility of "site-specific plans, procedures, and practices to be implemented and/or mitigation measures to minimize the impacts to marine organisms when the CDP intake requirements exceed the volume of water being discharged by the EPS." Contingent upon the approval of the Mitigation Plan, CDP can withdraw water through the EPS intake when the operation of EPS does not provide adequate flow (Order No. R9-2006-0065, Section VI.C.2.e.).

The Minimization Plan, dated March 27, 2009, was approved May 13, 2009 (Order No. R9-2009-0038). The Minimization Plan:

- Identifies the best available site feasible to minimize IM&E of marine life
- Identifies the best available design and technology feasible to minimize IM&E
- Estimates potential unavoidable impacts to marine life
- Identifies the best available mitigation feasible to minimize any residual IM&E, and is in addition to those measures addressed through site, design and technology approaches
- Establishes a Biological Performance Standard
- Requires a Productivity Monitoring Plan
- Requires an Impingement Monitoring Program
- Requires notification of the Regional Board Executive Officer when all units at EPS will be non-operational for power generation, without seawater intake, and unavailable to the California Independent System Operator to be called upon to produce power for a consecutive period of 180 days or more.

Implementation Plan for Compliance with California Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling

3. Compliance Alternatives

3.1 Track 1 Compliance

3.1.1 Units 1-3

3.1.1.1 Repowering Application

On September 14, 2007 an Application for Certification (AFC) for the Carlsbad Energy Center Project (CECP) was filed by Carlsbad Energy Center LLC[1] to develop a natural gas-fired generating facility in the City of Carlsbad in San Diego County, California. The proposed CECP will be a fast-start high-efficiency, combined-cycle facility with a capacity of a 558 megawatt electrical (MWe) gross. CECP will utilize air cooled condensers, thereby reducing the volume of seawater withdrawn by the current EPS OTC system. Upon successful commercial operation of the CECP, but no later than December 31, 2017, EPS Units 1-3 will be retired and the seawater withdrawal associated with the OTC water and service water systems for these units will cease. The total intake flow for Units 1-3, approximately 225 MGD, will be eliminated.

The Policy states, "The installation of closed cycle dry cooling systems meets the intent and minimum reduction requirements of this compliance option" (Policy 2.A. (1)). Pg. 4). The use of air cooled condensers is equivalent to dry cooling towers (i.e., both transfer heat through tubes directly to air without the evaporation of water). Through the retirement of Units 1-3 and repowering with dry cooling, Units 1-3 will comply with the requirements of the Policy under Track 1.

A Decision from the California Energy Commission (CEC) of the CECP has not been issued. Under the Policy, EPS must be in compliance no later than December 31, 2017 (Compliance Date). CECP anticipates that the repowering will be approved resulting in the retirement of Units 1-3, the associated shutdown of approximately 225 MGD and the replacement of Units 1-3 with highly efficient, fast start combined cycle generation prior to the Compliance Date. In the event that the repowering of CECP is not completed by the Compliance Date, Cabrillo will retire Units 1-3 and cease withdrawing approximately 225 MGD of seawater. Under the scenario, the intake flow for Units 1-3 will be eliminated, therefore, exceeding the 93 percent flow reduction requirements for Track 1 compliance.

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[1] Carlsbad Energy Center LLC is an indirect wholly owned subsidiary of NRG Energy, Inc.

3.1.2 Units 4 and 5

3.1.2.1 Demonstration that Track 1 is Not Feasible

In order to utilize the Track 2 compliance alternative, an owner or operator of an existing power plant must demonstrate to the SWRCB's satisfaction that compliance with Track 1 is not feasible (Policy 2.A.(2). Pg. 4). Not feasible is defined in the Policy (Section 5) as:

> *...cannot be accomplished because of space constraints or the inability to obtain necessary permits due to public safety considerations, unacceptable environmental impacts, local ordinances, regulations, etc. Cost is not a factor to be considered when determining feasibility under Track 1.*

As demonstrated in the remainder of Section 3.1, compliance with Track 1 for EPS Units 4 and 5 is not feasible as defined in the Policy and EPS will pursue compliance with Track 2.

3.1.2.1.1 Site Space Constraints

The proposed redevelopment of the site includes the installation of new combined-cycle Units 6 and 7 and the installation of a new desalination plant, all located within the current property boundary of EPS. Figure 3-1 shows the locations of these proposed facilities.

The new combined-cycle units will be located east of the railroad tracks in the location of the existing fuel oil tanks number 5, 6 and 7, which will be removed before new unit construction. The installation footprint for the new units will approximately extend from the railroad tracks easterly to the eastern property line and from the northern berm of fuel oil tank number 7 southerly to the northern berm for fuel oil tank number 5.

The new desalination plant will be located south of existing fuel oil tanks number 1 and 2. The existing fuel oil tank number 3 will be removed and the footprint of the new plant will extend from the northern containment berm of fuel oil tank number 3 south approximately 800 ft and from the eastern berm of fuel oil tank number 3 westward approximately 250 ft.

It is also proposed that fuel oil tanks number 1 and 2 will be removed.

Since the prevailing wind direction at the site is predominantly from the west the preferred orientation for any mechanical draft cooling tower arrays would be in the east-west direction.

Available Space within the Property Boundary

Based on the proposed construction and demolition initiatives and since the preferred orientation of the cooling towers is in the east-west direction, the only areas that are available for installation of cooling towers within the current property boundary are the areas where the existing fuel oil tanks number 1 and 2 are located and a narrow piece of land adjacent to the south-east side of Unit 5 and north of the railroad siding.

The largest amount of area available in the space currently occupied by fuel oil tanks number 1 and 2 is approximately 480 ft in the east-west direction and 600 ft in the north-south direction. For the additional area adjacent to the south-east side of Unit 5, the largest amount of area available north of the railroad siding is approximately 570 ft in the east-west direction and 120 ft in the north-south direction.

Cooling Tower Configurations

For rectangular mechanical draft cooling towers there are basically two standard configurations that are used. One is a side by side configuration where the individual tower cells are positioned side by side in a one cell wide arrangement resulting in an array that is one cell in width and the total number of cells in length. The other configuration is a back-to-back configuration where two cells are positioned together in a back-to-back arrangement resulting in an array that is two cells in width and one half the total number of cells in length. Where the availability of open space on a site is restricted due to the presence of other structures needed to support the plant's operation, the back-to-back arrangement is typically used.

At EPS, plume abatement for wet cooling towers is considered necessary due to the site's close proximity to residences, roads (US I-5 and Carlsbad Boulevard), the beach railroad tracks and agricultural roads. The addition of plume abatement technology increases the number of cooling tower cells required.

Table 3-1 provides the design criteria used in this evaluation for cooling tower sizing and selection.

Table 3-1. Cooling tower design parameters

Parameter	Unit 4	Unit 5
Unit Rating	287 MW	315 MW
Cooling Water Flow	200,000 gpm	208,000 gpm

Table 3-1. Cooling tower design parameters

Parameter	Unit 4	Unit 5
Steam Flow	1.511 x 10^6 lb/hr	1.658 x 10^6 lb/hr
Heat Duty	1.435 x 10^9 BTU/hr	1.575 x 10^9 BTU/hr
Cooling Water Temp. Rise	14.4 °F	15.2 °F
Design Wet Bulb Tem (1% incident)	68.8 °F	68.8 °F
Cooling Tower Approach	10 °F	10 °F
Cooling Tower Correction Factor	2 °F	2 °F
Cooling Tower Plume Abatement	Yes	Yes
Plume Abatement Design Point	45 °F / 95% RH	45 °F / 95% RH

MW = megawatt; gpm = gallons per minute; lb/hr = pound per hour; BTU/hr = British thermal unit per hour; °F = degrees Fahrenheit; RH = relative humidity

Side by Side Array – Unit 4

For Units 4 and 5 with plume abatement, and circulating water flow rate of 200,000 gpm and 208,000 gpm, respectively, it has been estimated that a total of 14 cooling tower cells would be required in the tower array for each unit. For each unit the estimated tower cell size would be 60 ft long by 65 ft wide. In addition, the plume abated towers would have a height of approximately 60 ft. The most effective configuration for an array is to position the cells side by side as this allows for air intake on both sides of the cell. For an array of 14 cells positioned side by side, this would require a total tower length of 910 ft. In addition, to allow for operating and maintenance access around each side of the tower, an additional 50 ft of space around the tower is recommended. For Unit 4, this would require a total footprint of 1,010 ft in length (east-west direction) and 160 ft in width (north-south direction).

Based on the space constraints discussed above, a side by side tower array for Unit 4 or Unit 5 would not fit within either of the available site locations.

Back to Back Arrays

There are suggested spacing and alignment criteria for cooling tower arrays when they have to be located in proximity to one another. Maintaining proper spacing and orientation ensures that the performance is not negatively impacted by the other towers.

The two possible alignments that would provide the east-west orientation that closely parallels the main wind direction have the two cooling tower arrays aligned in parallel to one another. The first alignment (parallel) has the towers parallel to one another in the east-west direction with the ends of each tower array in alignment with each other. The tower arrays are separated in the north-south direction by a distance equal to the length of one of the tower arrays. The second alignment (staggered) has the towers also in parallel to one another in the east-west direction but with the ends of the tower arrays offset in the east-west direction by one half of a tower array length. The tower arrays are separated in the north-south direction by a distance equal to three quarters of the length of one of the tower arrays.

For the parallel alignment, the footprint required for the Units 4 and 5 tower arrays, including the 50-ft access area around the tower installations, would measure approximately 790 ft in the north-south direction and 550 ft in the east-west direction. With an available area of 600 ft in the north-south direction and 480 ft in the east west direction, this tower array alignment would not be able to fit in the space available.

For the staggered alignment, the footprint required for the Units 4 and 5 tower arrays, including the 50-ft access area around the tower installations, would measure approximately 678 ft in the north-south direction and 775 ft in the east west direction. With an available area of 600 ft in the north-south direction and 480 ft in the east west direction, this tower array alignment also would not be able to fit in the space available.

Based on the discussion above, it is clear that the siting of mechanical draft cooling towers with plume abatement within the currently available areas on the plant site is not feasible.

Dry Cooling System for Units 4 and 5

An alternate methodology to the use of wet mechanical cooling towers is the use of an air cooled condenser (ACC), or dry system. This type of system directs the exhaust steam from the turbines to a series of finned tube assemblies where fans supply cooling air which causes the steam to condense. The condensate is then collected below the finned tube assemblies and pumped back to the steam generation system.

Since the exhaust steam from the turbines is being routed directly to the finned assemblies, the ACC system has to be located in close proximity to the steam turbine.

Using the steam flows and condensing heat loads identified in Table 3-1, a design (1 percent incident) dry bulb temperature of 79.3 °F, and an allowable condenser pressure of 5 in mercury (Hg), Units 4 and 5 would each require an array of seven A-Frame assemblies, with each A-frame assembly consisting of six fan-cooled modules, to provide the level of steam condensing needed.

For seven A-Frame assemblies, the space requirement, including a 50 ft access area around each assembly, would measure approximately 370 ft by 319 ft. As noted above these arrays should be located as close as possible to the steam turbines. Units 4 and 5 are located at the south end of the generating station. The closest area to Units 4 and 5 would be the area just east of the boiler rooms for these units. This area is currently largely occupied by the 230 kilovolt (kV) and 138 kV substations and is not a viable location.

There is also a narrow strip of land just south of Unit 5 and abutting the southern property line. This area measures approximately 570 ft by 150 ft, which is not sufficient space for either of the ACCs.

The only other location within the property boundary that has any open space is the area where fuel oil tanks 1 and 2 are located. In addition to this location being a significant distance from Units 4 and 5 (approximately 1,800 ft), the space available in this area is 600 ft by 480 ft. To locate both arrays in this area would require a space measuring approximately 787 ft by 319 ft. This location would not be viable for locating the arrays due to insufficient space as well as the excessive distance from the units.

Based on the space and proximity requirements for an ACC system at the EPS site, it is clear that this type of system is not a viable consideration.

3.1.2.1.2 Carlsbad Desalination Plan

As stated earlier, CDP will obtain process and dilution water from the EPS discharge flow. CDP is authorized to withdraw up to 304 MGD of ocean water through the EPS intake. Regardless of any flow reduction resulting from EPS actions, CDP will continue to withdraw up to 304 MGD. If EPS permanently ceases operations and CDP proposes to independently operate the existing EPS seawater intake and outfall for the benefit of the CDP ("stand-alone operation"), it will be necessary to evaluate whether, under those conditions, CDP complies with the requirements of Water Code section 13142.5(b). EPS Units 4 and 5 withdraw 307 MGD and 326 MGD, respectively. Due to the CDP requirement of 304 MGD, only one of the units can use flow reduction as a means of compliance. If the flow in both units were to be reduced to meet Track

1 compliance, it would be necessary for CDP to operate the EPS intake to obtain its required 304 MGD requirement.

3.1.2.1.3 Proximity to Roads, Domiciles and Agriculture

As stated earlier, wet cooling towers without plume abatement could not be used at EPS for Track 1 compliance due to the close proximity of residences, roads (US I-5 and Carlsbad Boulevard) and agricultural fields that would be potentially impacted by the cooling towers' plume. Therefore, plume abatement was considered necessary in the feasibility review for cooling towers.

3.1.2.1.4 Permitting Constraints

Since EPS is an existing major source of emissions as defined in the San Diego Air Pollution Control District (District) Regulation II, Rule 20.1 *New Source Review – General Provisions*, modifications would be subject to requirements specified in District Regulation II, Rule 20.3. Based on available information, it is believed that obtaining a District Permit-to-Operate (District Regulation II, Rule 10) and subsequent modified Title V Operating Permit under Regulation XIV is feasible. However, significant barriers will likely be encountered that would make it difficult to meet current District Requirements.

The cooling tower installation will likely be required to comply with New Source Review requirements specified in Rule 20.3. These requirements include, but are not limited to, the following:

- The project will be required to meet Best Available Control Technology (BACT) requirements for PM10 emissions under Rule 20.3(d)(1). This is required for any project in the District where the post-project potential-to-emit (PTE) exceeds 10 lbs per day PM10 emissions. This would likely require the installation of high efficiency drift eliminators. It would be the responsibility of the applicant to prepare a "Top-Down" BACT analysis to demonstrate that the chosen drift eliminators represent the most efficient, technically feasible and cost-effective technology that has been demonstrated in practice.

- The applicant would be required to complete an air quality impact analysis (AQIA) for PM10 emissions as specified in Rule 20.3(d)(2). The purpose of the AQIA would be to demonstrate that the project would not:

    - cause a violation of a state or national ambient air quality standard anywhere that does not already exceed such standard, nor

- cause additional violations of a national ambient air quality standard anywhere the standard is already being exceeded, nor
- cause additional violations of a state ambient air quality standard anywhere the standard is already being exceeded, nor
- prevent or interfere with the attainment or maintenance of any state or national ambient air quality standard.

The AQIA trigger thresholds for PM10 as specified in Rule 20.3, Table 20.3-1 are 100 lbs per day (lb/day) or 15 tons per year (ton/year). The estimated PM10 emissions from cooling tower drift would be 600 lb/day (28.1 ton/year) and 624 lb/day (30.4 ton/year) for Units 4 and 5 respectively. These estimated PM10 emission rates assume a 0.0010 percent drift eliminator efficiency and exceed the subject AQIA thresholds.

District project approval would be subject to public review requirements under Rule 20.3(d)(4). This can potentially add significant time to project approval as any comments presented by the public will be required to be addressed by the District/applicant. In addition, a public hearing can be requested which may also extend the project approval process.

Other agency requirements that can add difficulty to the permitting process and potentially delay project approval include:

- The facility Title V Operating Permit would be subject to modification under Regulation XIV. This process would require public review and the final permit would be subject to USEPA review and approval. An updated Compliance Assurance Monitoring (CAM) Plan would likely be required for the drift eliminators in accordance with Federal Clean Air Act requirements (40 CFR Part 64).
- A visible plume analysis would likely be required due to the proximity to the beach, the US I-5 Freeway, railroad tracks and residential areas.
- The facility would likely be required to undergo air toxics new source review under District Regulation XII Rule 1200: *Toxic Air Contaminants – New Source Review* due to potential metals emissions in the cooling tower drift. This would include conducting dispersion modeling and a health risk assessment. This can potentially complicate the permitting process, especially if health-risk criteria cannot be met.
- The project may be subject to California Environmental Quality Act (CEQA) review which would result in a multi-media environmental impact analysis for

the entire project, including both construction and operational impacts. This review process can add significant time to the project approval process.

- It should also be noted that there would be an "energy penalty" associated with the installation of wet cooling towers that is predicted to be approximately 2.5 percent. This would result in an approximate 2.5 percent increase in operational emissions from Units 4 and 5 for equivalent power output to current conditions

3.1.2.1.5 Local Ordinances/Regulations

In addition to the District permitting requirements, other local requirements through the City of Carlsbad can add significant challenges to the project permitting process. Examples include local height restriction, aesthetics and noise ordinances.

Local height restriction ordinances include a limit of 45 ft as indicated in the Electric Power Research Institute (EPRI) *Issues Analysis of Retrofitting Once-Through Cooled Plants with Closed-Cycle Cooling – California Coastal Plants* document (EPRI 2007). The addition of a plume abatement tower would result in the cooling towers exceeding this limit. Therefore, a variance may be required to obtain local approval.

Other local requirements are summarized below.

Local Noise Requirements

The noise element to the general plan must consider applicable land use compatibility for the cooling towers. Elements to a proper study include the consideration of noise source, mitigation design and overall visual constraints. Past experiences with the City of Carlsbad regarding these issues indicates that it would be a time consuming and costly effort to satisfy all regulatory requirements for a complete noise study submittal. Site measurements and surveys would be required which, in many cases, places a burden on the applicant to generate and/or acquire the appropriate land use maps necessary to complete a simple noise study, such as topographic features, visual simulations and other site specific details. The city's project managers are thorough in their reviews which typically lead to additional project costs and schedule delays.

The noise ordinance must additionally consider construction and operational noise impacts on all pre-determined sensitive receptors, such as nearby residential communities, avian habitats and local fish species. This portion of the study is data intensive and requires research into all relevant noise code guidelines that govern such actions. A complex noise model is then constructed to simulate all identified construction phases to assess the worst-case impact.

Cooling tower operational noise sources must also be clearly identified and modeled for comparison to daytime and nighttime noise code regulations. This can be problematic for the applicant as nighttime noise limits are generally much quieter and represent the most-restrictive and costly noise mitigation scenario.

Noise Control Design Issues

Cost and aesthetics play a role in the final choice of any mechanical system and mitigation system design. Given the final location of the cooling towers, it may be necessary to accurately assess and create a noise model that accounts for all mechanical equipment associated with the proposed project. In most cases, it is cumbersome for the applicant and consultant to acquire the necessary manufacturer's mechanical equipment specifications necessary to build an accurate noise model. Mitigation may become exotic given the type and location of the noise source which can lead to delays and increased costs in project deliverables. Furthermore, elevated noise sources such as a cooling tower can become quite problematic, especially if they increase the risk of direct noise pathway exposure to adjacent residential communities. This can play a significant role in obtaining local project approval.

Visual Aesthetics

Many communities within the Carlsbad coastal zone are locally governed by visual guidelines. The affluent beachfront community of Carlsbad is no exception. Residents pay a premium in order to enjoy a controlled and visually regulated community environment. The city is well known to be keenly aware of these issues and will likely require the applicant to address all visual components that may infringe upon robust code requirements. It should be considered, however, that normally the benefits of noise reduction far outweigh the aesthetic impacts for residents protected from unwanted sound. Several disadvantages of noise barriers and/or exotic noise mitigation include:

- Aesthetic impacts for motorists and neighbors, particularly if scenic vistas are blocked
- Costly visual simulations to assess impacts from all directions
- Costs of mitigation design, construction and maintenance

3.1.2.2 Ancillary Benefits to Agua Hedionda Lagoon from Maintaining Cooling Flow

One of the benefits of operating the cooling water intake system at EPS in AHL is the enhancement of hydraulic circulation in the lagoon system. Without the power plant, the only exchange in the lagoon would occur from tidal exchange and during storm events when there is freshwater inflow from runoff from the

surrounding watershed. The opening between the lagoon and the ocean is also maintained through dredging done by the power plant. The dredging and the operation of the power plant cooling water intake system reduce the residence time of water in the entire lagoon to approximately 2.6 days or five tidal cycles. Even in the Inner Lagoon, the residence time is only 3.2 days or 6.3 tidal cycles. As the following examples show, the maintenance dredging of the opening and the operation of the EPS CWIS greatly enhances water quality in the lagoon.

The water quality improvements in AHL due to operation of the EPS CWIS have not been quantified, but studies done in Alamitos Bay, to the north in Long Beach, California, for the original 316(b) studies for the Alamitos Generating Station (AGS) by Intersea Research Corporation (IRC; 1981), showed that the flows from AGS and the Haynes Generating Station, also located in Alamitos Bay, reduce the residence time of the water in Alamitos Bay to approximately one day. IRC (1981) estimated that the cooling water flows annually supply the bay with 50 tons of additional oxygen relative to the supply provided by natural exchange processes, greatly enhancing the water quality in the bay.

The benefit to water quality in Alamitos Bay due to operation of the power plants was clearly shown when the operation of AGS was reduced due to lower energy demand in recent years. As a result of the reduced flow from AGS, concern was expressed over odor problems and bacteria in the Los Cerritos Wetlands. The Los Cerritos Wetlands are located in the back reaches of Alamitos Bay near the power plant and under normal conditions benefit from continual inflows of water through the channel leading to the power plant which helps circulate water through the wetland system during plant operation. AES Alamitos, the owner/operator of AGS, was contacted with a request to discuss options for maintaining flow in the channel in order to maintain the health of the Los Cerritos Wetlands even during times when cooling water is not needed by the plant. If plants like EPS and AGS were retrofitted with closed-cycle cooling, the health of the associated wetland systems and their associated productivity would be adversely affected.

The benefits of maintaining tidal exchange in AHL and other coastal lagoons through dredging are widely recognized and are usually an integral component of wetland restoration projects. For example, one of the conditions of the coastal development permit adopted by the California Coastal Commission (CCC) for the San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 was to create or substantially restore 150 acres of tidal wetland as mitigation for impacts to the marine environment caused by the construction and operation of SONGS Units 2 and 3. The CCC initially identified eight wetland sites for potential mitigation, before approving the choice in June 1992 of San Dieguito, approximately 15 miles to the south of EPS in Del Mar, California. The

Environmental Impact Report/Environmental Impact Statement (EIR/EIS) prepared for the San Dieguito restoration project included information on the final permit conditions for the project (San Dieguito River Park Joint Powers Authority [SDJPA] and United States Fish and Wildlife Service [USFWS] 2000). The permit conditions in the EIR/EIS stated that Southern California Edison was required to submit a plan that included a total of 150 acres of credit, including the creation and/or substantial restoration of 115 acres of tidal wetland and that up to 35 acres of enhancement credit would be given for permanent, continuous maintenance of tidal flows through the system by dredging the channel out to the ocean. The 35 acres of enhancement credit was based on the determination that 126 acres of existing wetlands at San Dieguito would be enhanced by 28 percent if the tidal flows were maintained continuously.

It is clear from the examples above that the flow resulting from the cooling water intake system assists in maintaining water quality in AHL. With the current EPS operation, the inlet and the lagoon are periodically maintenance dredged to maintain the flow. Without the flow from EPS, sediment accretion would accelerate, potentially resulting in inadequate flow through the inlet and a decrease in water quality that would substantially affect the multiple beneficial uses of the lagoon which includes water recreation in the Inner Lagoon, and the aquaculture operations in the Outer Lagoon, including the white sea bass restoration program at the Hubbs Sea World Research Institute.

3.2 Track 2 (Units 4 and 5)

3.2.1 Compliance Criteria

In order to be able to use the Track 2 compliance alternative, an owner or operator of an existing power plant must first demonstrate, to the SWRCB's satisfaction, that compliance with Track 1 is not feasible. The previous sections describe the basis upon which Cabrillo claims that compliance with Track 1 is not feasible at EPS. Therefore, EPS will comply with the Policy under Track 2.

Under Track 2, an owner or operator of an existing power plant must reduce IM&E of marine life on a unit-by-unit basis to a level comparable to Track 1 using operational or structural controls or both.

3.2.1.1 Impingement Mortality

Impingement mortality compliance under Track 2 can be achieved in one or two ways:

- Demonstrate, through monthly verification, that the through-screen intake velocity does not exceed 0.5 fps

  or

- Demonstrate actual reduction in impingement mortality comparable to that achieved under Track 1

A comparable level, as defined by the Policy, is a level that achieves at least 90 percent of the reduction in impingement mortality required under Track 1. Track 1 requires a minimum 93 percent reduction in intake flow rate for each unit for compliance, compared to the unit's design intake flow rate.

The relationship between impingement and flow rates was studied as a potential indicator of impacts (EPRI 2003). This study concluded that volumetric flow rate is a poor predictor of impingement and that there are a number of factors which may influence impingement rates, including waterbody size and ecological zone of withdrawal. The extensive review of studies in the United States and internationally found that there are generally more fish impinged (or entrained) with increased withdrawal rate; however, there is much variability. For purposes of compliance under Track 2, it will be assumed that less water withdrawn will result in comparably reduced impingement rates. Therefore, we can translate the Track 1 minimum 93 percent reduction in intake flow rate as an equivalent reduction of fish impingement rate. Applying the definition of a comparable level (i.e., achieving a 90 percent reduction required under Track 1), the minimum compliance criteria for impingement mortality reduction is 84 percent (93 percent x 90 percent).

3.2.1.2 Entrainment

Entrainment compliance under Track 2 can be achieved one of two ways:

- Reduce cooling water flow a minimum of 93 percent as compared to the average actual flow for the corresponding months from 2000 to 2005

  or

- Demonstrate an actual reduction of entrainment relying in whole or in part of control technology comparable to that achieved under Track 1

A comparable level, as defined by the Policy, is a level that achieves at least 90 percent of the reduction in impingement mortality required under Track 1. For purposes of compliance, it is assumed we can translate the Track 1 minimum 93

percent reduction in intake flow rate as an equivalent reduction of fish entrainment. Applying the definition of a comparable level (i.e., achieving a 90 percent reduction required under Track 1), the minimum compliance criteria for impingement mortality reduction is 84 percent (93 percent x 90 percent). Compliance must be determined based on ichthyoplankton and on certain invertebrate lifestages, specifically, the crustacean phyllosoma and megalops larvae, and squid paralarvae fractions of meroplankton if screens are employed to reduce entrainment.

EPS will use an Equivalent Adult Modeling (EAM) approach for evaluating the effectiveness of any screening technologies used in complying with Track 2 of the Policy. EAM is a well established approach for evaluating IM&E losses (Horst 1975, Goodyear 1978, Dixon 1999) that was also used extensively by USEPA in analyses for the 316(b) Phase II rulemaking (USEPA 2004, EPA-821-R-02-003). EAM is a useful approach for evaluating IM&E losses because it accounts for the multiple ages and life stages of fishes potentially impacted and standardizes the losses to numbers of equivalent adults at a specific age or life stage. The model recognizes that natural mortality rates vary for different age and life stages and uses these age and life stage specific mortality rates to estimate the number of fishes at a different age that would have been expected to survive in the absence of the power plant losses.

As a direct consequence of the processes of natural mortality, later stage fish larvae have a much higher probability of reaching adulthood than earlier life stages. For example, the number of adult equivalents resulting from an EAM for 1,000, 30-day old larvae will be much greater than the equivalent adults from 1,000, 3-day old larvae. Accounting for the different mortality rates for the age and life stages of larvae is especially important for evaluating the effectiveness of any screening technology because of the need to balance screening efficiency with the potential for survival. While a small mesh size down to 0.02 in will screen out large numbers of small, very young larvae, very few of these larvae will survive to become reproductive adults due to the high natural mortality rates experienced by these earliest life stages. The greatest population benefit from intake screens will result from using screen sizes that minimize the entrainment of older (larger) larvae and juveniles that have a higher likelihood of becoming reproductive adults.

3.2.2 Prior Technologies/Operational Measures for Impingement Mortality and Entrainment Reduction

The operation of the cooling water intake system during the 2004-2005 12-month study period resulted in an annual estimated impingement of 120,354 fish weighing 4,780 lb on the traveling screens during normal operations, and an

additional 94,991 fish weighing 4,484 lb that were collected during periodic heat treatment operations used to control the growth of fouling organisms on the tunnel walls. This means that numerically 44 percent and 48 percent by weight of the fish impingement occurred during heat treatment.

In the EPS Proposal for Information Collection (PIC), dated April 1, 2006, Cabrillo committed to evaluate potential operational and procedural enhancements to reduce impingement during heat treatment events. EPS has open channels that can be dewatered and in the future, manual cleaning of the channel walls will occur to control biofouling.

3.2.3 Potential Technologies/Operational Measures for Impingement Mortality and Entrainment Compliance

3.2.3.1 Alternative Intake Technology/Operational Measures Screening Assessment (Based on Prior 316(b) Submittals)

A review of potential technologies/operational measures was included in the PIC. That evaluation is summarized below with some revisions based on the latest information available.

3.2.3.1.1 Cylindrical Wedge-Wire Screens – Fine Slot Width

In the PIC, the use of wedge-wire screens located in AHL was eliminated from further consideration due to the lack of ambient cross flow current velocity, which is necessary to sweep organisms and debris away from the screen. Although ambient velocity is an important factor for the successful operation of wedge-wire screens, there is the potential that currents created in the Outer Lagoon by tidal fluctuations may be adequate. For this reason it is now proposed to further evaluate the use of wedge-wire screens, although other factors including, but not limited to biofouling, shallow water depth, deposition of sand and dredging requirements, may present significant challenges to the use of this technology.

3.2.3.1.2 Fish Barrier Net

It was determined that a barrier net with an area of 30,000 square ft (ft^2) would be required for the full station flow. With just Units 4 and 5 in operation, the required net size would be approximately 22,000 ft^2. It was noted in the PIC that the net would be subject to biofouling with no mechanism for self cleaning of the net. It would be necessary for a diving contractor to remove and clean the net and replace it with a second net while the first net was being cleaned. Due to the size of the openings in the net, no entrainment reduction would be achieved. For

these reasons it was concluded that the barrier net was not practically feasible for implementation at EPS.

3.2.3.1.3 Aquatic Filter Barrier

This technology, as manufactured by Gunderboom, is an aquatic microfiltration barrier system consisting of a fabric filter that is installed in the waterbody around the entrance to the intake. The fabric filter is supported by floating booms and extends the full water depth. It was determined in the PIC that the aquatic filter barrier was not practically feasible at EPS due to the lack of cross currents which are necessary to carry away impinged organisms and debris. Beyond what was identified in the PIC, the surface area of the fabric filter should be such that the flow rate is approximately 4 gpm per ft^2. To provide entrainment protection for EPS at Units 4 and 5 with a design flow of 439,200 gpm, the fabric filter surface area would have to be approximately 110,000 ft^2. With an average water depth of approximately 10 ft at normal low tide, the fabric filter would have to be approximately 11,000 ft long. A filter barrier of this length within the lagoon is not practical.

3.2.3.1.4 Fine Mesh Dual Flow Screens

In the PIC it was concluded that application of fine mesh dual flow screens at the location of the existing screens is not feasible due to the inability to achieve a 0.5 fps approach velocity at the face of the screens. It was also concluded that the application of fine mesh dual flow screens would require the construction of a new screening structure at the lagoon, but that the use of fine mesh dual flow screens did not present any significant advantage when compared to a new structure with fine mesh through flow screens. For these reasons, further evaluation of fine mesh dual flow screens was not recommended.

After further evaluation and the acceptance of through screen velocities of approximately 2 fps, the replacement of the through flow screens with dual flow fine mesh screens may be feasible. For Unit 4 the screen basket width may have to approach 12 ft, which is wider than typically used for this style screen, but may be feasible. For Unit 5, screens with a basket width of 6 to 8 ft would be necessary. For either unit, structural modifications to the existing screenwells would be necessary. If the required structural modifications are determined to be feasible, other potential operational issues with the conversion to dual flow screens with wider than normal baskets would have to be investigated. The impact of the high velocity and turbulent screen exit conditions on the CWPs would have to be studied and the ability to achieve an acceptable velocity distribution across the face of the wide screen baskets would require further analysis or flow modeling.

With the through screen velocity in excess of 0.5 fps, it would also require the installation of a fish return system. After an initial review, the installation of a fish return system appears feasible. An acceptable discharge location for the system will have to be determined.

For the reasons noted above, the replacement of the existing through flow screens for Units 4 and 5 with fine mesh dual flow screens will be an option for further evaluation.

With regard to the use of fine mesh dual flow screens with a new intake structure, it may be possible to design a structure that could be somewhat smaller than what will be required using through flow screens and potentially reduce the number of screens required. For this reason, fine mesh dual flow screens will remain a possible technology for use with a new screening structure at the lagoon.

3.2.3.1.5 Modular Inclined Screens

This technology was eliminated from further consideration in the PIC since it was not a suitable or proven technology. Modular inclined screens with opening sizes small enough to reduce entrainment of eggs and larvae have not been tested. In addition, this technology has never been tested or installed at a generating station with a seawater intake.

3.2.3.1.6 Angled Screen System – Fine Mesh

This style of screen cannot be installed in the existing intake structure. It would be necessary to construct a new screening structure at the lagoon. As noted in the PIC, a new screening structure for fine mesh angled screens would be at least as large, and significantly more complex, than a new structure for either through flow or dual flow screens. Since the angled screens have fewer installations and have not demonstrated IM&E reductions which are significantly better than either through flow or dual flow fine mesh screens, this style of screen was eliminated from further consideration.

3.2.3.1.7 Behavior Barriers

3.2.3.1.7.1 Offshore Intake with Velocity Cap

The construction of an offshore intake with a velocity cap at EPS would likely achieve compliance for impingement mortality reduction based on the documented results from the El Segundo offshore intake (Weight 1956) and more recent studies at Scattergood Generating Station (MBC Applied

Environmental Sciences [MBC] et al. 2006). While the offshore intake would likely produce some reduction in entrainment due to location, full compliance with entrainment reduction requirements is unlikely. For this reason, the offshore intake was not considered for further evaluation.

3.2.3.1.7.2 Air Bubble Curtain

Little or no testing has been completed to determine the effectiveness of air bubble curtains for the species present in AHL. Due to the lack of data to project any level of IM&E reduction, this technology was not recommended for further consideration.

3.2.3.1.7.3 Strobe Lights

As noted in the PIC, few species similar to those which are present in AHL have been tested for avoidance response to strobe lights. Laboratory testing was also completed for the possible application of strobe lights at SONGS and the results were not conclusive. Furthermore, this technology does not reduce entrainment. Due to the lack of supporting effectiveness data, further consideration of this technology was not recommended.

3.2.3.1.7.4 Sound

This technology was not recommended for further consideration in the PIC since there was no data that clearly demonstrated an avoidance response by those species that are present in AHL, even though many different sound devices have been tested and numerous species have demonstrated an avoidance response. Furthermore, this technology does not reduce entrainment.

3.2.3.2 Selected Alternative Intake Technology/Operational Measures Conceptual Design

A preliminary evaluation of alternative technologies and operational measures was completed to identify the potential options for compliance with the IM&E reduction requirements. Due to the time available from the release of the Policy and the submittal date of this Implementation Plan and the requirement for additional analysis and site specific testing to more accurately determine design parameters and associated effectiveness of technologies, in addition to the need to resolve operational concerns and potential environmental and permitting issues, one specific compliance alternative has not been identified. The intent here is to identify alternatives that are feasible at EPS and have the potential to achieve compliance. Along with the identification of these alternatives, a

preliminary plan for future analysis and testing to identify the final compliance option is presented.

3.2.3.2.1 Coarse Mesh Modified Ristroph Screens

The PIC identified two technologies as feasible and recommended for further evaluation. The one option was replacement of the existing traveling intake screens with coarse mesh modified Ristroph style screens. The modified Ristroph screens would have ⅜ in smooth mesh baskets with fish buckets, a dual pressure spray wash system, independent fish and debris troughs, and other features to enhance impingement survival. It would also be required that the screens operate continuously to avoid long periods of impingement prior to removal of the organisms from the screens. This technology would reduce impingement mortality but would not reduce entrainment, since the mesh size would not be reduced from what is used on the existing screens. Under the current Policy it is required that both IM&E be reduced; therefore, this technology does not have the potential to satisfy the full compliance requirements. Since other potential technologies that must be considered for entrainment reduction will also achieve equivalent impingement mortality reductions as coarse mesh modified Ristroph screens, this option for modified Ristroph screens will not be evaluated further since it would be redundant with other options to be considered.

3.2.3.2.2 New Fine Mesh Screening Structure

The second option for compliance with IM&E reduction requirements presented in the PIC was a new fine mesh screening structure. The option as presented in the PIC is for a screening structure where the through screen velocities would be less than 0.5 fps, therefore, meeting the requirement for impingement mortality. Upon further review of this option, the construction of a structure with enough screens to achieve a through screen velocity of 0.5 fps does not appear practically feasible. Due to the shallow water depth at and around the intake (approximately 10 to 12 ft at low tide) and the low percentage of open area for fine mesh screens (25 to 30 percent), it would require over 60 through flow screens with baskets that are 10 ft in width to achieve a through screen velocity of 0.5 fps. If dual flow screens with baskets that are 10 ft wide were used, the number of screens required would be slightly over 30.

A more feasible option would be to use 2 fps or less as the through screen velocity with the use of dual flow screens. This velocity is reasonable for effective operation of the screens, but since it is in excess of 0.5 fps a fish return system will be required to safely return impinged fish to the waterbody. This

concept would require approximately eight screens, with the actual number of screens dependent upon the screen mesh requirement.

Verification of the feasibility of this concept and the capability to achieve the necessary reduction in IM&E would require a thorough analysis of the length frequency distribution for the entrained organisms with correlation to the head capsule depth, lab testing to determine the effectiveness of entrainment reduction with different mesh sizes and through mesh velocities, analysis of intake water for size distribution of suspended solids, gathering of bathymetric and geotechnical information at the intake, and flow modeling of any new intake structure.

The mesh size for use with a screening technology would be selected using an analysis of the lengths of fish larvae collected during the June 2004-May 2005 entrainment sampling. The geometric relationship between length and head capsule dimensions (width and depth) has been determined for larvae from California fishes entrained in the highest number at coastal power plants. These relationships would be used to determine the distribution of head capsule dimensions for the larvae entrained at EPS and the proportion of the entrained larvae that would be excluded by different mesh sizes accounting for the variation in length and head capsule for each age. The head capsule is used to set the minimum mesh size since that is the only part of the larvae with hard body parts that are not easily compressible. The relationship between length and age would be determined from published larval growth rates for those fishes. The proportion of the larvae in each age class would then be extrapolated to a common age using EAM, such as the age-one equivalent used in the USEPA analyses. This would be done for estimates of entrainment with and without screens of varying sized mesh to compare their effectiveness at protecting the population. The mesh size that Cabrillo would propose to use would be the size most appropriate to meet the Policy criteria.

The estimated effectiveness of the different mesh sizes using this approach should be conservative since the majority of the larvae would not contact the screen head-first. Also, the larvae used in estimating the screen size have been preserved in formalin and alcohol, which results in shrinkage of the specimens. As a result, the actual larvae contacting the screen will be slightly larger at the same age than the larvae used in estimating mesh size

3.2.3.2.3 Cylindrical Wedge-Wire Screens

Another potential option that will be further evaluated is the use of cylindrical wedge-wire screens with fine slot width openings. The potential exists to install wedge-wire screens in AHL; however, a significant number of concerns

regarding the operation and maintenance of wedge-wire screens installed at this site have to be addressed. With the limited depth within the lagoon it is anticipated that the maximum size of the screens would be 48 in diameter. The number of required screens is a function of the selected slot width, but it is anticipated that between 40 and 60 screens would be required for the cooling water flow associated with Units 4 and 5. It would be necessary to optimize the configuration of the array of screens with consideration of local ambient currents, sand deposition tendencies, dredging requirements, interference with recreational boating, proximity to aquaculture, and flow distribution between screens. Other operational and maintenance concerns include biofouling and the possible release of copper from anti-bioufouling materials.

3.2.3.2.4 C-Water AquaSweep™ Technology

The C-Water AquaSweep™ is an intake technology for the reduction of IM&E which is being developed for commercial operation by CH2M Hill. While this technology has not been developed to the point of commercialization, the concept has been proven to have the potential for reduction of IM&E through the use of computational fluid dynamics (CFD) modeling and preliminary physical model testing. The technology would employ the use of a new structure at the current intake structure. The AquaSweep™ grid, through which the intake water flows, would be installed in front of the existing trash racks. The concept would also employ the use of low head, low speed circulators to create a sweeping current approximately parallel to the face of the grid. Effectively, the source water body flow is split into an intake flow and a sweeping flow. The inertial separation which ensues, efficiently and effectively prevents the smallest of aquatic life forms from being pulled into the existing CWIS, and ensures their safe movement through the separator and delivery back to the source water body.

The concept has the potential for use at EPS, but still requires several phases of development prior to becoming commercially available. The developers of this technology anticipate initiating pilot testing of this concept as soon as 2012 and commercialization by 2013. Although this intake technology is still in the development phase and does not have any full scale applications on which to base effectiveness, it is considered a potential technology for application at EPS. For a full description of the C-Water AquaSweep™ technology see Attachment 3.

3.2.3.2.5 Fine Mesh Dual Flow Screens

Replacement of the existing through flow screens with fine mesh dual flow screens presents some challenges due to the requirement for structural

modifications to the existing intake tunnels and screenwells, stretching the limits of the dual flow technology regarding maximum basket widths, and achieving acceptable flow velocities and patterns for proper operation of the screens and the CWPs. However, with approximate screen basket widths of 12 ft for Unit 4 and 6 to 8 ft for Unit 5, the use of these screens may be feasible. This option will also require the installation of a fish return system. NRG Energy, Inc. has successfully pilot tested fine mesh dual flow screens at an east coast generating facility and considers fine mesh dual flow screens to be a feasible option worthy of further consideration at EPS.

3.2.3.2.6 Flow Reduction

In addition to the use of intake technologies, operational changes will be investigated to identify possible reductions in flow that can be achieved to supplement the reductions from the selected intake technology if the required compliance reductions are not completely achieved through the technology option. Projected flow reductions will be based on comparisons to the average actual flow from 2000 to 2005.

3.2.3.3 Outage Requirements and Coordination

Each of the potential options will require different outage durations. It is anticipated that the fine mesh screening structure, cylindrical wedge-wire screens, and C-Water AquaSweep™ Technology will require that the Unit 4 and Unit 5 outages occur at the same time. The replacement of the through flow screens with fine mesh dual flow screens will require outages for both units, but not simultaneous outages. The actual outage durations can be better developed after the design of the selected technology is further advanced and construction techniques for minimizing the required outages are investigated. It is estimated that the installation of a new technology at the existing intake could require an outage of 8 to 12 weeks, while the installation of dual flow screens in the existing intake tunnels may require individual unit outages of 2 to 6 weeks, depending upon the extent of the structural modifications required . Upon completion of the selection and pilot testing of the proposed technology, the specific time periods for the unit outages will be identified and coordination with the proper authority will be conducted.

3.2.4 Beneficial Cooling Water Reuse (Carlsbad Desalination Plant)

EPS has agreed to provide 304 MGD of production water to CDP from its cooling water discharge flow. This is considered a beneficial reuse of water. As described earlier, any reduction in flow below 304 MGD for power production will be augmented up to 304 MGD to provide production water for CDP.

4. Immediate and Interim Requirements

4.1 Large Mammal Exclusion Device

EPS does not have an offshore intake structure and is not required to have a large organism exclusion device. As stated previously, EPS has metal trash racks on the intake structure, with vertical bars that are spaced about 3.5 in apart which exclude large organisms. Therefore, EPS currently meets the Policy requirement for large mammal exclusion devices spaced at less than 9 in.

4.2 Mitigation for Interim Impingement and Entrainment Impacts

The State Policy requires existing power plants to "implement measures to mitigate the interim IM&E impacts resulting from the cooling water intake structure(s), commencing October 1, 2015 and continuing up to and until the owner or operator achieves final compliance. The owner or operator must include in the Implementation Plan the specific measures that will be undertaken to comply with this requirement."

The SWRCB has identified the preferred mitigation method as providing funding to the California Coastal Conservancy that will ultimately be used "for mitigation projects directed toward increases in marine life associated with the State's Marine Protected Areas in the geographic region of the facility." The California Coastal Conservancy has identified several restoration projects in the South Coast region that, when implemented, would provide increases in habitat and production of marine life.

Cabrillo proposes to provide funding to the California Coastal Conservancy as interim mitigation from October 1, 2015 and continuing up to and until EPS is in final compliance with the Policy. The amount provided will be based on the actual cooling water intake flow of each unit during each calendar year (January 1 through December 31). Discharge data submitted to SDRWQCB will be used for the volume calculations. Cabrillo proposes as mitigation three dollars ($3.00) for each one million gallons withdrawn by each unit. The calculations will be based on actual flow for the 12 months preceding the October 1, 2015 interim mitigation requirement and on a rolling 12-month period thereafter to the Compliance Date. Funds will be submitted to the California Coastal Conservancy annually.

Cabrillo is also interested in discussing potential credit towards the interim mitigation payments for the maintenance dredging conducted by EPS to maintain tidal flow to AHL. A precedent for this credit is the permit conditions for the restoration of the San Dieguito wetlands being funded by Southern California

Edison for the impacts of SONGS that provides for up to 35 acres of enhancement credit maintenance of tidal flows through the system by dredging the channel out to the ocean.

This approach will allow for consistent implementation of the Policy among all the plants required to conduct interim mitigation. By providing funding on an annual basis it also addresses uncertainties on the volume of cooling water necessary to support operations at EPS. This approach also avoids the uncertainties that are associated with the implementation of any restoration project and the difficulties in determining the appropriate level of funding for projects that might continue to require funding and provide benefits well beyond the date when final compliance is achieved.

5. Proposed Monitoring Plan

5.1 Current Studies Adequately Describe Baseline Impingement Mortality and Entrainment Losses

As described above, the data collected at EPS during the recent 2004-2005 study are appropriate for use in characterizing baseline IM&E at EPS and no additional monitoring is proposed until studies are required to confirm that installed technologies are providing the necessary reductions under the new Policy. The quality of the 2004-2005 study is demonstrated by the use of the results by several California resource agencies in considering permits for the Poseidon CDS, and an even more recent AFC submitted to the CEC for the replacement of Units 1-3 with two new units using closed cycle cooling.

As shown in the comparison of the results from the two 316(b) studies conducted at EPC in 1979-1980 and 2004-2005 described above, the species composition of the fishes impinged and entrained by EPS have not changed considerably. The species composition of fishes impinged and entrained at EPS with an intake inside AHL will be much less variable than plants with intakes on the open coast. For example, the dominant fish larvae in enclosed habitats like AHL (lagoons, harbors and coastal embayments) will always include gobies due to the abundance of shallow mudflat and sandy habitat, and blennies due to habitat associated with rock jetties and fouling communities on docks, pilings and other structures. In fact, gobies and blennies have been two of the dominant fish larvae collected during all of the recent entrainment studies conducted at other power plants located in harbor and coastal embayments in southern California, often comprising 90 percent or more of the total entrainment as they did at EPS. Shifts in the dominant species entrained at EPS would only be expected to occur with major changes in the available habitat in AHL.

Although few changes in species composition would be expected to occur in IM&E at EPS, there will be changes in abundance among years. These fluctuations will not affect the ability to determine if any installed technologies provide the necessary reduction required under Track 2 in the new Policy since these studies will be designed to detect the proportional reductions in IM&E due to the technology, which should be independent of the absolute levels of abundance. This proportional difference would not be expected to vary except with significant changes in species composition or changes in plant operation and is one of the primary arguments for using the Empirical Transport Model in most of the recent entrainment assessments in California (Steinbeck et al. 2007). This assessment model estimates the proportional losses to source populations of larvae due to entrainment and is generally conducted for only a

single year since the proportional loss to the population will vary much less than the absolute abundances of those populations among years.

No additional monitoring is proposed at EPS until studies are required to prove installed technologies are providing necessary reductions under the new Policy. Data from the 2004-2005 study remains as the appropriate baseline IM&E data as the data for that study were collected using the same standard sampling techniques used for studies at other coastal power plants in recent years including the use of 335 micron mesh net for the entrainment sampling as specified in Section 4.B.(1) on Track 2 Monitoring Provisions in the Policy. The quality of the data collected during the 2004–2005 study is reflected in the fact that it has been used for recent California permits for the Poseidon CDP at EPS which have been reviewed by several state and federal resource agencies. EPS will submit study plans for demonstrating compliance of any technologies proposed for meeting the required reductions under Track 2 and work with SWRCB and SDRWQCB staff to ensure that the studies provide the data necessary for that determination.

5.2 Post Technology/Operational Modification Monitoring

As described above, a number of technology modifications are being considered for installation/modification at EPS. Monitoring programs to validate the performance of a technological modification against the criteria in the Policy are fundamentally different than those studies performed to characterize IM&E. How these studies are designed and conducted can be very dependent on the modifications to the intake. Cabrillo will propose an appropriate monitoring plan once a technology has been pilot tested and determined adequate for meeting the IM&E criteria contained in the Policy. The proposed monitoring plan will contain annual reporting to allow a review of the necessity for additional monitoring.

6. Proposed Compliance Schedule

Below is the proposed schedule for EPS to comply with the Policy:

- April 1, 2011: Submit Implementation Plan to outline Track 1 and/or Track 2 compliance with IM&E.
- October 1, 2011: Verify Policy requirement that no greater than 9 in spacing between bars for the intake structure is in compliance with the large organism exclusion devices. This requirement has been satisfied as the distance between the trash rack bars in front of the intake structure are 3.5 in.
- October 31, 2011: Potential SWRCB approval of the Implementation Plan.
- December 31, 2011: Develop engineering and biological assessment of proposed technologies and develop pilot testing program.
- July 2012: Install approved pilot technology to assess IM&E reduction.
- July 2012 - April 2014: Perform quantitative study to evaluate IM&E reductions by pilot technology.
- October 2015: Initiate full scale installation and deployment of approved technology.
- October 2015 - May 2017: Implement an approved quantitative study to demonstrate compliance with IM&E objectives in the Policy from full scale deployment of technology.
- October 1, 2015 - December 31, 2017: Apply Interim Mitigation fee of $3.00/million gallons based on actual flow to the California Coastal Conservancy. The fee will be paid on an annual basis. Interim mitigation fee will be canceled if demonstration of Policy compliance is achieved prior to or after October 2015, but before the Compliance Date.
- December 31, 2017 (on or before): Demonstrate compliance with Policy.

7. References

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Implementation Plan for Compliance with California Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling

Figure 2-1. Location of Encina Power Station Cooling Water Intake Structure in Relation to Agua Hedionda Lagoon Source Water

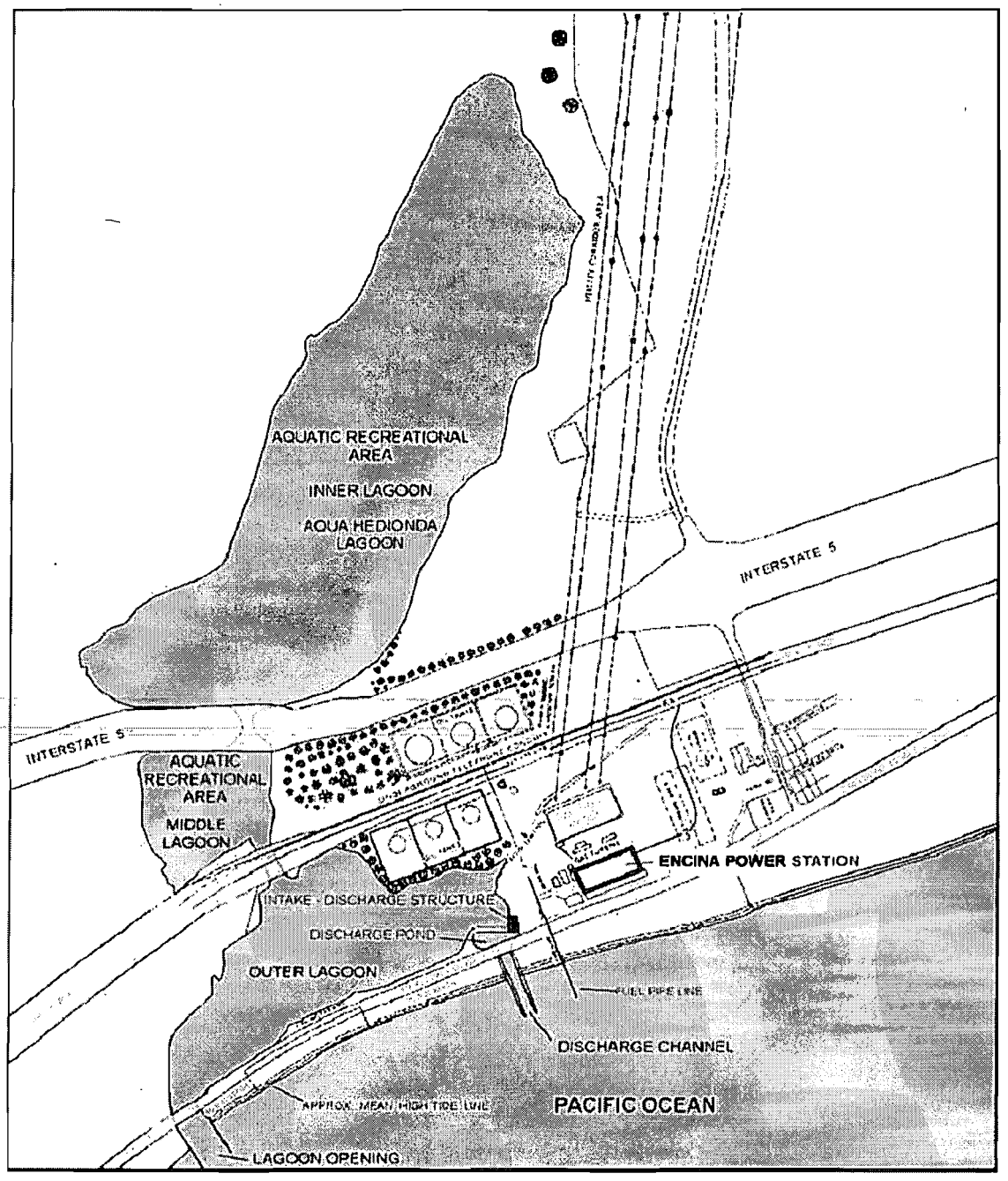


Figure 2-2. Encina Power Station Location Map

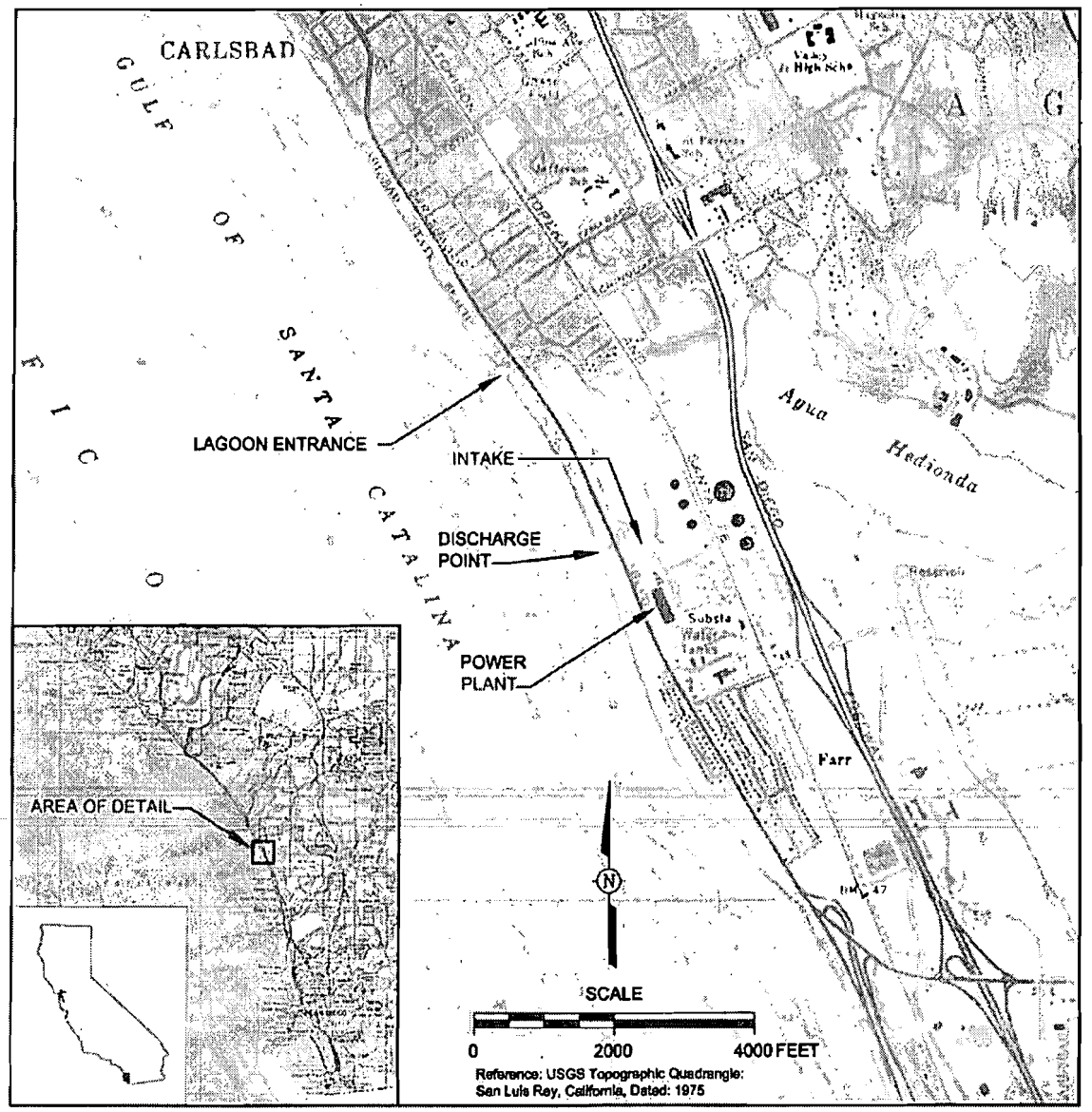


Figure 2-3. Longitudinal Cross-Section of Encina Power Station Intake Structure

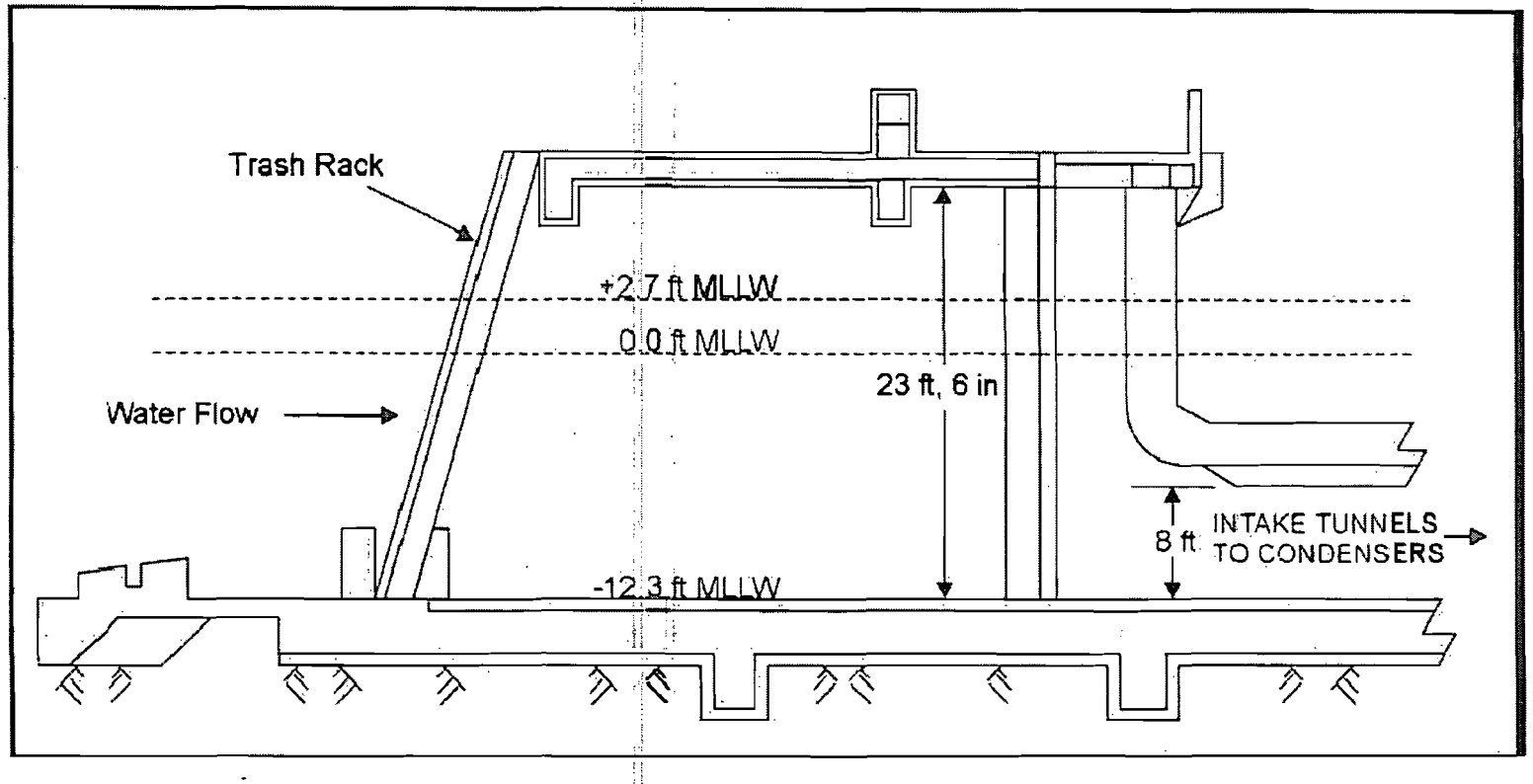
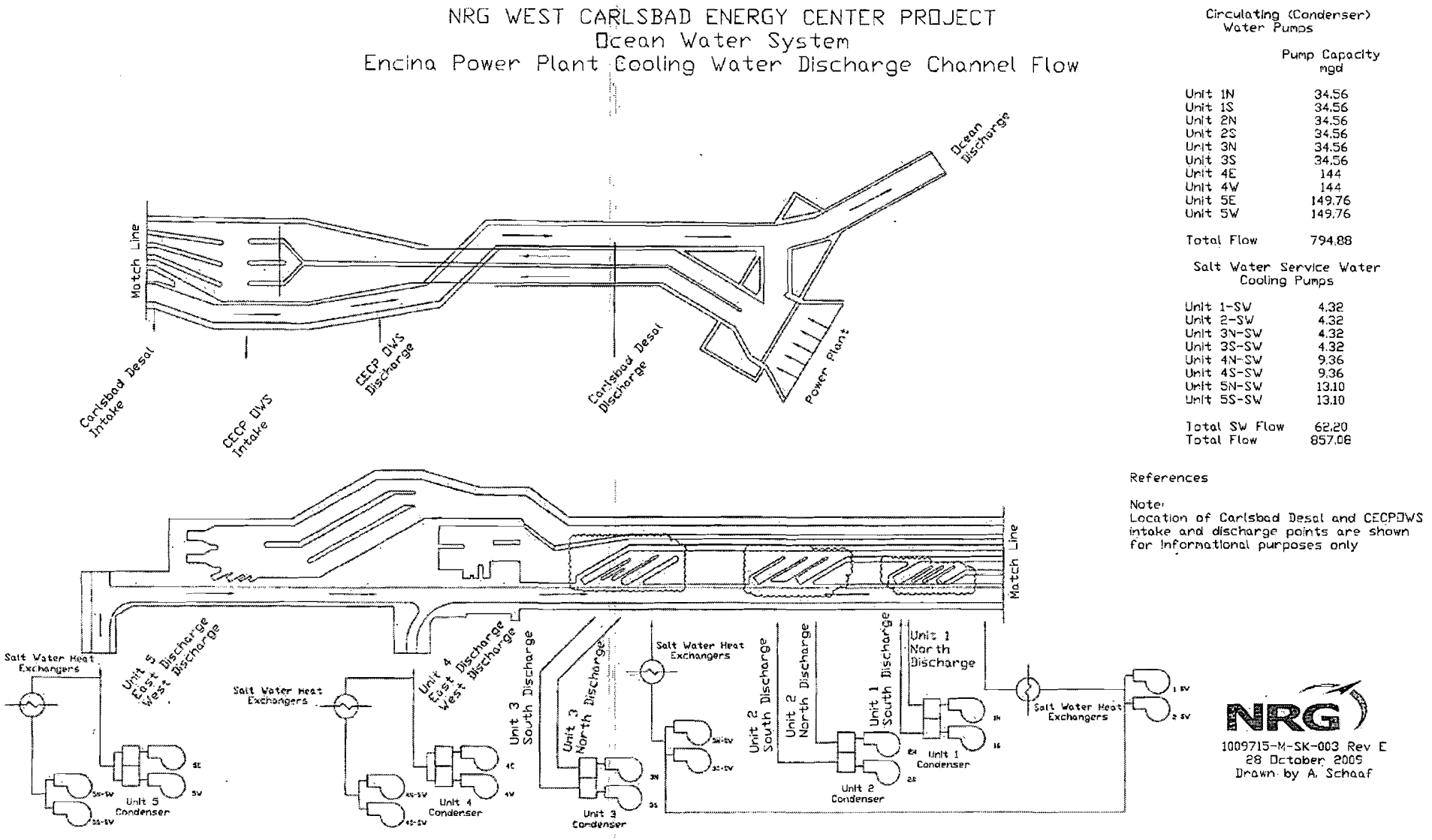


Figure 2-4. Schematic of Encina Power Station Cooling Water Intake Structure



Circulating (Condenser) Water Pumps

	Pump Capacity mgd
Unit 1N	34.56
Unit 1S	34.56
Unit 2N	34.56
Unit 2S	34.56
Unit 3N	34.56
Unit 3S	34.56
Unit 4E	144
Unit 4W	144
Unit 5E	149.76
Unit 5W	149.76
Total Flow	794.88

Salt Water Service Water Cooling Pumps

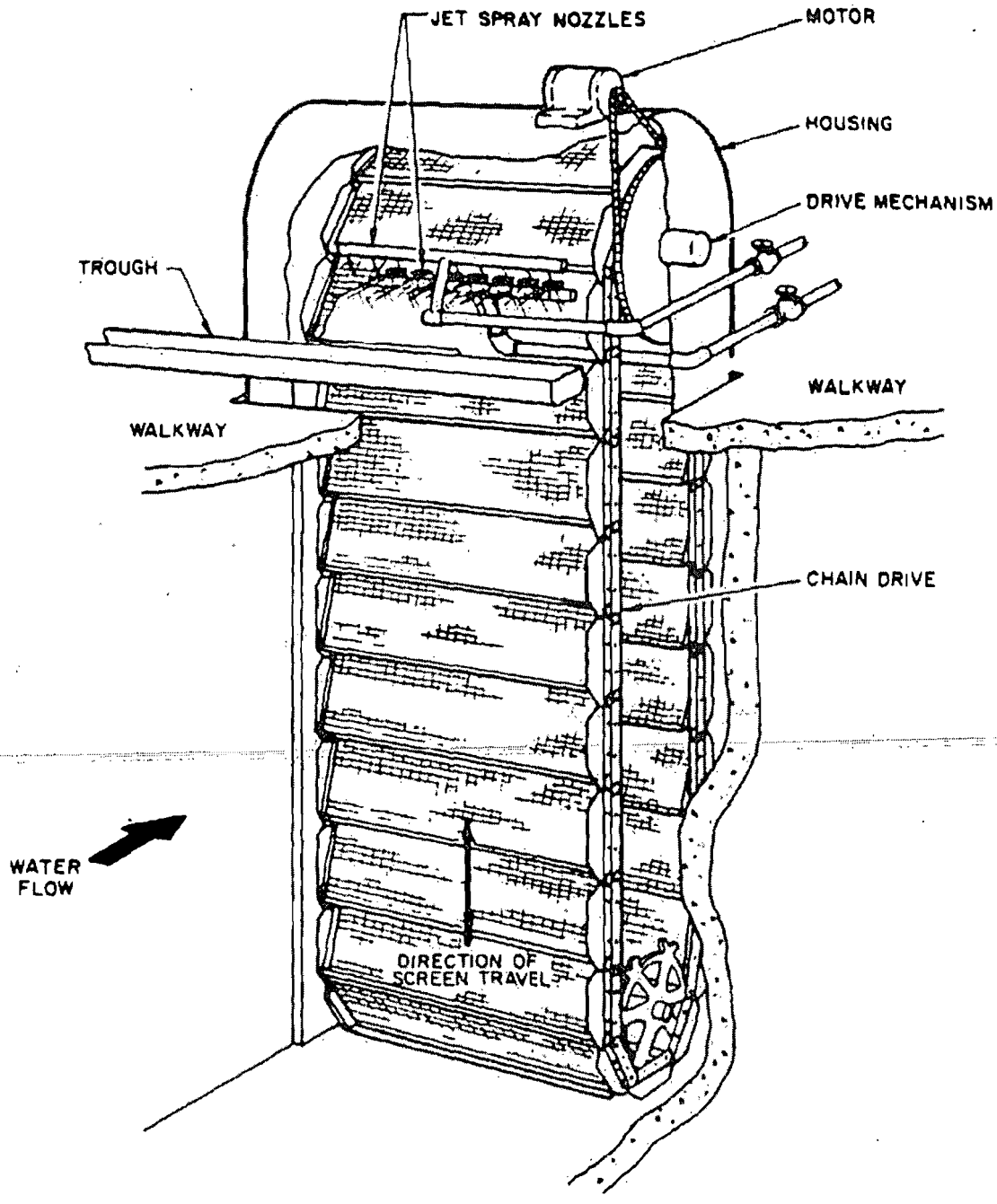
Unit 1-SW	4.32
Unit 2-SW	4.32
Unit 3N-SW	4.32
Unit 3S-SW	4.32
Unit 4N-SW	9.36
Unit 4S-SW	9.36
Unit 5N-SW	13.10
Unit 5S-SW	13.10
Total SW Flow	62.20
Total Flow	857.08

References

Note:
Location of Carlsbad Desal and CECPOWS intake and discharge points are shown for informational purposes only

1009715-M-SK-003 Rev E
28 October 2009
Drawn by A. Schaaf

Figure 2-5. Diagram of Traveling Water Screen Similar to Those in Use at the Encina Power Station (illustration from EPRI)



1. Total flow including circulating water and saltwater service pumps
2. Gas turbine units do not utilize once-through cooling water sources

Figure 2-6. Location of Encina Power Station Entrainment (E1) and Source Water (L1-L4; N1-N5) Plankton Stations

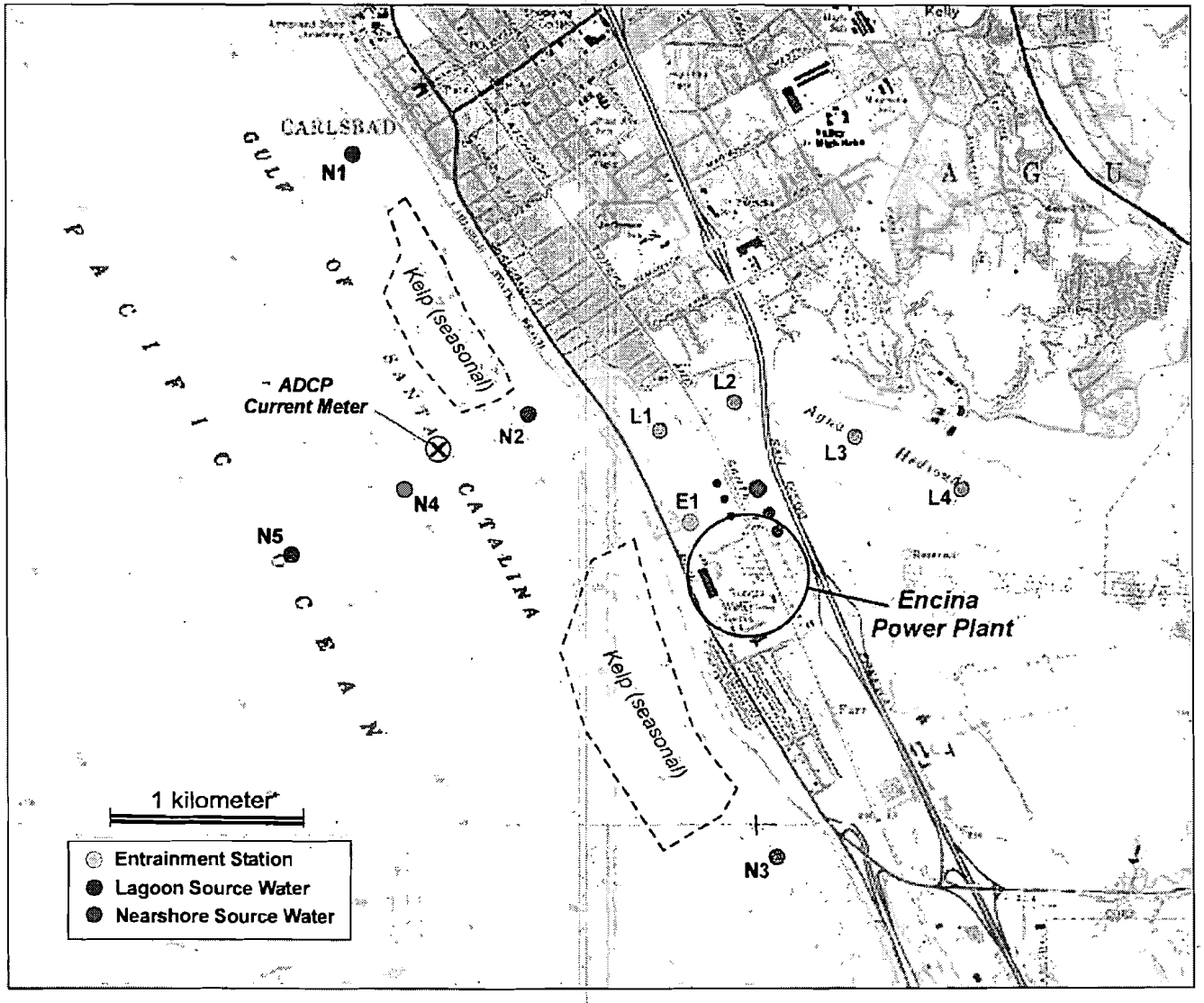
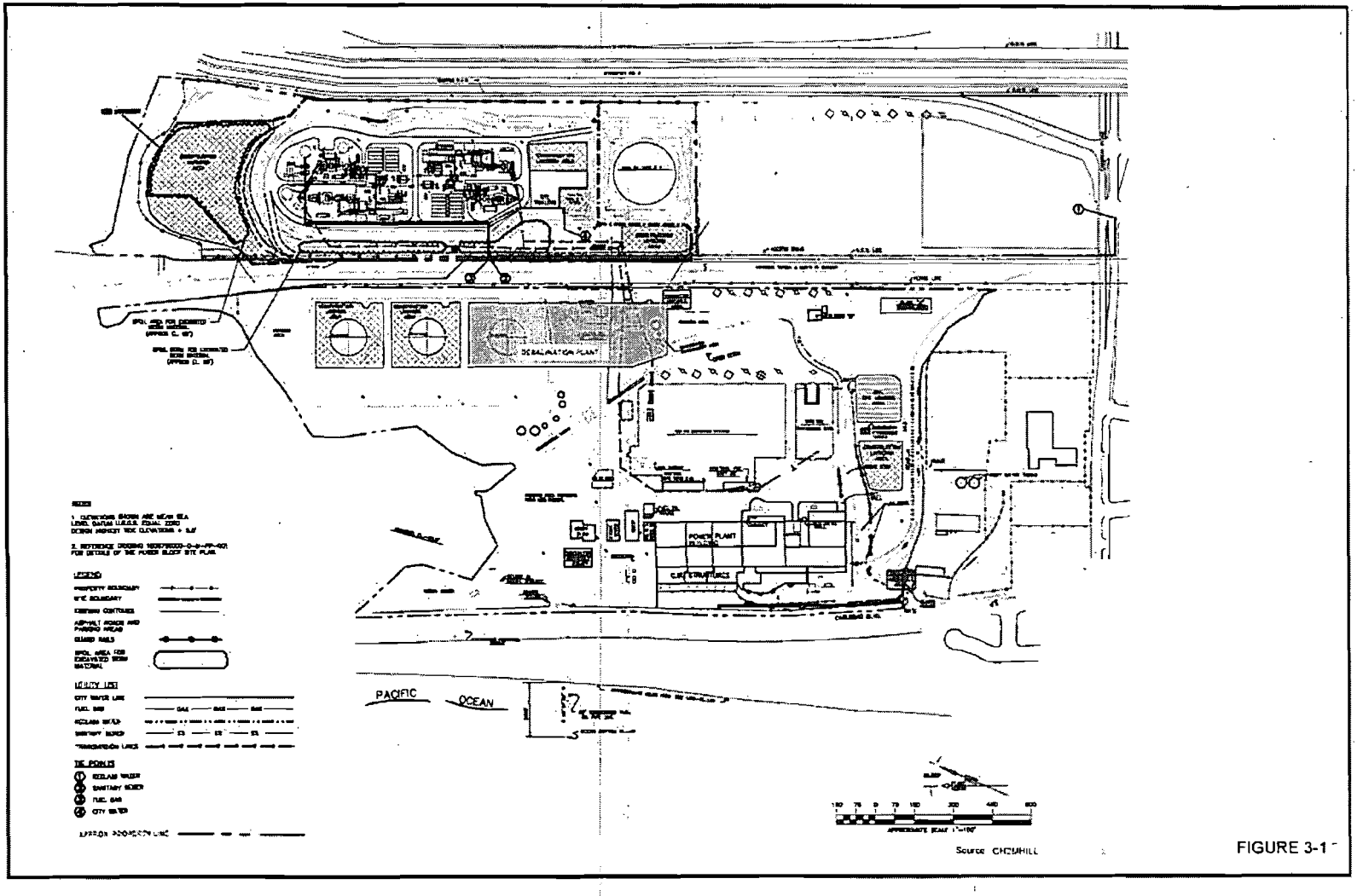


Figure 3-1. Carlsbad Energy Center Project – Plot Plan



Source: CH2MHILL

FIGURE 3-1

CALIFORNIA INDEPENDENT SYSTEM OPERATOR

AND

SAN DIEGO GAS & ELECTRIC COMPANY

RELIABILITY STANDARDS AGREEMENT

FILE COPY

RELIABILITY STANDARDS AGREEMENT

This Reliability Standards Agreement ("Agreement"), dated June 15, 2007, is entered into by and between the California Independent System Operator Corporation, a California nonprofit public benefit corporation ("CAISO") and San Diego Gas & Electric Company ("TE"). In this Agreement, the CAISO and TE are jointly referred to as the "Parties" and individually as a "Party."

RECITALS

WHEREAS, the Energy Policy Act of 2005 was signed into law in August 2005, which added a new Section 215 to the Federal Power Act giving the Federal Energy Regulatory Commission ("FERC") authority over developing and enforcing reliability standards for the Bulk Power System;

WHEREAS, in Docket RM06-16-000; 118 FERC ¶ 61,218 ("Order No. 693"), FERC approved various Reliability Standards applicable to users, owners and operators of the Bulk Power System developed by the North American Electric Reliability Corporation ("NERC"), the entity certified by FERC as the Electric Reliability Organization ("ERO"), and FERC intends to approve additional Reliability Standards.;

WHEREAS, the NERC, through the Western Electricity Coordinating Council ("WECC") Delegation Agreement (filed with FERC in Docket No. RR07-7) has delegated authority to the WECC for the purposes of proposing Reliability Standards to the ERO and enforcing Reliability Standards within the WECC;

WHEREAS, the CAISO is registered with the NERC as a Transmission Operator ("TOP") in accordance with the NERC compliance registry process and, as such, is responsible for complying with Reliability Standards which are subject to enforcement by the Compliance Enforcement Authority designated by the NERC;

WHEREAS, the TE owns and maintains transmission facilities that are part of the Bulk Power System, is registered with the NERC as a TOP in accordance with the NERC compliance registry process, and, in either capacity, may be subject to Penalties imposed by the Compliance Enforcement Authority for failure to comply with Reliability Standards;

WHEREAS, the CAISO and the TE at times agree upon the delegation of responsibilities in order to ensure that the Reliability Standards and the applicable responsibilities identified in each Reliability Standard are satisfied;

WHEREAS, as of the effective date of Order No. 693 and any subsequent orders related thereto, in order to ensure Reliability Standards are met, Penalties may be

assessed by the Compliance Enforcement Authority for failure to comply with the Reliability Standards;

WHEREAS, in order to ensure that the Reliability Standards and the applicable responsibilities identified in each Reliability Standard are satisfied, and where more than one entity is registered as a user, owner or operator of the Bulk Power System within the same Balancing Authority Area, the FERC in Order No. 693 (¶145) has directed the NERC to assure that there is clarity in identifying responsibilities for, and that there be no gaps or unnecessary redundancies with regard to Parties' compliance with, the requirement of each relevant Reliability Standard; and

WHEREAS, in order to (i) address FERC's concern of unintended redundancy or gaps of responsibilities, particularly such gaps that could occur in the context of compliance with Reliability Standards applicable to multiple entities registered as TOPs, (ii) comply with NERC and WECC compliance registration criteria, and (iii) identify the Party responsible for each Reliability Standard requirement and any Penalties related thereto, the Parties desire to enter into this Agreement to clarify each Party's responsibilities with regard to the Reliability Standards and to address the imposition of Penalties.

AGREEMENT

NOW THEREFORE, in view of the recitals set forth above, which the Parties acknowledge and agree are accurate representations of the facts and are hereby incorporated by reference, the CAISO and TE agree to the terms of this Agreement that sets forth the delegation of tasks and responsibilities of each Party with regard to the applicable Reliability Standards.

1. DEFINITIONS.

Unless otherwise defined herein, all capitalized terms shall have the meaning set forth in the FERC-approved NERC Glossary of Terms, the NERC Functional Model, the WECC/NERC Delegation Agreement, including the WECC Compliance Monitoring and Enforcement Program contained in Exhibit D to the Delegation Agreement, and the NERC Rules of Procedure.

"CAISO Tariff" means the California Independent System Operator Corporation Operating Agreement and Tariff, dated March 31, 1997, as it may be modified from time to time.

"Compliance" means full performance of the tasks and responsibilities and associated measures required by the Reliability Standards requirements, by the NERC compliance procedures and the WECC Compliance Monitoring and Enforcement Program.

"Confidential Information" means (i) all written materials marked "Confidential", "Proprietary" or with words of similar import provided to either Party by the other Party, and (ii) all observations of equipment (including computer screens) and oral disclosures related to either Party's systems, operations and activities that are indicated as such at the time of observation or disclosure, respectively (collectively, "Confidential Information"). Confidential Information includes portions of documents, records and other material forms or representations that either Party may create, including but not limited to, handwritten notes or summaries that contain or are derived from such Confidential Information.

"Delegated Task" means those tasks pursuant to Reliability Standards that are delegated to the Supporting Entity.

"Good Utility Practice" means any of the practices, methods, and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods, and acts that, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety, and expedition. Good Utility Practice is not intended to be any one of a number of the optimum practices, methods, or acts to the exclusion of all other, but rather to be acceptable practices, methods, or acts generally accepted in the region.

"Non-Complying Party" means either or both Parties that fail to act according to their respective obligations set forth in the applicable Schedules attached to this Agreement.

"Penalty" or "Penalties" means any fine, reprimand or monetary or non-monetary penalty issued or assessed by a Compliance Enforcement Authority.

"Responsible Entity" means the Party that is charged, as set forth in the attached Schedules, with the responsibility for demonstrating Compliance as the registered TOP in accordance with the joint registration of the CAISO and TE with a Reliability Standard requirement. The Responsible Entity shall assemble the documentation necessary for demonstrating Compliance.

"Reliability Standard" means a requirement approved by the FERC under Section 215 of the Federal Power Act to provide for reliable operation of the Bulk Power System. The term includes requirements for the operation of the existing Bulk Power System facilities, including cyber security protection, and the design of planned additions or modifications to such facilities to the extent necessary for the reliable operation of the Bulk Power System; but the term does not include any requirement to enlarge such facilities or to construct new transmission capacity or generation capacity.

"Supporting Entity" means the Party that is charged, as set forth in the attached Schedules, with the responsibility for demonstrating Compliance with a Delegated Task under a Reliability Standard.

2. TERM.

2.1 Effective Date. This Agreement shall be effective as of the later of the date it is executed by the Parties or the date when the pro forma agreement is accepted for filing and made effective by FERC, if a FERC filing is required.

2.2 Termination. This Agreement shall remain in effect until (1) a date upon which the Parties agree in writing to terminate it, or (2) the effective date of the withdrawal of the TE's transmission facilities from the CAISO Balancing Authority Area, or (3) upon six (6) months' written notice of termination by the TE. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement was filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the request to file a notice of termination is made after the preconditions for termination have been met, and (2)(a) the CAISO files the notice of termination within sixty (60) days after receipt of such request, or (b) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if such notice is required to be filed with FERC, or upon ninety (90) days after the CAISO's receipt of the TE's notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

2.3 Surviving Obligations. This Agreement shall continue in effect after termination to the extent necessary to complete corrective mitigating actions identified in the Compliance monitoring process as well as satisfy all other obligations including any financial responsibilities. Upon termination of this Agreement, any outstanding financial right or obligation, and any provision of this Agreement necessary to give effect to such right or obligation, shall survive until satisfied.

2.4 FERC Submittal of Pro Forma Agreement. The CAISO shall file the pro forma agreement upon which this Agreement is based with the FERC and shall request that FERC issue an order either disclaiming jurisdiction over the pro forma agreement or establishing an effective date of June 18, 2007 for the pro forma agreement. If FERC determines that the pro forma agreement is subject to its jurisdiction, the CAISO shall use its best efforts to obtain approval of the pro forma agreement in the form submitted, including taking all reasonable,

necessary and usual steps to secure regulatory approval. In the event of a FERC hearing or review process concerning the pro forma agreement, the TE shall file a letter with FERC and, if necessary, submit testimony in support of the pro forma agreement. Following an order of the FERC addressing the pro forma agreement, the Parties shall review such order to determine if the FERC has changed or modified a condition, deleted a condition, or imposed a new condition in the pro forma agreement. Within ten (10) days after the issuance of the FERC order, the Parties shall indicate to each other in writing their acceptance or rejection of this Agreement based upon any changes required by the FERC in the pro forma agreement. A failure to notify within such ten (10) day period will be equivalent to a notification of acceptance. If a Party rejects this Agreement, the Parties shall attempt to renegotiate the objectionable term or condition to satisfy FERC's concerns. Notwithstanding the best efforts of the Parties to comply with the FERC order(s), this Agreement shall terminate if the Parties are unable to reach agreement on appropriate modification(s) within sixty (60) days of the FERC order not accepting the pro forma agreement in its originally filed form.

3. STATUS OF PARTIES; REGISTRATION AS TRANSMISSION OPERATOR(S) (TOPs); PURPOSE OF AGREEMENT.

3.1 Status of Parties. The Parties acknowledge that the CAISO is responsible for reliably operating the transmission grid within the CAISO Balancing Authority Area. The Parties also recognize that while the CAISO is a transmission operator under the CAISO Tariff, the CAISO does not own any transmission facilities, and the TE owns, constructs, and maintains the facilities to which generating facilities are interconnected, and that the TE may construct or modify facilities to allow the interconnection. As such, the TE has rights to take actions as necessary to protect its electric system. Furthermore, the CAISO has operational control of certain transmission lines and associated facilities which are to be incorporated into the CAISO controlled grid for the purpose of allowing them to be controlled by the CAISO as part of an integrated Balancing Authority Area. Given this relationship and Order No. 693, the CAISO and TE can both be registered as a TOP.

3.2 Delegated Tasks. The Parties agree that as set forth in ¶145 of Order No. 693, NERC and WECC Compliance registration criteria, and any other applicable orders, an entity registered with NERC and charged with the performance of a function remains responsible for Compliance with Reliability Standards for that function, even if the performance of certain tasks is delegated to other entities. Thus, the Parties acknowledge and agree that to ensure clarity in identifying, establishing and delegating responsibility for Compliance for the transmission facilities within the CAISO Balancing Authority Area identified in

Appendix 1, the Parties delegate such Compliance responsibilities in this Agreement as set forth in the Schedules attached hereto.

3.3 Purpose of Agreement. The Parties agree that the purpose of this Agreement is to identify the tasks and responsibilities of each Party with respect to Compliance for the transmission facilities within the CAISO Balancing Authority Area identified in Appendix 1 with Reliability Standards pursuant to Order No. 693 applicable to TOPs and any other similar orders that may be issued from time to time.

4. DELINEATION OF RESPONSIBILITIES BETWEEN THE CAISO AND TE; SCHEDULES.

4.1 Schedules. To identify the responsibilities of each Party and to avoid gaps or redundancy in the performance of Compliance activities, the Parties have mutually collaborated in developing a Schedule of Compliance responsibilities and Delegated Tasks for each Reliability Standard requirement (where necessary) applicable to the CAISO and the TE as TOPs. The Parties have determined their respective responsibilities for each Reliability Standard requirement based upon consideration of past practice, practicality, efficiency and Good Utility Practice. The Schedules are attached hereto and made a part hereof.

4.2 Delineation of Responsibilities. Each Schedule details the CAISO's and the TE's responsibilities and obligations with regard to each specific Reliability Standard requirement by identifying the Responsible Entity, Supporting Entity, and the Delegated Tasks for each respective Reliability Standard requirement. Further, although the Responsible Entity will be the primary contact for the Compliance Enforcement Authority, the Schedule shall set forth in greater detail the obligations of the Supporting Entity in participating in a Compliance Audit.

4.3 Process for Changing the Schedules or Adding New Schedules.

4.3.1 The CAISO, upon approval by the FERC of any new Reliability Standard(s) or change(s) to the existing Reliability Standards, shall communicate those changes in writing to the TE within ten (10) days of receipt of such information or upon availability of such notice, whichever is later, from FERC, NERC or WECC. The Parties shall jointly review any changes to the Reliability Standard(s) or the new Reliability Standard and determine the Party responsible for Compliance with changed or new Reliability Standard requirement(s).

4.3.2 Upon identification of the Party that is responsible for Compliance with the Reliability Standard requirement(s), the CAISO shall prepare a revised page(s) for the Schedule that includes change(s) resulting from a revised, modified, or new Reliability Standard requirement(s) and forward it to the TE for signatures by the representatives identified in Appendix 2 as having the authority to sign Schedule amendments or new Schedules. The TE shall return it to the CAISO within ten (10) days before such revised Reliability Standards take effect, unless otherwise agreed by the Parties. The CAISO shall provide a signed original of the revised page of the Schedule to the TE. The revised Schedule page shall replace and supersede the existing page, which shall be indicated on the page by its new number as well as the number of the page it is replacing. Such change to a Schedule does not constitute an amendment to this Agreement.

4.3.3 Upon ten (10) days written notice, either Party may initiate a review of the Schedules for purposes of redefining Delegated Tasks or changing the Responsible Entity designation.

5. MUTUAL COOPERATION; PARTICIPATION IN COMPLIANCE AUDIT PROCESS; ALLOCATION OF COMPLIANCE AUDIT PENALTIES.

5.1 Mutual Cooperation. In addition to any obligations set forth in the Schedules, the Parties agree to cooperate fully to provide each other the information, documentation and assistance necessary to demonstrate Compliance with their respective obligations. Unless otherwise agreed, the Parties agree that upon fifteen (15) days of receipt of a written notice from the Party requesting the information, the other Party responsible for providing the information shall timely deliver the requested information. The written notice shall be delivered as set forth in Section 9.19 of this Agreement, unless the Schedule identifies an alternative person and means of communication.

5.2 Participation in Compliance Audit Process. In accordance with Section 3.1.1 of the WECC Compliance Monitoring and Enforcement Program, the Responsible Entity shall promptly furnish the audit report to the Supporting Entity for review and comment before it is finalized, and shall notify the Supporting Entity in writing if the audit team schedules an exit interview, in which case the Supporting Entity shall have the right to participate in discussions with the audit team.

5.3 Notice of Alleged Violation. The Responsible Entity will notify the Supporting Entity in writing within seven (7) days of receiving written notice of an Alleged Violation from the Compliance Enforcement Authority as set forth in Section 5.1 of the WECC Compliance Monitoring and Enforcement Program. In the event that there is a question or dispute as to who the Non-Complying Party is, then the alleged Non-Complying Party shall immediately notify the other Party in writing and detail its support for why it should not be deemed the Non-Complying Party. Upon ten (10) days review by the other Party, that Party shall notify the alleged Non-Complying Party as to whether it agrees with the alleged Non-Complying Party's assessment and both Parties shall mutually decide how to remedy and respond to the Alleged Violation within the time frame set forth in Section 5.1.

5.4 Participation in Appeals Process. If either Party seeks to challenge the Alleged Violation, the other Party shall provide any assistance, documentation and information necessary to assist the challenging Party to challenge the findings of the Compliance Enforcement Authority, respond to notices of Alleged Violations, enter into settlement discussions with the Compliance Enforcement Authority, and initiate and participate in any hearing and appeal process with respect to the Alleged Violation in accordance with Sections 5.1-5.5 of the WECC Compliance Monitoring and Enforcement Program and the NERC and FERC appeals processes.

5.5 Arbitration for Non-Compliance. In the event the alleged Non-Complying Party and the other Party cannot reach a resolution as to liability for the Alleged Violation, the Parties shall resolve such dispute through arbitration as set forth in Section 9.1 below.

5.6 Allocation and Recovery of Penalties. In the event a Compliance Enforcement Authority assesses Penalties for failure to comply with the Reliability Standards, to the extent that WECC or other similar enforcement entity has jurisdiction to impose a fine and assess a Penalty, then the Non-Complying Party shall bear the cost of such Penalties in proportion to its respective fault, as determined mutually or through dispute resolution as set forth in Section 9.1 below. Each Non-Complying Party shall be responsible for remedying the non-compliance as required by the Compliance Enforcement Authority. Should the Non-Complying Party be identified as the CAISO, any Penalties attributable to the CAISO shall be satisfied by allocating such costs as set forth in the CAISO Tariff or as otherwise required or ordered by the FERC; provided, however, that non-monetary penalties directed to the CAISO for performance specifically by the CAISO shall not be included in the allocation process.

6. AMENDMENT TO AGREEMENT.

This Agreement may not be amended or otherwise modified without the written consent of both Parties. Changes to Schedules and Appendices will not constitute an amendment to this Agreement.

7. USE OF CONTRACTORS.

Nothing in this Agreement shall prevent either the CAISO or the TE from using qualified third party contractors to meet the Party's rights or obligations under this Agreement. However, under no circumstances shall the use or hiring of a qualified third party contractor or agent relieve either the CAISO or the TE of any liability hereunder. Without limiting the foregoing, either Party shall have the right to file counterclaim against the third party contractor for such third party's failure or negligence to satisfy its obligations under its arrangement with the CAISO or TE, as applicable.

8. PERFORMANCE STANDARDS.

Each Party shall perform all of its obligations under this Agreement in accordance with applicable laws and regulations, applicable Reliability Standards, and Good Utility Practice.

9. GENERAL TERMS AND CONDITIONS.

9.1 Dispute Resolution. Except as provided herein, in the event of any dispute regarding the terms, conditions and performance of this Agreement, including but not limited to a dispute regarding responsibility for Penalties assessed by the Compliance Enforcement Authority, and such dispute is not settled informally, the Parties shall follow the CAISO dispute resolution procedures set forth in Section 13 of the CAISO Tariff.

9.1.1 Notwithstanding any provision to the contrary in Section 13.3.5.1 of the CAISO Tariff, if a dispute regarding the interpretation or the application of this Agreement, or the apportionment of responsibility and penalties, is referred to the dispute resolution process set forth in this Agreement, the arbitrator(s) shall have no authority to add to, delete from, or alter this Agreement; provided, however, that the arbitrator(s) shall have the authority to grant reformation of the Agreement in the case of a scrivener's error or rescission of the Agreement, when appropriate.

9.1.2 If a Party is precluded by federal or state law from agreeing to, or participating in, the foregoing dispute resolution process, then either Party to this Agreement may bring an action in a court of competent jurisdiction

to interpret or enforce this Agreement, or to apportion responsibility and Penalties for non-compliance with a Reliability Standard.

9.2 Liability. Except for Penalties assessed by a Compliance Enforcement Authority, no Party to this Agreement shall be liable to any other party for any indirect, special, incidental or consequential losses, damages, claims, liabilities, costs or expenses (including attorneys fees and court costs) arising from the performance or non-performance of its obligations under this Agreement regardless of the cause (including intentional action, willful action, gross or ordinary negligence, or force majeure); provided, however, that a Party may seek equitable or other non-monetary relief as may be necessary to enforce this Agreement and that damages for which a Party may be liable to another Party under another agreement will not be considered damages under this Agreement.

9.3 Confidentiality.

9.3.1 Treatment of Confidential Information. The Parties recognize and agree that for the purposes of complying with the Reliability Standards and responding to a Compliance Audit, they will receive information from each other that has been marked as Confidential Information. Except as set forth herein, the Parties agree to keep in confidence and not to copy, disclose, or distribute any Confidential Information or any part thereof, without the prior written permission of the other Party.

9.3.1.1 Location of Confidential Information. Confidential Information that the Parties have given to each other in hard copy form that is intended for disclosure to the Compliance Enforcement Authority during the course of a Compliance Audit will be kept in a secure and restricted location separate and apart from the business records of the Party receiving the Confidential Information.

9.3.1.2 Provision of Confidential Information to Compliance Enforcement Authority. During the course of a Compliance Audit, the Party providing the Confidential Information to the Compliance Enforcement Authority shall notify the other Party if and when the Compliance Enforcement Authority takes physical possession of the Confidential Information. If the Compliance Enforcement Authority takes physical possession of the Confidential Information, the receiving Party shall be permitted to make one copy of the Confidential Information that will be afforded confidential treatment pursuant to this Agreement. To the extent the Compliance Enforcement Authority does not take physical possession of the Confidential Information, or if a copy has been made of the Confidential Information, the receiving Party shall return the Confidential Information to the providing Party promptly after the conclusion of the Compliance Audit, including the appeal

of Alleged Violations or Penalties. The Party providing the other Party's Confidential Information to the Compliance Enforcement Authority has the affirmative duty to request that the Compliance Enforcement Authority treat the Confidential Information as Confidential Information under NERC Rules of Procedure Section 1500.

9.3.2 Disclosure of Confidential Information. If, while in the possession of the receiving Party, disclosure of the Confidential Information is required to respond to a subpoena, law, or other directive of a court, administrative agency, or arbitration panel, the receiving Party hereby agrees to provide the providing Party with prompt written notice of such request or requirement in order to enable the providing Party to (a) seek an appropriate protective order or other remedy, (b) consult with the receiving Party with respect to taking steps to resist or narrow the scope of such request or legal process, or (c) waive compliance, in whole or in part, with the terms of this Section. The receiving Party agrees to work with the providing Party to obtain assurance that confidential treatment will be accorded to such Confidential Information and will cooperate to the maximum extent practicable to minimize the disclosure of the Confidential Information consistent with applicable law.

9.3.3 Exceptions to Non-Disclosure. Notwithstanding Sections 9.3.1 and 9.3.2 above, each Party to this Agreement shall not have breached any obligation under this Agreement if Confidential Information is disclosed to a third party when the Confidential Information:

(a) was in the public domain at the time of such disclosure or is subsequently made available to the public consistent with the terms of this Agreement; or

(b) had been received by either Party at the time of disclosure through other means without restriction on its use, or had been independently developed by either Party as shown through documentation; or

(c) is subsequently disclosed to either Party by a third party without restriction on use and without breach of any agreement or legal duty; or

(d) subject to the provisions of Sections 9.3.1 and 9.3.2, is used or disclosed pursuant to statutory duty or an order, subpoena or other lawful process issued by a court or other governmental authority of competent jurisdiction.

9.3.4 Other Parties. Each Party shall keep Confidential Information in confidence and shall not disclose such information or otherwise make it

available, in any form or manner, to any other person or entity (a "third party") other than its employees, without the prior written consent of the other Party. Each Party will cause each of its employees, contractors, sub-contractors, sub-contractors' employees and agents who will have access to Confidential Information, if any, to acknowledge that they have read this Agreement and agree to abide by all of its terms regarding use and disclosure of Confidential Information.

9.4 Binding Effect. This Agreement and the rights and obligations hereof, shall be binding upon and shall inure to the benefit of the successors and assigns of the Parties hereto.

9.5 Rules of Interpretation. This Agreement, unless a clear contrary intention appears, shall be construed and interpreted as follows:

(1) the singular number includes the plural number and vice versa;

(2) reference to any person includes such person's successors and assigns but, in the case of a Party, only if such successors and assigns are permitted by this Agreement, and reference to a person in a particular capacity excludes such person in any other capacity or individually;

(3) reference to any agreement, document, instrument, or tariff means such agreement, document, instrument, or tariff as amended or modified and in effect from time to time, including, if applicable, rules and regulations promulgated thereunder;

(4) reference to any applicable laws and regulations means such applicable laws and regulations as amended, modified, codified, or reenacted, in whole or in part, and in effect from time to time, including, if applicable, rules and regulations promulgated thereunder;

(5) unless expressly stated otherwise, reference to any Article, Section, Schedule, or Appendix means such Article or Section of this Agreement or such Schedule or Appendix to this Agreement;

(6) "hereunder", "hereof", "herein", "hereto" and words of similar import shall be deemed references to this Agreement as a whole and not to any particular Section;

(7) "including" (and with correlative meaning "include") means including without limiting the generality of any description preceding such term;

(8) relative to the determination of any period of time, "from" means "from and including", "to" means "to but excluding" and "through" means "through and including;" and

(9) "days" shall mean calendar days; if the last calendar day falls on a weekend or national holiday, the specified deadline shall fall on the next calendar day that is not a weekend or national holiday.

9.6 Entire Agreement. This Agreement, including all Attachments, Exhibit(s) and Schedule(s) hereto, constitutes the entire agreement among the Parties with reference to the subject matter hereof, and supersedes all prior and contemporaneous understandings or agreements, oral or written, among the Parties with respect to the subject matter of this Agreement. There are no other agreements, representations, warranties, or covenants, which constitute any part of the consideration for, or any condition to, any Party's compliance with its obligations under this Agreement.

9.7 General Interpretation. The terms of this Agreement have been negotiated by the Parties hereto and the language used in this Agreement shall be deemed the language chosen by the Parties to express their mutual intent. This Agreement shall be construed without regard to any presumption or rule requiring construction against the party causing such instrument or portion hereof to be drafted or in favor of the party receiving a particular benefit under this Agreement. No rule or strict construction will be applied against any Party.

9.8 No Third Party Beneficiaries. This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporations, associations, or entities other than the Parties, and the obligations herein assumed are solely for the use and benefit of the Parties, their successors in interest and, where permitted, their assigns.

9.9 Waiver. The failure of a Party to this Agreement to insist, on any occasion, upon strict performance of any provision of this Agreement will not be considered a waiver of any obligation, right, or duty of, or imposed upon, such Party. Any waiver at any time by a Party of its rights with respect to this Agreement shall not be deemed a continuing waiver or a waiver with respect to any other failure to comply with any other obligation, right, or duty of this Agreement. Any waiver of this Agreement shall, if requested, be provided in writing. Any waivers at any time by any Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.

9.10 Headings. The descriptive headings of the various Articles and Sections of this Agreement have been inserted for convenience of reference only and are of no significance in the interpretation or construction of this Agreement.

9.11 Authority. The undersigned hereby represents and warrants that he or she has the requisite power and authority to bind the applicable Party to the terms and obligations of this Agreement.

9.12 Multiple Counterparts. This Agreement may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

9.13 No Partnership. This Agreement shall not be interpreted or construed to create an association, joint venture, agency relationship, or partnership between the Parties or to impose any partnership obligation or partnership liability upon any Party. No Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, another Party.

9.14 Assignment. This Agreement may be assigned by a Party only with the written consent of the other Party; provided that a Party may assign this Agreement without the consent of the other Party to any affiliate of the assigning Party with an equal or greater credit rating and with the legal authority and operational ability to satisfy the obligations of the assigning Party under this Agreement. Any attempted assignment that violates this Section 9.14 is void and ineffective. Any assignment under this Agreement shall not relieve a Party of its obligations, nor shall a Party's obligations be enlarged, in whole or in part, by reason thereof. Where required, consent to assignment will not be unreasonably withheld, conditioned or delayed. Notwithstanding the above, this Agreement may be assigned by a governmental Party without consent of the other Parties, if the United States, a state, or a local government with jurisdiction over such Party orders such governmental Party to assign this Agreement.

9.15 Specific Performance. Each Party's obligations under this Agreement are unique. The Parties each acknowledge that, if any Party should default in performance of the duties and obligations imposed by this Agreement, it would be extremely impracticable to measure the resulting damages. Accordingly, the non-defaulting Party, in addition to any other available rights or remedies, may sue in equity for specific performance and the Parties each expressly waive the defense that a remedy in damages will be adequate.

9.16 Force Majeure. No Party shall be liable for any failure to perform its obligations in connection with any action described in this Agreement, if such failure results from an Uncontrollable Force as defined in the CAISO Tariff (including any mechanical, electronic, or communication failures, but excluding failure caused by a party's financial condition or negligence).

9.17 Governing Law. The rights and obligations of the Parties and the interpretation and performance of this Agreement shall be governed by the law of California, excluding its conflicts of law rules, except if a federal Party is involved, in which case federal law shall apply as if performed within the state of California. Notwithstanding the foregoing, nothing shall affect the rights of the TE under Section 215 of the FPA, any applicable agreement, the NERC Rules of Procedure, or rules or orders promulgated by FERC.

9.18 Consistency with Federal Laws and Regulations. Section 22.9 of the CAISO Tariff titled "Consistency with Federal Laws and Regulations" is hereby incorporated herein by reference, providing however, that the references to the CAISO Tariff in Section 22.9 shall include this Agreement.

9.19 Notices. Any requirement for written notice provided in this Agreement will be in writing transmitted via electronic mail to the persons identified in Appendix 2 followed with a hard copy delivered in person, sent by overnight mail or United States certified mail within three (3) days of the electronic mail transmission. Electronic mail notice shall be deemed effective upon transmission unless the Party sending the electronic mail learns that delivery was unsuccessful, in which case notice is deemed effective upon service of the hard copy. Any Party may at any time, by at least fifteen (15) days notice to the other Party, change the designation or address of a person specified in Appendix 2. Such a change to Appendix 2 shall not constitute an amendment to this Agreement.

9.20 FERC Jurisdiction. Nothing in this Agreement shall be meant to imply or cede jurisdiction to FERC, NERC or any other regulatory or Compliance Enforcement Authority, to the extent that FERC, NERC or other regulatory or Compliance Enforcement Authority does not have jurisdiction over a Party to this Agreement. FERC, NERC and other regulatory or Compliance Enforcement Authority entities have limited jurisdiction over certain Parties and, by executing this Agreement, no Party is waiving or conceding any defenses it has to assert jurisdictional defenses, including, but not limited to, sovereign immunity, intergovernmental immunities, or lack of subject matter jurisdiction.

9.21 Severability. If any term or provision of this Agreement is held to be illegal, invalid, or unenforceable under any present or future law or by the Federal Energy Regulatory Commission, (a) such term or provision shall be fully severable, (b) this Agreement shall be construed and enforced as if such illegal, invalid or unenforceable provision had never comprised a part hereof, and (c) the remaining provisions of this Agreement shall remain in full force and effect and shall not be affected by the illegal, invalid or unenforceable provision or by its severance herefrom.

IN WITNESS WHEREOF, the Parties have executed this Agreement and it is effective as of the effective date pursuant to Section 2.1.

California Independent System Operator Corporation

By: _____

Name: JAMES W DETMERS

Title: VP OPERATIONS

Date: 6/15/07

San Diego Gas & Electric Company

By: _____

Name: James P. Avery

Title: Senior Vice President - Electric

Date: June 14,2007

APPENDIX 1

APPLICABLE TRANSMISSION FACILITIES SAN DIEGO GAS & ELECTRIC COMPANY

[SECTIONS 3.2 AND 3.3]

The following transmission facilities within the CAISO Balancing Authority Area that are internal to the TE's transmission system and end at the point of interconnection with other TOPs are applicable to the Agreement as follows:

1. Those transmission facilities listed in the ISO Register that are under CAISO Operational Control as identified to the TE by transmission line number, terminal facility number, or substation transformer bank number, as amended from time to time.

2. Those transmission facilities comprising the terminal facilities associated with the facilities identified in the preceding paragraph, including without limitation to buses, breakers, disconnects, reactive devices, protection, monitoring, and control.

3. Those transmission facilities and terminal facilities operated by the TE pursuant to the IMPERIAL IRRIGATION DISTRICT (IID) AND SAN DIEGO GAS & ELECTRIC COMPANY CALIFORNIA TRANSMISSION SYSTEM PARTICIPATION AGREEMENT (California Agreement) between those two parties, as amended from time to time. This California Agreement is an Entitlement and Encumbrance listed under the Transmission Control Agreement (TCA).

   Provided, however, the transmission facilities described in the paragraphs above do not include those transmission facilities, including associated terminal facilities, owned by the TE in the State of Arizona that are the subject of the ARIZONA PUBLIC SERVICE COMPANY AND SAN DIEGO GAS & ELECTRIC COMPANY ARIZONA TRANSMISSION SYSTEM PARTICIPATION AGREEMENT (Arizona Agreement), as amended from time to time. Those Southwest Powerlink transmission facilities in the State of Arizona (i) owned by the TE that are under the Operational Control of the CAISO pursuant to the TCA and (ii) those portions of the Southwest Powerlink owned by Arizona Public Service Company (APS) and IID are operated by APS pursuant to the Arizona Agreement, which is an Entitlement and Encumbrance listed under the TCA.

APPENDIX 2 (Amended)

NOTICES

[Section 4.3]

Transmission Entity:	San Diego Gas & Electric Company
Name of Primary Representative for changes to Delegation Agreement:	James F. Walsh
Title:	Senior Counsel
Company:	San Diego Gas & Electric Company
Address:	101 Ash, HQ12
City / State / Zip Code:	San Diego, CA 92101-3017
Email Address:	jfwalsh@semprautilities.com
Telephone:	(619) 699-5022
Fax:	(619) 699-5027

Name of Alternative Representative for changes to Delegation Agreement:	E. Gregory Barnes
Title:	Senior Counsel
Company:	San Diego Gas & Electric Company
Address:	101 Ash, HQ12
City / State / Zip Code:	San Diego, CA 92101-3017
Email Address:	gbarnes@semprautilities.com
Telephone:	(619) 699-5019
Fax:	(619) 699-5027

Name of Primary Representative for changes to Compliance Schedules, and Authorized Signature for Compliance Schedule Adds, Deletions, and Changes:	Scott N. Peterson
Title:	Director, Electric Grid Operations
Company:	San Diego Gas & Electric Company
Address:	9060 Friars Road
City / State / Zip Code:	San Diego, CA 92108-5855
Email Address:	speterson@semprautilities.com
Telephone:	(619) 725-8639
Fax:	(619) 725-8616

Name of Alternative Representative for changes to Compliance Schedules:	Randy Schimka
Title:	FERC & CAISO Regulatory Affairs, NERC Compliance Manager
Company:	San Diego Gas & Electric Company
Address:	8330 Century Park Court, CP32H
City / State / Zip Code:	San Diego, CA 92123
Email Address:	rschimka@semprautilities.com
Telephone:	(858) 636-3922
Fax:	(858) 654-1586

San Diego Gas & Electric Company
Authorized Representative

10-26-10
Date

Scott Peterson
Print Name

Director, Electric Grid operations
Print Title

APPENDIX 2 (Amended)

NOTICES

[Section 4.3]

CAISO

Name of Primary Representative:	Lisa Milanes
Title:	Director, Corporate Compliance
Address:	250 Outcropping Way
City/State/Zip Code:	Folsom, CA 95630
Email address:	lmilanes@caiso.com
Phone:	(916) 351-2172
Fax:	(916) 608-7222
Name of Alternative Representative:	Burton Gross
Title:	Senior Counsel
Address:	250 Outcropping Way
City/State/Zip Code:	Folsom, CA 95630
Email address:	bgross@caiso.com
Phone:	(916) 608-7268
Fax:	(916) 608-7222

CAISO Authorized Representative — Date: 9/30/11

Lisa Milanes — Print Name

Director, Corporate Compliance — Print Title

BAL-005-0.1b

Requirement and Sub-requirements:

R1. All generation, transmission, and load operating within an Interconnection must be included within the metered boundaries of a Balancing Authority Area.
R1.2. Each Transmission Operator with transmission facilities operating in an Interconnection shall ensure that those transmission facilities are included within the metered boundaries of a Balancing Authority Area.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will ensure that all of its transmission facilities are within the metered boundaries of a Balancing Authority Area, as required in R1.2.

CAISO
Authorized Representative — Date: 10/1/09

TE
Authorized Representative — Date: 9-25-09

Schedule CIP-001-2

Requirement and Sub-requirements:

R1. Each Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator, and Load Serving Entity shall have procedures for the recognition of and for making their operating personnel aware of sabotage events on its facilities and multi-site sabotage affecting larger portions of the Interconnection.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-001-2

Requirement and Sub-requirements:

R2. Each Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator, and Load Serving Entity shall have procedures for the communication of information concerning sabotage events to appropriate parties in the Interconnection.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-001-2

Requirement and Sub-requirements:

R3. Each Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator, and Load Serving Entity shall provide its operating personnel with sabotage response guidelines, including personnel to contact, for reporting disturbances due to sabotage events.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-001-2

Requirement and Sub-requirements:

R4. Each Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator, and Load Serving Entity shall establish communications contacts, as applicable, with local Federal Bureau of Investigation (FBI) or Royal Canadian Mounted Police (RCMP) officials and develop reporting procedures as appropriate to their circumstances.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Nancy A. Jiawek — CAISO Authorized Representative — 9-30-11 — Date

TE Authorized Representative — 9-29-11 — Date

Schedule CIP-002-3

Requirement and Sub-requirements:

R1. Critical Asset Identification Method — The Responsible Entity shall identify and document a risk-based assessment methodology to use to identify its Critical Assets.
R1.1. The Responsible Entity shall maintain documentation describing its risk-based assessment methodology that includes procedures and evaluation criteria.
R1.2. The risk-based assessment shall consider the following assets:
R1.2.1. Control centers and backup control centers performing the functions of the entities listed in the Applicability section of this standard.
R1.2.2. Transmission substations that support the reliable operation of the Bulk Electric System.
R1.2.3. Generation resources that support the reliable operation of the Bulk Electric System.
R1.2.4. Systems and facilities critical to system restoration, including blackstart generators and substations in the electrical path of transmission lines used for initial system restoration.
R1.2.5. Systems and facilities critical to automatic load shedding under a common control system capable of shedding 300 MW or more.
R1.2.6. Special Protection Systems that support the reliable operation of the Bulk Electric System.
R1.2.7. Any additional assets that support the reliable operation of the Bulk Electric System that the Responsible Entity deems appropriate to include in its assessment.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-002-3

Requirement and Sub-requirements:

R2. Critical Asset Identification - The Responsible Entity shall develop a list of its identified Critical Assets determined through an annual application of the risk-based assessment methodology required in R1. The Responsible Entity shall review this list at least annually, and update it as necessary.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-002-3

Requirement and Sub-requirements:

R3. Critical Cyber Asset Identification — Using the list of Critical Assets developed pursuant to Requirement R2, the Responsible Entity shall develop a list of associated Critical Cyber Assets essential to the operation of the Critical Asset. Examples at control centers and backup control centers include systems and facilities at master and remote sites that provide monitoring and control, automatic generation control, real-time power system modeling, and real-time inter-utility data exchange. The Responsible Entity shall review this list at least annually, and update it as necessary. For the purpose of Standard CIP-002-3, Critical Cyber Assets are further qualified to be those having at least one of the following characteristics:
R3.1. The Cyber Asset uses a routable protocol to communicate outside the Electronic Security Perimeter; or,
R3.2. The Cyber Asset uses a routable protocol within a control center; or,
R3.3. The Cyber Asset is dial-up accessible.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-002-3

Requirement and Sub-requirements:

R4. Annual Approval —The senior manager or delegate(s) shall approve annually the risk-based assessment methodology, the list of Critical Assets and the list of Critical Cyber Assets. Based on Requirements R1, R2, and R3 the Responsible Entity may determine that it has no Critical Assets or Critical Cyber Assets. The Responsible Entity shall keep a signed and dated record of the senior manager or delegate(s)'s approval of the risk-based assessment methodology, the list of Critical Assets and the list of Critical Cyber Assets (even if such lists are null.)

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

CAISO
Authorized Representative — Date: 2/28/11

TE
Authorized Representative — Date: 2-17-11

Schedule CIP-003-3

Requirement and Sub-requirements:

R1. Cyber Security Policy - The Responsible Entity shall document and implement a cyber security policy that represents management's commitment and ability to secure its Critical Cyber Assets. The Responsible Entity shall, at minimum, ensure the following:
R1.1. The cyber security policy addresses the requirements in Standards CIP-002-3 through CIP-009-3, including provision for emergency situations.
R1.2. The cyber security policy is readily available to all personnel who have access to, or are responsible for, Critical Cyber Assets.
R1.3. Annual review and approval of the cyber security policy by the senior manager assigned pursuant to R2.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-003-3

Requirement and Sub-requirements:

R2. Leadership - The Responsible Entity shall assign a single senior manager with overall responsibility and authority for leading and managing the entity's implementation of, and adherence to, Standards CIP-002-3 through CIP-009-3.
R2.1. The senior manager shall be identified by name, title, and date of designation.
R2.2. Changes to the senior manager must be documented within thirty calendar days of the effective date.
R2.3. Where allowed by Standards CIP-002-3 through CIP-009-3, the senior manager may delegate authority for specific actions to a named delegate or delegates. These delegations shall be documented in the same manner as R2.1 and R2.2, and approved by the senior manager.
R2.4. The senior manager or delegate(s), shall authorize and document any exception from the requirements of the cyber security policy.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-003-3

Requirement and Sub-requirements:

R3. Exceptions - Instances where the Responsible Entity cannot conform to its cyber security policy must be documented as exceptions and authorized by the senior manager or delegate(s).
R3.1. Exceptions to the Responsible Entity's cyber security policy must be documented within thirty days of being approved by the senior manager or delegate(s).
R3.2. Documented exceptions to the cyber security policy must include an explanation as to why the exception is necessary and any compensating measures.
R3.3. Authorized exceptions to the cyber security policy must be reviewed and approved annually by the senior manager or delegate(s) to ensure the exceptions are still required and valid. Such review and approval shall be documented.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-003-3

Requirement and Sub-requirements:

R4. Information Protection - The Responsible Entity shall implement and document a program to identify, classify, and protect information associated with Critical Cyber Assets.
R4.1. The Critical Cyber Asset information to be protected shall include, at a minimum and regardless of media type, operational procedures, lists as required in Standard CIP-002-3, network topology or similar diagrams, floor plans of computing centers that contain Critical Cyber Assets, equipment layouts of Critical Cyber Assets, disaster recovery plans, incident response plans, and security configuration information.
R4.2. The Responsible Entity shall classify information to be protected under this program based on the sensitivity of the Critical Cyber Asset information.
R4.3. The Responsible Entity shall, at least annually, assess adherence to its Critical Cyber Asset information protection program, document the assessment results, and implement an action plan to remediate deficiencies identified during the assessment.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-003-3

Requirement and Sub-requirements:

R5. Access Control — The Responsible Entity shall document and implement a program for managing access to protected Critical Cyber Asset information.
R5.1. The Responsible Entity shall maintain a list of designated personnel who are responsible for authorizing logical or physical access to protected information.
R5.1.1. Personnel shall be identified by name, title, and the information for which they are responsible for authorizing access.
R5.1.2. The list of personnel responsible for authorizing access to protected information shall be verified at least annually.
R5.2. The Responsible Entity shall review at least annually the access privileges to protected information to confirm that access privileges are correct and that they correspond with the Responsible Entity's needs and appropriate personnel roles and responsibilities.
R5.3. The Responsible Entity shall assess and document at least annually the processes for controlling access privileges to protected information.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-003-3

Requirement and Sub-requirements:

R6. Change Control and Configuration Management — The Responsible Entity shall establish and document a process of change control and configuration management for adding, modifying, replacing, or removing Critical Cyber Asset hardware or software, and implement supporting configuration management activities to identify, control and document all entity or vendor-related changes to hardware and software components of Critical Cyber Assets pursuant to the change control process.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

CAISO
Authorized Representative — Date: 2/28/11

TE
Authorized Representative — Date: 2-17-11

Schedule CIP-004-3

Requirement and Sub-requirements:

R1. Awareness — The Responsible Entity shall establish, document, implement, and maintain a security awareness program to ensure personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets receive on-going reinforcement in sound security practices. The program shall include security awareness reinforcement on at least a quarterly basis using mechanisms such as:
• Direct communications (e.g., emails, memos, computer based training, etc.);
• Indirect communications (e.g., posters, intranet, brochures, etc.);
• Management support and reinforcement (e.g., presentations, meetings, etc.).

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-004-3

Requirement and Sub-requirements:

R2. Training — The Responsible Entity shall establish, document, implement, and maintain an annual cyber security training program for personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets. The cyber security training program shall be reviewed annually, at a minimum, and shall be updated whenever necessary.
R2.1. This program will ensure that all personnel having such access to Critical Cyber Assets, including contractors and service vendors, are trained prior to their being granted such access except in specified circumstances such as an emergency.
R2.2. Training shall cover the policies, access controls, and procedures as developed for the Critical Cyber Assets covered by CIP-004-3, and include, at a minimum, the following required items appropriate to personnel roles and responsibilities:
R2.2.1. The proper use of Critical Cyber Assets;
R2.2.2. Physical and electronic access controls to Critical Cyber Assets;
R2.2.3. The proper handling of Critical Cyber Asset information; and,
R2.2.4. Action plans and procedures to recover or re-establish Critical Cyber Assets and access thereto following a Cyber Security Incident.
R2.3. The Responsible Entity shall maintain documentation that training is conducted at least annually, including the date the training was completed and attendance records.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-004-3

Requirement and Sub-requirements:

R3. Personnel Risk Assessment —The Responsible Entity shall have a documented personnel risk assessment program, in accordance with federal, state, provincial, and local laws, and subject to existing collective bargaining unit agreements, for personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets. A personnel risk assessment shall be conducted pursuant to that program prior to such personnel being granted such access except in specified circumstances such as an emergency.
The personnel risk assessment program shall at a minimum include:
R3.1. The Responsible Entity shall ensure that each assessment conducted include, at least, identity verification (e.g., Social Security Number verification in the U.S.) and seven-year criminal check. The Responsible Entity may conduct more detailed reviews, as permitted by law and subject to existing collective bargaining unit agreements, depending upon the criticality of the position.
R3.2. The Responsible Entity shall update each personnel risk assessment at least every seven years after the initial personnel risk assessment or for cause.
R3.3. The Responsible Entity shall document the results of personnel risk assessments of its personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets, and that personnel risk assessments of contractor and service vendor personnel with such access are conducted pursuant to Standard CIP-004-3.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-004-3

Requirement and Sub-requirements:

R4. Access — The Responsible Entity shall maintain list(s) of personnel with authorized cyber or authorized unescorted physical access to Critical Cyber Assets, including their specific electronic and physical access rights to Critical Cyber Assets.
R4.1. The Responsible Entity shall review the list(s) of its personnel who have such access to Critical Cyber Assets quarterly, and update the list(s) within seven calendar days of any change of personnel with such access to Critical Cyber Assets, or any change in the access rights of such personnel. The Responsible Entity shall ensure access list(s) for contractors and service vendors are properly maintained.
R4.2. The Responsible Entity shall revoke such access to Critical Cyber Assets within 24 hours for personnel terminated for cause and within seven calendar days for personnel who no longer require such access to Critical Cyber Assets.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

CAISO
Authorized Representative — Date: 2/28/11

TE
Authorized Representative — Date: 2-17-11

Schedule CIP-005-3

Requirement and Sub-requirements:

R1. Electronic Security Perimeter — The Responsible Entity shall ensure that every Critical Cyber Asset resides within an Electronic Security Perimeter. The Responsible Entity shall identify and document the Electronic Security Perimeter(s) and all access points to the perimeter(s).
R1.1. Access points to the Electronic Security Perimeter(s) shall include any externally connected communication end point (for example, dial-up modems) terminating at any device within the Electronic Security Perimeter(s).
R1.2. For a dial-up accessible Critical Cyber Asset that uses a non-routable protocol, the Responsible Entity shall define an Electronic Security Perimeter for that single access point at the dial-up device.
R1.3. Communication links connecting discrete Electronic Security Perimeters shall not be considered part of the Electronic Security Perimeter. However, end points of these communication links within the Electronic Security Perimeter(s) shall be considered access points to the Electronic Security Perimeter(s).
R1.4. Any non-critical Cyber Asset within a defined Electronic Security Perimeter shall be identified and protected pursuant to the requirements of Standard CIP-005-3.
R1.5. Cyber Assets used in the access control and/or monitoring of the Electronic Security Perimeter(s) shall be afforded the protective measures as a specified in Standard CIP-003-3; Standard CIP-004-3 Requirement R3; Standard CIP-005-3 Requirements R2 and R3; Standard CIP-006-3 Requirement R3; Standard CIP-007-3 Requirements R1 and R3 through R9; Standard CIP-008-3; and Standard CIP-009-3.
R1.6. The Responsible Entity shall maintain documentation of Electronic Security Perimeter(s), all interconnected Critical and non-critical Cyber Assets within the Electronic Security Perimeter(s), all electronic access points to the Electronic Security Perimeter(s) and the Cyber Assets deployed for the access control and monitoring of these access points.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-005-3

Requirement and Sub-requirements:

R2. Electronic Access Controls — The Responsible Entity shall implement and document the organizational processes and technical and procedural mechanisms for control of electronic access at all electronic access points to the Electronic Security Perimeter(s).
R2.1. These processes and mechanisms shall use an access control model that denies access by default, such that explicit access permissions must be specified.
R2.2. At all access points to the Electronic Security Perimeter(s), the Responsible Entity shall enable only ports and services required for operations and for monitoring Cyber Assets within the Electronic Security Perimeter, and shall document, individually or by specified grouping, the configuration of those ports and services.
R2.3. The Responsible Entity shall implement and maintain a procedure for securing dial-up access to the Electronic Security Perimeter(s).
R2.4. Where external interactive access into the Electronic Security Perimeter has been enabled, the Responsible Entity shall implement strong procedural or technical controls at the access points to ensure authenticity of the accessing party, where technically feasible.
R2.5. The required documentation shall, at least, identify and describe:
R2.5.1. The processes for access request and authorization.
R2.5.2. The authentication methods.
R2.5.3. The review process for authorization rights, in accordance with Standard CIP-004-3 Requirement R4.
R2.5.4. The controls used to secure dial-up accessible connections.
R2.6. Appropriate Use Banner — Where technically feasible, electronic access control devices shall display an appropriate use banner on the user screen upon all interactive access attempts. The Responsible Entity shall maintain a document identifying the content of the banner.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule CIP-005-3

Requirement and Sub-requirements:

R3. Monitoring Electronic Access — The Responsible Entity shall implement and document an electronic or manual process(es) for monitoring and logging access at access points to the Electronic Security Perimeter(s) twenty-four hours a day, seven days a week.
R3.1. For dial-up accessible Critical Cyber Assets that use non-routable protocols, the Responsible Entity shall implement and document monitoring process(es) at each access point to the dial-up device, where technically feasible.
R3.2. Where technically feasible, the security monitoring process(es) shall detect and alert for attempts at or actual unauthorized accesses. These alerts shall provide for appropriate notification to designated response personnel. Where alerting is not technically feasible, the Responsible Entity shall review or otherwise assess access logs for attempts at or actual unauthorized accesses at least every ninety calendar days.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-005-3

Requirement and Sub-requirements:

R4. Cyber Vulnerability Assessment — The Responsible Entity shall perform a cyber vulnerability assessment of the electronic access points to the Electronic Security Perimeter(s) at least annually. The vulnerability assessment shall include, at a minimum, the following:
R4.1. A document identifying the vulnerability assessment process;
R4.2. A review to verify that only ports and services required for operations at these access points are enabled;
R4.3. The discovery of all access points to the Electronic Security Perimeter;
R4.4. A review of controls for default accounts, passwords, and network management community strings;
R4.5. Documentation of the results of the assessment, the action plan to remediate or mitigate vulnerabilities identified in the assessment, and the execution status of that action plan.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-005-3

Requirement and Sub-requirements:

R5. Documentation Review and Maintenance — The Responsible Entity shall review, update, and maintain all documentation to support compliance with the requirements of Standard CIP-005-3.
R5.1. The Responsible Entity shall ensure that all documentation required by Standard CIP-005-3 reflect current configurations and processes and shall review the documents and procedures referenced in Standard CIP-005-3 at least annually.
R5.2. The Responsible Entity shall update the documentation to reflect the modification of the network or controls within ninety calendar days of the change.
R5.3. The Responsible Entity shall retain electronic access logs for at least ninety calendar days. Logs related to reportable incidents shall be kept in accordance with the requirements of Standard CIP-008-3.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

CAISO
Authorized Representative

2/28/11
Date

TE
Authorized Representative

2-17-11
Date

Schedule CIP-006-3

Requirement and Sub-requirements:

R1. Physical Security Plan — The Responsible Entity shall document, implement, and maintain a physical security plan, approved by the senior manager or delegate(s) that shall address, at a minimum, the following:
R1.1. All Cyber Assets within an Electronic Security Perimeter shall reside within an identified Physical Security Perimeter. Where a completely enclosed ("six-wall") border cannot be established, the Responsible Entity shall deploy and document alternative measures to control physical access to such Cyber Assets.
R1.2. Identification of all physical access points through each Physical Security Perimeter and measures to control entry at those access points.
R1.3. Processes, tools, and procedures to monitor physical access to the perimeter(s).
R1.4. Appropriate use of physical access controls as described in Requirement R4 including visitor pass management, response to loss, and prohibition of inappropriate use of physical access controls.
R1.5. Review of access authorization requests and revocation of access authorization, in accordance with CIP-004-3 Requirement R4.
R1.6. A visitor control program for visitors (personnel without authorized unescorted access to a Physical Security Perimeter), containing at a minimum the following:
R1.6.1. Logs (manual or automated) to document the entry and exit of visitors, including the date and time, to and from Physical Security Perimeters.
R1.6.2. Continuous escorted access of visitors within the Physical Security Perimeter.
R1.7. Update of the physical security plan within thirty calendar days of the completion of any physical security system redesign or reconfiguration, including, but not limited to, addition or removal of access points through the Physical Security Perimeter, physical access controls, monitoring controls, or logging controls.
R1.8. Annual review of the physical security plan.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-006-3

Requirement and Sub-requirements:

R2. Protection of Physical Access Control Systems — Cyber Assets that authorize and/or log access to the Physical Security Perimeter(s), exclusive of hardware at the Physical Security Perimeter access point such as electronic lock control mechanisms and badge readers, shall:
R2.1. Be protected from unauthorized physical access.
R2.2. Be afforded the protective measures specified in Standard CIP-003-3; Standard CIP-004-3 Requirement R3; Standard CIP-005-3 Requirements R2 and R3; Standard CIP-006-3 Requirements R4 and R5; Standard CIP-007-3; Standard CIP-008-3; and Standard CIP-009-3.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-006-3

Requirement and Sub-requirements:

R3. Protection of Electronic Access Control Systems – Cyber Assets used in the access control and/or monitoring of the Electronic Security Perimeter(s) shall reside within an identified Physical Security Perimeter.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-006-3

Requirement and Sub-requirements:

R4. Physical Access Controls — The responsible Entity shall document and implement the operational and procedural controls to manage physical access at all access points to the Physical Security Perimeter(s) twenty-four hours a day, seven days a week. The Responsible Entity shall implement one or more of the following physical access methods:

- Card Key: A means of electronic access where the access rights of the card holder are predefined in a computer database. Access rights may differ from one perimeter to another.
- Special Locks: These include, but are not limited to, locks with "restricted key" systems, magnetic locks that can be operated remotely, and "man-trap" systems.
- Security Personnel: Personnel responsible for controlling physical access who may reside on-site or at a monitoring station.
- Other Authentication Devices: Biometric, keypad, token, or other equivalent devices that control physical access to the Critical Cyber Assets.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-006-3

Requirement and Sub-requirements:

R5. Monitoring Physical Access – The Responsible Entity shall document and implement the technical and procedural controls for monitoring physical access at all access points to the Physical Security Perimeter(s) twenty-four hours a day, seven days a week. Unauthorized access attempts shall be reviewed immediately and handled in accordance with the procedures specified in Requirement CIP-008-3. One or more of the following monitoring methods shall be used:

- Alarm Systems: Systems that alarm to indicate a door, gate or window has been opened without authorization. These alarms must provide for immediate notification to personnel responsible for response.
- Human Observation of Access Points: Monitoring of physical access points by authorized personnel as specified in Requirement R4.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-006-3

Requirement and Sub-requirements:

R6. Logging Physical Access – Logging shall record sufficient information to uniquely identify individuals and the time of access twenty-four hours a day, seven days a week. The Responsible Entity shall implement and document the technical and procedural mechanisms for logging physical entry at all access points to the Physical Security Perimeter(s) using one or more of the following logging methods or their equivalent:

- Computerized Logging: Electronic logs produced by the Responsible Entity's selected access control and monitoring method.
- Video Recording: Electronic capture of video images of sufficient quality to determine identity.
- Manual Logging: A log book or sign-in sheet, or other record of physical access maintained by security or other personnel authorized to control and monitor physical access as specified in Requirement R4.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-006-3

Requirement and Sub-requirements:

R7. Access Log Retention – The Responsible Entity shall retain physical access logs for at least ninety calendar days. Logs related to reportable incidents shall be kept in accordance with the requirements of Standard CIP-008-3.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-006-3

Requirement and Sub-requirements:

R8. Maintenance and Testing — The Responsible Entity shall implement a maintenance and testing program to ensure that all physical security systems under Requirements R4, R5, and R6 function properly. The program must include, at a minimum, the following:
R8.1. Testing and maintenance of all physical security mechanisms on a cycle no longer than three years.
R8.2. Retention of testing and maintenance records for the cycle determined by the Responsible Entity in Requirement R8.1.
R8.3. Retention of outage records regarding access controls, logging, and monitoring for a minimum of one calendar year.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

2/28/11
CAISO
Authorized Representative
Date

2-17-11
TE
Authorized Representative
Date

Schedule CIP-007-3

Requirement and Sub-requirements:

R1. Test Procedures — The Responsible Entity shall ensure that new Cyber Assets and significant changes to existing Cyber Assets within the Electronic Security Perimeter do not adversely affect existing cyber security controls. For purposes of Standard CIP-007-3, a significant change shall, at a minimum, include implementation of security patches, cumulative service packs, vendor releases, and version upgrades of operating systems, applications, database platforms, or other third-party software or firmware.
R1.1. The Responsible Entity shall create, implement, and maintain cyber security test procedures in a manner that minimizes adverse effects on the production system or its operation.
R1.2. The Responsible Entity shall document that testing is performed in a manner that reflects the production environment.
R1.3. The Responsible Entity shall document test results.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-007-3

Requirement and Sub-requirements:

R2. Ports and Services — The Responsible Entity shall establish, document and implement a process to ensure that only those ports and services required for normal and emergency operations are enabled.
R2.1. The Responsible Entity shall enable only those ports and services required for normal and emergency operations.
R2.2. The Responsible Entity shall disable other ports and services, including those used for testing purposes, prior to production use of all Cyber Assets inside the Electronic Security Perimeter(s).
R2.3. In the case where unused ports and services cannot be disabled due to technical limitations, the Responsible Entity shall document compensating measure(s) applied to mitigate risk exposure.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-007-3

Requirement and Sub-requirements:

R3. Security Patch Management — The Responsible Entity, either separately or as a component of the documented configuration management process specified in CIP-003-3 Requirement R6, shall establish, document and implement a security patch management program for tracking, evaluating, testing, and installing applicable cyber security software patches for all Cyber Assets within the Electronic Security Perimeter(s).
R3.1. The Responsible Entity shall document the assessment of security patches and security upgrades for applicability within thirty calendar days of availability of the patches or upgrades.
R3.2. The Responsible Entity shall document the implementation of security patches. In any case where the patch is not installed, the Responsible Entity shall document compensating measure(s) applied to mitigate risk exposure.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-007-3

Requirement and Sub-requirements:

R4. Malicious Software Prevention — The Responsible Entity shall use anti-virus software and other malicious software ("malware") prevention tools, where technically feasible, to detect, prevent, deter, and mitigate the introduction, exposure, and propagation of malware on all Cyber Assets within the Electronic Security Perimeter(s).
R4.1. The Responsible Entity shall document and implement anti-virus and malware prevention tools. In the case where anti-virus software and malware prevention tools are not installed, the Responsible Entity shall document compensating measure(s) applied to mitigate risk exposure.
R4.2. The Responsible Entity shall document and implement a process for the update of anti-virus and malware prevention "signatures." The process must address testing and installing the signatures.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-007-3

Requirement and Sub-requirements:

R5. Account Management — The Responsible Entity shall establish, implement, and document technical and procedural controls that enforce access authentication of, and accountability for, all user activity, and that minimize the risk of unauthorized system access.
R5.1. The Responsible Entity shall ensure that individual and shared system accounts and authorized access permissions are consistent with the concept of "need to know" with respect to work functions performed.
R5.1.1. The Responsible Entity shall ensure that user accounts are implemented as approved by designated personnel. Refer to Standard CIP-003-3 Requirement R5.
R5.1.2. The Responsible Entity shall establish methods, processes, and procedures that generate logs of sufficient detail to create historical audit trails of individual user account access activity for a minimum of ninety days.
R5.1.3. The Responsible Entity shall review, at least annually, user accounts to verify access privileges are in accordance with Standard CIP-003-3 Requirement R5 and Standard CIP-004-3 Requirement R4.
R5.2. The Responsible Entity shall implement a policy to minimize and manage the scope and acceptable use of administrator, shared, and other generic account privileges including factory default accounts.
R5.2.1. The policy shall include the removal, disabling, or renaming of such accounts where possible. For such accounts that must remain enabled, passwords shall be changed prior to putting any system into service.
R5.2.2. The Responsible Entity shall identify those individuals with access to shared accounts.
R5.2.3. Where such accounts must be shared, the Responsible Entity shall have a policy for managing the use of such accounts that limits access to only those with authorization, an audit trail of the account use (automated or manual), and steps for securing the account in the event of personnel changes (for example, change in assignment or termination).
R5.3. At a minimum, the Responsible Entity shall require and use passwords, subject to the following, as technically feasible:
R5.3.1. Each password shall be a minimum of six characters.
R5.3.2. Each password shall consist of a combination of alpha, numeric, and "special" characters.
R5.3.3. Each password shall be changed at least annually, or more frequently based on risk.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule CIP-007-3

Requirement and Sub-requirements:

R6. Security Status Monitoring — The Responsible Entity shall ensure that all Cyber Assets within the Electronic Security Perimeter, as technically feasible, implement automated tools or organizational process controls to monitor system events that are related to cyber security.
R6.1. The Responsible Entity shall implement and document the organizational processes and technical and procedural mechanisms for monitoring for security events on all Cyber Assets within the Electronic Security Perimeter.
R6.2. The security monitoring controls shall issue automated or manual alerts for detected Cyber Security Incidents.
R6.3. The Responsible Entity shall maintain logs of system events related to cyber security, where technically feasible, to support incident response as required in Standard CIP-008-3.
R6.4. The Responsible Entity shall retain all logs specified in Requirement R6 for ninety calendar days.
R6.5. The Responsible Entity shall review logs of system events related to cyber security and maintain records documenting review of logs.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-007-3

Requirement and Sub-requirements:

R7. Disposal or Redeployment — The Responsible Entity shall establish and implement formal methods, processes, and procedures for disposal or redeployment of Cyber Assets within the Electronic Security Perimeter(s) as identified and documented in Standard CIP-005-3.
R7.1. Prior to the disposal of such assets, the Responsible Entity shall destroy or erase the data storage media to prevent unauthorized retrieval of sensitive cyber security or reliability data.
R7.2. Prior to redeployment of such assets, the Responsible Entity shall, at a minimum, erase the data storage media to prevent unauthorized retrieval of sensitive cyber security or reliability data.
R7.3. The Responsible Entity shall maintain records that such assets were disposed of or redeployed in accordance with documented procedures.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-007-3

Requirement and Sub-requirements:

R8. Cyber Vulnerability Assessment — The Responsible Entity shall perform a cyber vulnerability assessment of all Cyber Assets within the Electronic Security Perimeter at least annually. The vulnerability assessment shall include, at a minimum, the following:
R8.1. A document identifying the vulnerability assessment process;
R8.2. A review to verify that only ports and services required for operation of the Cyber Assets within the Electronic Security Perimeter are enabled;
R8.3. A review of controls for default accounts; and,
R8.4. Documentation of the results of the assessment, the action plan to remediate or mitigate vulnerabilities identified in the assessment, and the execution status of that action plan.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-007-3

Requirement and Sub-requirements:

R9. Documentation Review and Maintenance — The Responsible Entity shall review and update the documentation specified in Standard CIP-007-3 at least annually. Changes resulting from modifications to the systems or controls shall be documented within thirty calendar days of the change being completed.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

_____ 2/28/11
CAISO
Authorized Representative — Date

_____ 2-17-11
TE
Authorized Representative — Date

Schedule CIP-008-3

Requirement and Sub-requirements:

R1. Cyber Security Incident Response Plan — The Responsible Entity shall develop and maintain a Cyber Security Incident response plan and implement the plan in response to Cyber Security Incidents. The Cyber Security Incident response plan shall address, at a minimum, the following:
R1.1. Procedures to characterize and classify events as reportable Cyber Security Incidents.
R1.2. Response actions, including roles and responsibilities of Cyber Security Incident response teams, Cyber Security Incident handling procedures, and communication plans.
R1.3. Process for reporting Cyber Security Incidents to the Electricity Sector Information Sharing and Analysis Center (ES-ISAC). The Responsible Entity must ensure that all reportable Cyber Security Incidents are reported to the ES-ISAC either directly or through an intermediary.
R1.4. Process for updating the Cyber Security Incident response plan within thirty calendar days of any changes.
R1.5. Process for ensuring that the Cyber Security Incident response plan is reviewed at least annually.
R1.6. Process for ensuring the Cyber Security Incident response plan is tested at least annually. A test of the Cyber Security Incident response plan can range from a paper drill, to a full operational exercise, to the response to an actual incident.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-008-3

Requirement and Sub-requirements:

R2. Cyber Security Incident Documentation — The Responsible Entity shall keep relevant documentation related to Cyber Security Incidents reportable per Requirement R1.1 for three calendar years.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

CAISO
Authorized Representative — Date: 2/28/11

TE
Authorized Representative — Date: 2-17-11

Schedule CIP-009-3

Requirement and Sub-requirements:

R1. Recovery Plans — The Responsible Entity shall create and annually review recovery plan(s) for Critical Cyber Assets. The recovery plan(s) shall address at a minimum the following:
R1.1. Specify the required actions in response to events or conditions of varying duration and severity that would activate the recovery plan(s).
R1.2. Define the roles and responsibilities of responders.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-009-3

Requirement and Sub-requirements:

R2. Exercises — The recovery plan(s) shall be exercised at least annually. An exercise of the recovery plan(s) can range from a paper drill, to a full operational exercise, to recovery from an actual incident.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-009-3

Requirement and Sub-requirements:

R3. Change Control — Recovery plan(s) shall be updated to reflect any changes or lessons learned as a result of an exercise or the recovery from an actual incident. Updates shall be communicated to personnel responsible for the activation and implementation of the recovery plan(s) within thirty calendar days of the change being completed.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-009-3

Requirement and Sub-requirements:

R4. Backup and Restore — The recovery plan(s) shall include processes and procedures for the backup and storage of information required to successfully restore Critical Cyber Assets. For example, backups may include spare electronic components or equipment, written documentation of configuration settings, tape backup, etc.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule CIP-009-3

Requirement and Sub-requirements:

R5. Testing Backup Media — Information essential to recovery that is stored on backup media shall be tested at least annually to ensure that the information is available. Testing can be completed off site.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements for its assets is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

CAISO
Authorized Representative — Date: 2/28/11

TE
Authorized Representative — Date: 2-17-11

COM-001-1.1

Requirement and Sub-requirements:

R1. Each Reliability Coordinator, Transmission Operator and Balancing Authority shall provide adequate and reliable telecommunications facilities for the exchange of Interconnection and operating information:
R1.1. Internally
R1.2. Between the Reliability Coordinator and its Transmission Operators and Balancing Authorities
R1.3. With other Reliability Coordinators, Transmission Operators, and Balancing Authorities as necessary to maintain reliability
R1.4. Where applicable, these facilities shall be redundant and diversely routed

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will have adequate and reliable telecommunications facilities as required in R1.1 and R1.4.

COM-001-1.1

Requirement and Sub-requirements:

R2. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall manage, alarm, test and/or actively monitor vital telecommunications facilities. Special attention shall be given to emergency telecommunications facilities and equipment not used for routine communications.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall manage alarm, test and/or actively monitor their vital telecommunications facilities as required by R2.

COM-001-1.1

Requirement and Sub-requirements:

R3. Each Reliability Coordinator, Transmission Operator and Balancing Authority shall provide a means to coordinate telecommunications among their respective areas. This coordination shall include the ability to investigate and recommend solutions to telecommunications problems within the area and with other areas.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall provide a means to coordinate telecommunications among their respective areas as required by R3.

COM-001-1.1

Requirement and Sub-requirements:

R4. Unless agreed to otherwise, each Reliability Coordinator, Transmission Operator, and Balancing Authority shall use English as the language for all communications between and among operating personnel responsible for the real-time generation control and operation of the interconnected Bulk Electric System. Transmission Operators and Balancing Authorities may use an alternate language for internal operations.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

Unless agreed to otherwise, the TE shall use English as the language for all communications between and among operating personnel responsible for the real-time generation control and operation of the interconnected Bulk Electric System as required by R4.

COM-001-1.1

Requirement and Sub-requirements:

R5. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall have written operating instructions and procedures to enable continued operation of the system during the loss of telecommunications facilities.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall have written operating instructions and procedures to enable continued operation of their system during the loss of telecommunications facilities as required by R5.

CAISO
Authorized Representative

10/1/09
Date

TE
Authorized Representative

9-25-09
Date

Schedule COM-002-2

Requirement and Sub-requirements:

R1. Each Transmission Operator, Balancing Authority, and Generator Operator shall have communications (voice and data links) with appropriate Reliability Coordinators, Balancing Authorities, and Transmission Operators. Such communications shall be staffed and available for addressing a real-time emergency condition.

R.1.1. Each Balancing Authority and Transmission Operator shall notify its Reliability Coordinator, and all other potentially affected Balancing Authorities and Transmission Operators through predetermined communication paths of any condition that could threaten the reliability of its area or when firm load shedding is anticipated.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will have communications as required in R1.
The TE will notify the CAISO for conditions as required in R1.1.

Schedule COM-002-2

Requirement and Sub-requirements:

R2. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall issue directives in a clear, concise, and definitive manner; shall ensure the recipient of the directive repeats the information back correctly; and shall acknowledge the response as correct or repeat the original statement to resolve any misunderstandings.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule EOP-001-0

Requirement and Sub-requirements:

R2. The Transmission Operator shall have an emergency load reduction plan for all identified IROLs. The plan shall include the details on how the Transmission Operator will implement load reduction in sufficient amount and time to mitigate the IROL violation before system separation or collapse would occur. The load reduction plan must be capable of being implemented within 30 minutes.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will have an emergency load reduction plan for its transmission area to be implemented as directed by the CAISO. The TE's plan will not be specific to IROLs, but the CAISO may choose to utilize the TE's plan to help in meeting its responsibility under this requirement.

Schedule EOP-001-0

Requirement and Sub-requirements:

R3. Each Transmission Operator and Balancing Authority shall:
R3.1. Develop, maintain, and implement a set of plans to mitigate operating emergencies for insufficient generating capacity.
R3.2. Develop, maintain, and implement a set of plans to mitigate operating emergencies on the transmission system.
R3.3. Develop, maintain, and implement a set of plans for load shedding.
R3.4. Develop, maintain, and implement a set of plans for system restoration.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒ CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☒ TE
☐ None for this standard

DELEGATED TASKS

The TE will have emergency operating plans for R3.2, R3.3, R3.4 for its transmission system.

Schedule EOP-001-0

Requirement and Sub-requirements:

R4. Each Transmission Operator and Balancing Authority shall have emergency plans that will enable it to mitigate operating emergencies. At a minimum, Transmission Operator and Balancing Authority emergency plans shall include:
R4.1. Communications protocols to be used during emergencies.
R4.2. A list of controlling actions to resolve the emergency. Load reduction, in sufficient quantity to resolve the emergency within NERC-established timelines, shall be one of the controlling actions.
R4.3. The tasks to be coordinated with and among adjacent Transmission Operators and Balancing Authorities.
R4.4. Staffing levels for the emergency.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will have emergency plans that will enable it to mitigate operating emergencies for its system that comply with R4 and its sub-requirements.

Schedule EOP-001-0

Requirement and Sub-requirements:

R5. Each Transmission Operator and Balancing Authority shall include the applicable elements in Attachment 1-EOP-001-0 when developing an emergency plan.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE emergency plans shall include the following elements as applicable from Attachment 1-EOP-001-0 when developing their emergency plan: 4. System Energy Use 5. Public Appeals 6. Load management 8. Appeals to customers to use alternate fuels 9. Interruptible and curtailable loads 13. Load Curtailment

Schedule EOP-001-0

Requirement and Sub-requirements:

R6. The Transmission Operator and Balancing Authority shall annually review and update each emergency plan. The Transmission Operator and Balancing Authority shall provide a copy of its updated emergency plans to its Reliability Coordinator and to neighboring Transmission Operators and Balancing Authorities.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall annually review and update each emergency plan and shall provide a copy of its updated emergency plans to its Reliability Coordinator and to neighboring Transmission Operators and Balancing Authorities as required by R6.

Schedule EOP-001-0

Requirement and Sub-requirements:

R7. The Transmission Operator and Balancing Authority shall coordinate its emergency plans with other Transmission Operators and Balancing Authorities as appropriate. This coordination includes the following steps, as applicable:
R7.1. The Transmission Operator and Balancing Authority shall establish and maintain reliable communications between interconnected systems.
R7.2. The Transmission Operator and Balancing Authority shall arrange new interchange agreements to provide for emergency capacity or energy transfers if existing agreements cannot be used.
R7.3. The Transmission Operator and Balancing Authority shall coordinate transmission and generator maintenance schedules to maximize capacity or conserve the fuel in short supply. (This includes water for hydro generators.)
R7.4. The Transmission Operator and Balancing Authority shall arrange deliveries of electrical energy or fuel from remote systems through normal operating channels.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒ CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☒ TE
☐ None for this standard

DELEGATED TASKS

The TE shall coordinate its emergency plans as required in R7.1.

Schedule EOP-003-1

Requirement and Sub-requirements:

R1. After taking all other remedial steps, a Transmission Operator or Balancing Authority operating with insufficient generation or transmission capacity shall shed customer load rather than risk an uncontrolled failure of components or cascading outages of the Interconnection.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒ CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☒ TE
☐ None for this standard

DELEGATED TASKS

The TE will take action unilaterally to initiate load shedding to protect its transmission system, employees, and the public if there is insufficient time to coordinate with the CAISO.

Schedule EOP-003-1

Requirement and Sub-requirements:

R2. Each Transmission Operator and Balancing Authority shall establish plans for automatic load shedding for underfrequency or undervoltage conditions.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule EOP-003-1

Requirement and Sub-requirements:

R3. Each Transmission Operator and Balancing Authority shall coordinate load shedding plans among other interconnected Transmission Operators and Balancing Authorities.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE's automatic load shedding plans shall comply with the WECC off Nominal Frequency Plan for underfrequency conditions. The TE shall coordinate other automatic load shedding plans with other interconnected Transmission Operators and Balancing Authorities as applicable.

Schedule EOP-003-1

Requirement and Sub-requirements:

R4. A Transmission Operator or Balancing Authority shall consider one or more of these factors in designing an automatic load shedding scheme: frequency, rate of frequency decay, voltage level, rate of voltage decay, or power flow levels.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule EOP-003-1

Requirement and Sub-requirements:

R5. A Transmission Operator or Balancing Authority shall implement load shedding in steps established to minimize the risk of further uncontrolled separation, loss of generation, or system shutdown.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall implement their automatic load shedding in steps as required by R5 for their system.

Schedule EOP-003-1

Requirement and Sub-requirements:

R6. After a Transmission Operator or Balancing Authority Area separates from the Interconnection, if there is insufficient generating capacity to restore system frequency following automatic underfrequency load shedding, the Transmission Operator or Balancing Authority shall shed additional load.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

In an islanded situation, where the CAISO is not directly coordinating restoration, the TE will act to restore frequency in its island, coordinating with other transmission entites in the island.

Schedule EOP-003-1

Requirement and Sub-requirements:

R7. The Transmission Operator and Balancing Authority shall coordinate automatic load shedding throughout their areas with underfrequency isolation of generating units, tripping of shunt capacitors, and other automatic actions that will occur under abnormal frequency, voltage, or power flow conditions.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule EOP-003-1

Requirement and Sub-requirements:

R8. Each Transmission Operator or Balancing Authority shall have plans for operator controlled manual load shedding to respond to real-time emergencies. The Transmission Operator or Balancing Authority shall be capable of implementing the load shedding in a timeframe adequate for responding to the emergency.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall have plans for operator controlled manual load shedding to respond to real-time emergencies for its system as required by R8.

Requirement and Sub-requirements:

R2. A Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator or Load Serving Entity shall promptly analyze Bulk Electric System disturbances on its system or facilities.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall promptly analyze Bulk Electric System disturbances on its system or facilities.

Requirement and Sub-requirements:

R3. A Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator or Load Serving Entity experiencing a reportable incident shall provide a preliminary written report to its Regional Reliability Organization and NERC.
R3.1. The affected Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator or Load Serving Entity shall submit within 24 hours of the disturbance or unusual occurrence either a copy of the report submitted to DOE, or, if no DOE report is required, a copy of the NERC Interconnection Reliability Operating Limit and Preliminary Disturbance Report form. Events that are not identified until some time after they occur shall be reported within 24 hours of being recognized.
R3.2. Applicable reporting forms are provided in Attachments 022-1 and 022-2.
R3.3. Under certain adverse conditions, e.g., severe weather, it may not be possible to assess the damage caused by a disturbance and issue a written Interconnection Reliability Operating Limit and Preliminary Disturbance Report within 24 hours. In such cases, the affected Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator, or Load Serving Entity shall promptly notify its Regional Reliability Organization(s) and NERC, and verbally provide as much information as is available at that time. The affected Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator, or Load Serving Entity shall then provide timely, periodic verbal updates until adequate information is available to issue a written Preliminary Disturbance Report.
R3.4. If, in the judgment of the Regional Reliability Organization, after consultation with the Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator, or Load Serving Entity in which a disturbance occurred, a final report is required, the affected Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator, or Load Serving Entity shall prepare this report within 60 days. As a minimum, the final report shall have a discussion of the events and its cause, the conclusions reached, and recommendations to prevent recurrence of this type of event. The report shall be subject to Regional Reliability Organization approval.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE

Schedule EOP-004-1

☐None for this standard

DELEGATED TASKS

For those NERC reportable incidents requiring reports from a Transmission Operator, the TE shall either directly file the report with NERC and WECC, or file a joint report with the CAISO, for those items marked with the reporting responsibility of PTO and as delineated by the notes in the CAISO N-703A DOE, NERC and WECC Significant Event Reporting Requirements Version No. 1.4 dated 9/4/07. If the TE individually files a report, the TE shall also submit a copy of the report to the CAISO.

CAISO Authorized Representative	11/14/07 Date
TE Authorized Representative	11-5-07 Date

Schedule EOP-005-1

Requirement and Sub-requirements:

R1. Each Transmission Operator shall have a restoration plan to reestablish its electric system in a stable and orderly manner in the event of a partial or total shutdown of its system, including necessary operating instructions and procedures to cover emergency conditions, and the loss of vital telecommunications channels. Each Transmission Operator shall include the applicable elements listed in Attachment 1-EOP-005 in developing a restoration plan.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will have a system restoration plan for its transmission system.

Schedule EOP-005-1

Requirement and Sub-requirements:

R2. Each Transmission Operator shall review and update its restoration plan at least annually and whenever it makes changes in the power system network, and shall correct deficiencies found during the simulated restoration exercises.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will at least annually review and update its transmission system restoration plan.

Schedule EOP-005-1

Requirement and Sub-requirements:

R3. Each Transmission Operator shall develop restoration plans with a priority of restoring the integrity of the Interconnection.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE's transmission system restoration plan will include a priority of restoring the integrity of the Interconnection.

Schedule EOP-005-1

Requirement and Sub-requirements:

R4. Each Transmission Operator shall coordinate its restoration plans with the Generator Owners and Balancing Authorities within its area, its Reliability Coordinator, and neighboring Transmission Operators and Balancing Authorities.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will coordinate its restoration plans with the CAISO and Generator Owners in its transmission system area with CAISO involvement as necessary.

Schedule EOP-005-1

Requirement and Sub-requirements:

R5. Each Transmission Operator and Balancing Authority shall periodically test its telecommunication facilities needed to implement the restoration plan.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will periodically test its telecommunications facilities needed to implement its restoration plan.

Schedule EOP-005-1

Requirement and Sub-requirements:

R6. Each Transmission Operator and Balancing Authority shall train its operating personnel in the implementation of the restoration plan. Such training shall include simulated exercises, if practicable.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will train its operating personnel per requirement R6.

Schedule EOP-005-1

Requirement and Sub-requirements:

R7. Each Transmission Operator and Balancing Authority shall verify the restoration procedure by actual testing or by simulation.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will verify its restoration plan per requirement R7.

Schedule EOP-005-1

Requirement and Sub-requirements:

R8. Each Transmission Operator shall verify that the number, size, availability, and location of system blackstart generating units are sufficient to meet Regional Reliability Organization restoration plan requirements for the Transmission Operator's area.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule EOP-005-1

Requirement and Sub-requirements:

R9. The Transmission Operator shall document the Cranking Paths, including initial switching requirements, between each blackstart generating unit and the unit(s) to be started and shall provide this documentation for review by the Regional Reliability Organization upon request. Such documentation may include Cranking Path diagrams.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will document its detailed Cranking Paths for its transmission system and provide the information to the CAISO.

Schedule EOP-005-1

Requirement and Sub-requirements:

R10. The Transmission Operator shall demonstrate, through simulation or testing, that the blackstart generating units in its restoration plan can perform their intended functions as required in the regional restoration plan.
R10.1. The Transmission Operator shall perform this simulation or testing at least once every five years.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule EOP-005-1

Requirement and Sub-requirements:

R11. Following a disturbance in which one or more areas of the Bulk Electric System become isolated or blacked out, the affected Transmission Operators and Balancing Authorities shall begin immediately to return the Bulk Electric System to normal.
R11.1. The affected Transmission Operators and Balancing Authorities shall work in conjunction with their Reliability Coordinator(s) to determine the extent and condition of the isolated area(s).
R11.2. The affected Transmission Operators and Balancing Authorities shall take the necessary actions to restore Bulk Electric System frequency to normal, including adjusting generation, placing additional generators on line, or load shedding.
R11.3. The affected Balancing Authorities, working with their Reliability Coordinator(s), shall immediately review the Interchange Schedules between those Balancing Authority Areas or fragments of those Balancing Authority Areas within the separated area and make adjustments as needed to facilitate the restoration. The affected Balancing Authorities shall make all attempts to maintain the adjusted Interchange Schedules, whether generation control is manual or automatic.
R11.4. The affected Transmission Operators shall give high priority to restoration of off-site power to nuclear stations.
R11.5. The affected Transmission Operators may resynchronize the isolated area(s) with the surrounding area(s) when the following conditions are met:
R11.5.1. Voltage, frequency, and phase angle permit.
R11.5.2. The size of the area being reconnected and the capacity of the transmission lines effecting the reconnection and the number of synchronizing points across the system are considered.
R11.5.3. Reliability Coordinator(s) and adjacent areas are notified and Reliability Coordinator approval is given.
R11.5.4. Load is shed in neighboring areas, if required, to permit successful interconnected system restoration.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE

☐None for this standard

DELEGATED TASKS

In the event of a blackout or islanding condition, the TE will perform its transmission system restoration as coordinated by the CAISO. (This does not include R11.3 which is only applicable to a BA.)

Schedule EOP-008-0

Requirement and Sub-requirements:

R1. Each Reliability Coordinator, Transmission Operator and Balancing Authority shall have a plan to continue reliability operations in the event its control center becomes inoperable. The contingency plan must meet the following requirements:
R1.1. The contingency plan shall not rely on data or voice communication from the primary control facility to be viable.
R1.2. The plan shall include procedures and responsibilities for providing basic tie line control and procedures and for maintaining the status of all inter-area schedules, such that there is an hourly accounting of all schedules.
R1.3. The contingency plan must address monitoring and control of critical transmission facilities, generation control, voltage control, time and frequency control, control of critical substation devices, and logging of significant power system events. The plan shall list the critical facilities.
R1.4. The plan shall include procedures and responsibilities for maintaining basic voice communication capabilities with other areas.
R1.5. The plan shall include procedures and responsibilities for conducting periodic tests, at least annually, to ensure viability of the plan.
R1.6. The plan shall include procedures and responsibilities for providing annual training to ensure that operating personnel are able to implement the contingency plans.
R1.7. The plan shall be reviewed and updated annually.
R1.8. Interim provisions must be included if it is expected to take more than one hour to implement the contingency plan for loss of primary control facility.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒ CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☒ TE
☐ None for this standard

DELEGATED TASKS

The TE will develop plans for the loss of its control center(s) that meet R1 and its sub-requirements, excluding requirement R1.2 and those portions R1.3 that address generation control, time and frequency control.

FAC-014-2

Requirement and Sub-requirements:

R2. The Transmission Operator shall establish SOLs (as directed by its Reliability Coordinator) for its portion of the Reliability Coordinator Area that are consistent with its Reliability Coordinator's SOL Methodology.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall establish, in coordination with the CAISO as necessary, SOLs (as directed by its Reliability Coordinator) for its transmission system that are consistent with its Reliability Coordinator's SOL Methodology.

FAC-014-2

Requirement and Sub-requirements:

R5.2 The Transmission Operator shall provide any SOLs it developed to its Reliability Coordinator and to the Transmission Service Providers that share its portion of the Reliability Coordinator Area.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will provide any SOLs it developed for the TE transmission system to the CAISO.

CAISO
Authorized Representative

10/1/09
Date

TE
Authorized Representative

9-25-09
Date

Schedule TOP-001-1

Requirement and Sub-requirements:

R1. Each Transmission Operator shall have the responsibility and clear decision-making authority to take whatever actions are needed to ensure the reliability of its area and shall exercise specific authority to alleviate operating emergencies.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall provide its operators the responsibility and clear decision-making authority required for its transmission system per requirement R1.

Schedule TOP-001-1

Requirement and Sub-requirements:

R2. Each Transmission Operator shall take immediate actions to alleviate operating emergencies including curtailing transmission service or energy schedules, operating equipment (e.g., generators, phase shifters, breakers), shedding firm load, etc.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will take actions unilaterally to protect its equipment if there is insufficient time to coordinate actions with the CAISO.

Schedule TOP-001-1

Requirement and Sub-requirements:

R3. Each Transmission Operator, Balancing Authority, and Generator Operator shall comply with reliability directives issued by the Reliability Coordinator, and each Balancing Authority and Generator Operator shall comply with reliability directives issued by the Transmission Operator, unless such actions would violate safety, equipment, regulatory or statutory requirements. Under these circumstances the Transmission Operator, Balancing Authority or Generator Operator shall immediately inform the Reliability Coordinator or Transmission Operator of the inability to perform the directive so that the Reliability Coordinator or Transmission Operator can implement alternate remedial actions.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

In the event the WECC RC directly contacts the TE, the TE shall comply with the WECC RC directive or inform the WECC RC that such action would violate safety, equipment, regulatory or statutory requirements.

Schedule TOP-001-1

Requirement and Sub-requirements:

R5. Each Transmission Operator shall inform its Reliability Coordinator and any other potentially affected Transmission Operators of real time or anticipated emergency conditions, and take actions to avoid, when possible, or mitigate the emergency.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

If the CAISO is unavailable and time permits, the TE will contact the WECC RC directly to inform the WECC RC of emergency conditions.

Schedule TOP-001-1

Requirement and Sub-requirements:

R6. Each Transmission Operator, Balancing Authority, and Generator Operator shall render all available emergency assistance to others as requested, provided that the requesting entity has implemented its comparable emergency procedures, unless such actions would violate safety, equipment, or regulatory or statutory requirements.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

If additional emergency assistance is requested by the CAISO, the TE will work with the CAISO to supply all available emergency assistance, unless such actions would violate safety, equipment, or regulatory or statutory requirements.

Schedule TOP-001-1

Requirement and Sub-requirements:

R7. Each Transmission Operator and Generator Operator shall not remove Bulk Electric System facilities from service if removing those facilities would burden neighboring systems unless:
R7.1. For a generator outage, the Generator Operator shall notify and coordinate with the Transmission Operator. The Transmission Operator shall notify the Reliability Coordinator and other affected Transmission Operators, and coordinate the impact of removing the Bulk Electric System facility.
R7.2. For a transmission facility, the Transmission Operator shall notify and coordinate with its Reliability Coordinator. The Transmission Operator shall notify other affected Transmission Operators, and coordinate the impact of removing the Bulk Electric System facility.
R7.3. When time does not permit such notifications and coordination, or when immediate action is required to prevent a hazard to the public, lengthy customer service interruption, or damage to facilities, the Generator Operator shall notify the Transmission Operator, and the Transmission Operator shall notify its Reliability Coordinator and adjacent Transmission Operators, at the earliest possible time.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule TOP-001-1

Requirement and Sub-requirements:

R8. During a system emergency, the Balancing Authority and Transmission Operator shall immediately take action to restore the Real and Reactive Power Balance. If the Balancing Authority or Transmission Operator is unable to restore Real and Reactive Power Balance it shall request emergency assistance from the Reliability Coordinator. If corrective action or emergency assistance is not adequate to mitigate the Real and Reactive Power Balance, then the Reliability Coordinator, Balancing Authority, and Transmission Operator shall implement firm load shedding.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

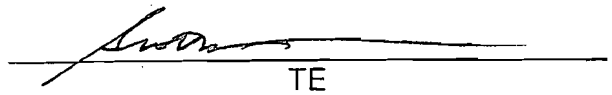
☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

During a system emergency the TE shall comply with requirement R8 as it pertains to reactive static devices.

CAISO
Authorized Representative

10/1/09
Date



TE
Authorized Representative

9-25-09
Date

TOP-002-2

Requirement and Sub-requirements:

R1. Each Balancing Authority and Transmission Operator shall maintain a set of current plans that are designed to evaluate options and set procedures for reliable operation through a reasonable future time period. In addition, each Balancing Authority and Transmission Operator shall be responsible for using available personnel and system equipment to implement these plans to ensure that interconnected system reliability will be maintained.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall have a current set of plans for operation of the TE system through a reasonable future time period in compliance with R1 and shall use its available personnel and system equipment to implement these plans.

TOP-002-2

Requirement and Sub-requirements:

R2. Each Balancing Authority and Transmission Operator shall ensure its operating personnel participate in the system planning and design study processes, so that these studies contain the operating personnel perspective and system operating personnel are aware of the planning purpose.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall ensure that the TE operators participate in the system planning and design study processes.

TOP-002-2

Requirement and Sub-requirements:

R4. Each Balancing Authority and Transmission Operator shall coordinate (where confidentiality agreements allow) its current-day, next-day, and seasonal planning and operations with neighboring Balancing Authorities and Transmission Operators and with its Reliability Coordinator, so that normal Interconnection operation will proceed in an orderly and consistent manner.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

TOP-002-2

Requirement and Sub-requirements:

R5. Each Balancing Authority and Transmission Operator shall plan to meet scheduled system configuration, generation dispatch, interchange scheduling and demand patterns.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

TOP-002-2

Requirement and Sub-requirements:

R6. Each Balancing Authority and Transmission Operator shall plan to meet unscheduled changes in system configuration and generation dispatch (at a minimum N-1 Contingency planning) in accordance with NERC, Regional Reliability Organization, subregional, and local reliability requirements.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will plan to meet unscheduled changes in system configuration in accordance with NERC, WECC, and CAISO reliability requirements for the TE system.

TOP-002-2

Requirement and Sub-requirements:

R10. Each Balancing Authority and Transmission Operator shall plan to meet all System Operating Limits (SOLs) and Interconnection Reliability Operating Limits (IROLs).

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

TE will plan to meet all SOLs for the TE system.

TOP-002-2

Requirement and Sub-requirements:

R11. The Transmission Operator shall perform seasonal, next-day, and current-day Bulk Electric System studies to determine SOLs. Neighboring Transmission Operators shall utilize identical SOLs for common facilities. The Transmission Operator shall update these Bulk Electric System studies as necessary to reflect current system conditions; and shall make the results of Bulk Electric System studies available to the Transmission Operators, Balancing Authorities (subject confidentiality requirements), and to its Reliability Coordinator.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will study and determine SOLs for its transmission system with CAISO coordination. The TE will share studies as appropriate.

TOP-002-2

TOP-002-2

Requirement and Sub-requirements:

R16. Subject to standards of conduct and confidentiality agreements, Transmission Operators shall, without any intentional time delay, notify their Reliability Coordinator and Balancing Authority of changes in capabilities and characteristics including but not limited to:
R16.1. Changes in transmission facility status.
R16.2. Changes in transmission facility rating.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will notify the CAISO of any changes in transmission facility status and rating for the TE system.

TOP-002-2

Requirement and Sub-requirements:

R17. Balancing Authorities and Transmission Operators shall, without any intentional time delay, communicate the information described in the requirements R1 to R16 above to their Reliability Coordinator.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE can directly contact the WECC RC and inform him of the information required in R17 if needed.

TOP-002-2

Requirement and Sub-requirements:

R18. Neighboring Balancing Authorities, Transmission Operators, Generator Operators, Transmission Service Providers and Load Serving Entities shall use uniform line identifiers when referring to transmission facilities of an interconnected network.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will use uniform line identifiers when referring to transmission facilities.

TOP-002-2

Requirement and Sub-requirements:

R19. Each Balancing Authority and Transmission Operator shall maintain accurate computer models utilized for analyzing and planning system operations

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall maintain accurate computer models utilized for analyzing and planning system operations for its TE system.

CAISO
Authorized Representative — Date: 10/19/10

TE
Authorized Representative — Date: 8-10-10

TOP-005-2

Requirement and Sub-requirements:

R2. Upon request, each Balancing Authority and Transmission Operator shall provide to other Balancing Authorities and Transmission Operators with immediate responsibility for operational reliability, the operating data that are necessary to allow these Balancing Authorities and Transmission Operators to perform operational reliability assessments and to coordinate reliable operations. Balancing Authorities and Transmission Operators shall provide the types of data as listed in Attachment 1-TOP-005 "Electric System Reliability Data," unless otherwise agreed to by the Balancing Authorities and Transmission Operators with immediate responsibility for operational reliability.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will provide the CAISO with the 1-TOP-005 "Electric System Reliability Data" TE data that the CAISO is required to share. If other TOPs and BAs request data directly from the TE, the TE will either supply the data as required by R2, or refer the TOP or BA to the CAISO to obtain the data.

Nancy A. Saracino — 9-30-11

CAISO
Authorized Representative — Date

[signature] — 9-29-11

TE
Authorized Representative — Date

Schedule INT-004-1

Requirement and Sub-requirements:

R1. At such time as the reliability event allows for the reloading of the transaction, the entity that initiated the curtailment shall release the limit on the Interchange Transaction tag to allow reloading the transaction and shall communicate the release of the limit to the Sink Balancing Authority.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒ CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

CAISO
Authorized Representative — Date: 1/3/08

TE
Authorized Representative — Date: 12-6-07

Schedule INT-004-2

Requirement and Sub-requirements:

R1. At such time as the reliability event allows for the reloading of the transaction, the entity that initiated the curtailment shall release the limit on the Interchange Transaction tag to allow reloading the transaction and shall communicate the release of the limit to the Sink Balancing Authority.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

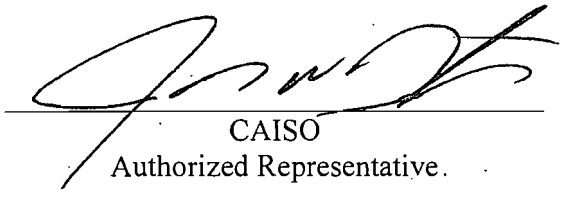
☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

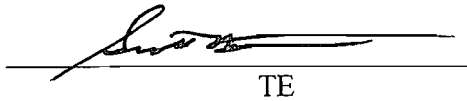
☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS



CAISO
Authorized Representative

11/26/08
Date



TE
Authorized Representative

11/19/08
Date

Schedule IRO-001-1.1

Requirement and Sub-requirements:

R8. Transmission Operators, Balancing Authorities, Generator Operators, Transmission Service Providers, Load-Serving Entities, and Purchasing-Selling Entities shall comply with Reliability Coordinator directives unless such actions would violate safety, equipment, or regulatory or statutory requirements. Under these circumstances, the Transmission Operator, Balancing Authority, Generator Operator, Transmission Service Provider, Load-Serving Entity, or Purchasing-Selling Entity shall immediately inform the Reliability Coordinator of the inability to perform the directive so that the Reliability Coordinator may implement alternate remedial actions.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

If the WECC RC issues a directive to the TE, the TE will follow the directive unless such actions would violate safety, equipment, or regulatory or statutory requirements. Under these circumstances, the TE will inform the WECC RC of its inability to perform the directive.

CAISO
Authorized Representative

10/1/09
Date

TE
Authorized Representative

9-25-09
Date

Schedule IRO-002-2

Requirement and Sub-requirements:

R2. Each Reliability Coordinator – or its Transmission Operators and Balancing Authorities – shall provide, or arrange provisions for, data exchange to other Reliability Coordinators or Transmission Operators and Balancing Authorities via a secure network.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Nancy A. Saracco — 9-30-11

CAISO
Authorized Representative — Date

9-29-11

TE
Authorized Representative — Date

Schedule IRO-004-2

Requirement and Sub-requirements:

R1. Each Transmission Operator, Balancing Authority, and Transmission Service Provider shall comply with the directives of its Reliability Coordinator based on the next day assessments in the same manner in which it would comply during real time operating events.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall implement applicable instructions provided to the TE by the CAISO to meet the RC directives.

Nancy A. Saracco — 9-30-11

CAISO
Authorized Representative — Date

[signature] — 9-29-11

TE
Authorized Representative — Date

Schedule IRO-005-3

Requirement and Sub-requirements:

R5. Each Reliability Coordinator shall monitor system frequency and its Balancing Authorities' performance and direct any necessary rebalancing to return to CPS and DCS compliance. The Transmission Operators and Balancing Authorities shall utilize all resources, including firm load shedding, as directed by its Reliability Coordinator to relieve the emergent condition.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall utilize all resources, including firm load shedding, as directed by the CAISO to relieve the emergent condition.

Schedule IRO-005-3

Requirement and Sub-requirements:

R9. Whenever a Special Protection System that may have an inter-Balancing Authority, or inter-Transmission Operator impact (e.g., could potentially affect transmission flows resulting in a SOL or IROL violation) is armed, the Reliability Coordinators shall be aware of the impact of the operation of that Special Protection System on inter-area flows. The Transmission Operator shall immediately inform the Reliability Coordinator of the status of the Special Protection System including any degradation or potential failure to operate as expected.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will inform the CAISO of any Special Protection System failure or degradation in the TE's system.

Schedule IRO-005-3

Requirement and Sub-requirements:

R10. In instances where there is a difference in derived limits, the Transmission Operators, Balancing Authorities, Generator Operators, Transmission Service Providers, Load-Serving Entities, and Purchasing-Selling Entities shall always operate the Bulk Electric System to the most limiting parameter.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Nancy A. Saracek — 9-30-11
CAISO Authorized Representative — Date

9-29-11
TE Authorized Representative — Date

Schedule IRO-010-1

Requirement and Sub-requirements:

R3. Each Balancing Authority, Generator Owner, Generator Operator, Interchange Authority, Load-serving Entity, Reliability Coordinator, Transmission Operator, and Transmission Owner shall provide data and information, as specified, to the Reliability Coordinator(s) with which it has a reliability relationship.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will supply CAISO with the TE data and information identified by the CAISO as specified by the RC.

Nancy A. Saracek — 9-30-11

CAISO
Authorized Representative — Date

[signature] — 9-29-11

TE
Authorized Representative — Date

Schedule MOD-001-1

Requirement and Sub-requirements:

R1. Each Transmission Operator shall select one of the methodologies listed below for calculating Available Transfer Capability (ATC) or Available Flowgate Capability (AFC) for each ATC Path per time period identified in R2 for those Facilities within its Transmission operating area:

- The Area Interchange Methodology, as described in MOD-028
- The Rated System Path Methodology, as described in MOD-029
- The Flowgate Methodology, as described in MOD-030

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule MOD-001-1

Requirement and Sub-requirements:

R6. When calculating Total Transfer Capability (TTC) or Total Flowgate Capability (TFC) the Transmission Operator shall use assumptions no more limiting than those used in the planning of operations for the corresponding time period studied, providing such planning of operations has been performed for that time period.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒ CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

JMS _____ 3/31/11
CAISO
Authorized Representative
Date

_____ 3-24-11
TE
Authorized Representative
Date

Schedule MOD-029-1

Requirement and Sub-requirements:

R1. When calculating TTCs for ATC Paths, the Transmission Operator shall use a Transmission model which satisfies the following requirements:
R1.1. The model utilizes data and assumptions consistent with the time period being studied and that meets the following criteria:
R1.1.1. Includes at least:
R1.1.1.1. The Transmission Operator area. Equivalent representation of radial lines and facilities 161kV or below is allowed.
R1.1.1.2. All Transmission Operator areas contiguous with its own Transmission Operator area. (Equivalent representation is allowed.)
R1.1.1.3. Any other Transmission Operator area linked to the Transmission Operator's area by joint operating agreement. (Equivalent representation is allowed.)
R1.1.2. Models all system Elements as in-service for the assumed initial conditions.
R1.1.3. Models all generation (may be either a single generator or multiple generators) that is greater than 20 MVA at the point of interconnection in the studied area.
R1.1.4. Models phase shifters in non-regulating mode, unless otherwise specified in the Available Transfer Capability Implementation Document (ATCID).
R1.1.5. Uses Load forecast by Balancing Authority.
R1.1.6 Uses Transmission Facility additions and retirements.
R1.1.7. Uses Generation Facility additions and retirements.
R1.1.8. Uses Special Protection System (SPS) models where currently existing or projected for implementation within the studied time horizon.
R1.1.9. Models series compensation for each line at the expected operating level unless specified otherwise in the ATCID.
R1.1.10. Includes any other modeling requirements or criteria specified in the ATCID.
R1.2. Uses Facility Ratings as provided by the Transmission Owner and Generator Owner

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this requirement

DELEGATED TASKS

Schedule MOD-029-1

Requirement and Sub-requirements:

R2. The Transmission Operator shall use the following process to determine TTC:

R2.1. Except where otherwise specified within MOD-029-1, adjust base case generation and Load levels within the updated power flow model to determine the TTC (maximum flow or reliability limit) that can be simulated on the ATC Path while at the same time satisfying all planning criteria contingencies as follows:

R2.1.1. When modeling normal conditions, all Transmission Elements will be modeled at or below 100% of their continuous rating.

R2.1.2. When modeling contingencies the system shall demonstrate transient, dynamic and voltage stability, with no Transmission Element modeled above its Emergency Rating.

R2.1.3. Uncontrolled separation shall not occur.

R2.2. Where it is impossible to actually simulate a reliability-limited flow in a direction counter to prevailing flows (on an alternating current Transmission line), set the TTC for the non-prevailing direction equal to the TTC in the prevailing direction. If the TTC in the prevailing flow direction is dependant on a Special Protection System (SPS), set the TTC for the non-prevailing flow direction equal to the greater of the maximum flow that can be simulated in the non-prevailing flow direction or the maximum TTC that can be achieved in the prevailing flow direction without use of a SPS.

R2.3. For an ATC Path whose capacity is limited by contract, set TTC on the ATC Path at the lesser of the maximum allowable contract capacity or the reliability limit as determined by R2.1.

R2.4. For an ATC Path whose TTC varies due to simultaneous interaction with one or more other paths, develop a nomogram describing the interaction of the paths and the resulting TTC under specified conditions.

R2.5. The Transmission Operator shall identify when the TTC for the ATC Path being studied has an adverse impact on the TTC value of any existing path. Do this by modeling the flow on the path being studied at its proposed new TTC level simultaneous with the flow on the existing path at its TTC level while at the same time honoring the reliability criteria outlined in R2.1. The Transmission Operator shall include the resolution of this adverse impact in its study report for the ATC Path.

R2.6. Where multiple ownership of Transmission rights exists on an ATC Path, allocate TTC of that ATC Path in accordance with the contractual agreement made by the multiple owners of that ATC Path.

R2.7. For ATC Paths whose path rating, adjusted for seasonal variance, was established, known and used in operation since January 1, 1994, and no action has been taken to have the path rated using a different method, set the TTC at that previously established amount.

R2.8. Create a study report that describes the steps above that were undertaken (R2.1 – R2.7), including the contingencies and assumptions used, when determining the TTC and the results of the study. Where three phase fault damping is used to determine stability limits, that report shall also identify the percent used and include justification for use unless specified otherwise in the ATCID.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this requirement

DELEGATED TASKS

Schedule MOD-029-1

Requirement and Sub-requirements:

R3. Each Transmission Operator shall establish the TTC at the lesser of the value calculated in R2 or any System Operating Limit (SOL) for that ATC Path.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this requirement

DELEGATED TASKS

Schedule MOD-029-1

Requirement and Sub-requirements:

R4. Within seven calendar days of the finalization of the study report, the Transmission Operator shall make available to the Transmission Service Provider of the ATC Path, the most current value for TTC and the TTC study report documenting the assumptions used and steps taken in determining the current value for TTC for that ATC Path.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

JMS _____ 3/31/11
CAISO
Authorized Representative
Date

_____ 3-24-11
TE
Authorized Representative
Date

NUC-001-2

Requirement and Sub-requirements:

R2. The Nuclear Plant Generator Operator and the applicable Transmission Entities shall have in effect one or more Agreements that include mutually agreed to NPIRs and document how the Nuclear Plant Generator Operator and the applicable Transmission Entities shall address and implement these NPIRs.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will document how it addresses and implements its delegated tasks under the NPIRs and provide that documentation to CAISO in compliance with this requirement.

NUC-001-2

Requirement and Sub-requirements:

R4. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities shall:
R4.1. Incorporate the NPIRs into their operating analyses of the electric system.
R4.2. Operate the electric system to meet the NPIRs.
R4.3. Inform the Nuclear Plant Generator Operator when the ability to assess the operation of the electric system affecting NPIRs is lost.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall incorporate the steady state NPIRs into the operating analyses of its electric system.

NUC-001-2

Requirement and Sub-requirements:

R6. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities and the Nuclear Plant Generator Operator shall coordinate outages and maintenance activities which affect the NPIRs.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

Per the Agreements developed in accordance with this standard, the TE shall coordinate its outages and maintenance activities which affect the NPIRs with the CAISO.

NUC-001-2

Requirement and Sub-requirements:

R8. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities shall inform the Nuclear Plant Generator Operator of actual or proposed changes to electric system design, configuration, operations, limits, protection systems, or capabilities that may impact the ability of the electric system to meet the NPIRs.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

Per the Agreements developed in accordance with this standard, the TE shall inform the CAISO of its actual or proposed changes to its electric system design, configuration, operations, limits, protection systems, or capabilities that may impact the ability of the electric system to meet the NPIRs.

NUC-001-2

Requirement and Sub-requirements:

R9. The Nuclear Plant Generator Operator and the applicable Transmission Entities shall include, as a minimum, the following elements within the agreement(s) identified in R2.
R9.1. Administrative elements:
R9.1.1. Definitions of key terms used in the agreement.
R9.1.2. Names of the responsible entities, organizational relationships, and responsibilities related to the NPIRs.
R9.1.3. A requirement to review the agreement(s) at least every three years.
R9.1.4. A dispute resolution mechanism.
R9.2. Technical requirements and analysis:
R9.2.1. Identification of parameters, limits, configurations, and operating scenarios included in the NPIRs and, as applicable, procedures for providing any specific data not provided within the agreement.
R9.2.2. Identification of facilities, components, and configuration restrictions that are essential for meeting the NPIRs.
R9.2.3. Types of planning and operational analyses performed specifically to support the NPIRs, including the frequency of studies and types of Contingencies and scenarios required.
R9.3. Operations and maintenance coordination:
R9.3.1. Designation of ownership of electrical facilities at the interface between the electric system and the nuclear plant and responsibilities for operational control coordination and maintenance of these facilities.
R9.3.2. Identification of any maintenance requirements for equipment not owned or controlled by the Nuclear Plant Generator Operator that are necessary to meet the NPIRs.
R9.3.3. Coordination of testing, calibration and maintenance of on-site and off-site power supply systems and related components.
R9.3.4. Provisions to address mitigating actions needed to avoid violating NPIRs and to address periods when responsible Transmission Entity loses the ability to assess the capability of the electric system to meet the NPIRs. These provisions shall include responsibility to notify the Nuclear Plant Generator Operator within a specified time frame.
R9.3.5. Provision for considering, within the restoration process, the requirements and urgency of a nuclear plant that has lost all off-site and on-site AC power.
R9.3.6. Coordination of physical and cyber security protection of the Bulk Electric System at the nuclear plant interface to ensure each asset is covered under at least one entity's plan.
R9.3.7. Coordination of the NPIRs with transmission system Special Protection Systems and underfrequency and undervoltage load shedding programs.

R9.4. Communications and training:
R9.4.1. Provisions for communications between the Nuclear Plant Generator Operator and Transmission Entities, including communications protocols, notification time requirements, and definitions of terms.
R9.4.2. Provisions for coordination during an off-normal or emergency event affecting the NPIRs, including the need to provide timely information explaining the event, an estimate of when the system will be returned to a normal state, and the actual time the system is returned to normal.
R9.4.3. Provisions for coordinating investigations of causes of unplanned events affecting the NPIRs and developing solutions to minimize future risk of such events.
R9.4.4. Provisions for supplying information necessary to report to government agencies, as related to NPIRs.
R9.4.5. Provisions for personnel training, as related to NPIRs.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

R9.2.1. The TE shall provide the CAISO with specific data relating to identification of parameters, limits, configurations, and operating scenarios included in the NPIRs, that it has, that are not yet provided for in the agreement(s) identified in R2.

R9.2.2. The TE shall provide the CAISO with Identification of facilities, components, and configuration restrictions for its system that are essential for meeting the NPIRs.

R9.2.3. The TE shall provide the CAISO the types of operational analyses performed for its system specifically to support the NPIRs, including the frequency of studies and types of Contingencies and scenarios required.

R9.3.1. Pursuant to the agreements identified in R2 (as they may be amended from time to time) the TE shall provide the CAISO with the designation of ownership of electrical facilities at the interface between the electric system and the nuclear plant and responsibilities for operational control coordination and maintenance of these facilities.

R9.3.2. Pursuant to the agreements identified in R2 (as they may be amended from time to time) the TE shall provide the CAISO with the identification of any maintenance requirements for its equipment not owned or controlled by the Nuclear Plant Generator Operator that are necessary to meet the NPIRs.

R9.3.3. The TE shall coordinate testing, calibration and maintenance of its off-site power supply systems and related components with the CAISO.

R9.3.4. The TE shall provide the CAISO with its provisions to address mitigating actions needed to avoid violating NPIRs. The TE shall notify the CAISO when it loses the ability to assess the capability of its electric system to meet the NPIRs.

R9.3.5. The TE shall include within its restoration plan a provision for considering, within the restoration process, the requirements and urgency of a nuclear plant that has lost all off-site and on-site AC power.

R9.4.1. Pursuant to the agreements identified in R2 (as they may be amended from time to time), the TE shall have provisions in place for communications with the Nuclear Plant Generator Operator, including communications protocols, notification time requirements, and definitions of terms.

R9.4.2. The TE shall coordinate with the CAISO during an off-normal or emergency event affecting the NPIRs, provide timely information explaining the event, an estimate of when the system will be returned to a normal state, and the actual time the system is returned to normal.

CAISO Authorized Representative	03/30/10 Date
TE Authorized Representative	3-29-10 Date

Schedule PER-001-0

Requirement and Sub-requirements:

R1. Each Transmission Operator and Balancing Authority shall provide operating personnel with the responsibility and authority to implement real-time actions to ensure the stable and reliable operation of the Bulk Electric System.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will provide its operating personnel with the responsibility and authority to implement real time actions to ensure the stable and reliable operation of its transmission system.

Schedule PER-002-0

Requirement and Sub-requirements:

R1. Each Transmission Operator and Balancing Authority shall be staffed with adequately trained operating personnel.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule PER-002-0

Requirement and Sub-requirements:

R2. Each Transmission Operator and Balancing Authority shall have a training program for all operating personnel that are in: R2.1. Positions that have the primary responsibility, either directly or through communications with others, for the real-time operation of the interconnected Bulk Electric System. R.2.2. Positions directly responsible for complying with NERC standards.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule PER-002-0

Requirement and Sub-requirements:

R3. For personnel identified in Requirement R2, the Transmission Operator and Balancing Authority shall provide a training program meeting the following criteria:
R3.1. A set of training program objectives must be defined, based on NERC and Regional Reliability Organization standards, entity operating procedures, and applicable regulatory requirements. These objectives shall reference the knowledge and competencies needed to apply those standards, procedures, and requirements to normal, emergency, and restoration conditions for the Transmission Operator and Balancing Authority operating positions.
R3.2. The training program must include a plan for the initial and continuing training of Transmission Operator and Balancing Authority operating personnel. That plan shall address knowledge and competencies required for reliable system operations.
R3.3. The training program must include training time for all Transmission Operator and Balancing Authority operating personnel to ensure their operating proficiency.
R3.4. Training staff must be identified, and the staff must be competent in both knowledge of system operations and instructional capabilities.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule PER-002-2

Nancy A. Saracek — 9-30-11

CAISO
Authorized Representative — Date

[signature] — 9-29-11

TE
Authorized Representative — Date

Schedule PER-003-0

Requirement and Sub-requirements:

R1. Each Transmission Operator, Balancing Authority, and Reliability Coordinator shall staff all operating positions that meet both of the following criteria with personnel that are NERC-certified for the applicable functions:
R1.1. Positions that have the primary responsibility, either directly or through communications with others, for the real-time operation of the interconnected Bulk Electric System.
R1.2. Positions directly responsible for complying with NERC standards.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule PER-005-1

Requirement and Sub-requirements:

R3. At least every 12 months each Reliability Coordinator, Balancing Authority and Transmission Operator shall provide each of its System Operators with at least 32 hours of emergency operations training applicable to its organization that reflects emergency operations topics, which includes system restoration using drills, exercises or other training required to maintain qualified personnel.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☐None for this standard

DELEGATED TASKS

Each party shall be separately and wholly responsible for compliance with this requirement.

CAISO
Authorized Representative — Date: 3/31/11

TE
Authorized Representative — Date: 3-29-11

Schedule PRC-001-1

Requirement and Sub-requirements:

R1. Each Transmission Operator, Balancing Authority, and Generator Operator shall be familiar with the purpose and limitations of protection system schemes applied in its area.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE is responsible for compliance with R1 for its transmission system.

Schedule PRC-001-1

Requirement and Sub-requirements:

R2 . Each Generator Operator and Transmission Operator shall notify reliability entities of relay or equipment failures as follows:
R2.2. If a protective relay or equipment failure reduces system reliability, the Transmission Operator shall notify its Reliability Coordinator and affected Transmission Operators and Balancing Authorities. The Transmission Operator shall take corrective action as soon as possible.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will notify the CAISO of any relay or equipment failure that reduces system reliability. The TE will repair the relay or equipment failures as soon as possible and notify the CAISO when the repairs are complete.

Schedule PRC-001-1

Requirement and Sub-requirements:

R3. A Generator Operator or Transmission Operator shall coordinate new protective systems and changes as follows. R3.2. Each Transmission Operator shall coordinate all new protective systems and all protective system changes with neighboring Transmission Operators and Balancing Authorities.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule PRC-001-1

Requirement and Sub-requirements:

R4. Each Transmission Operator shall coordinate protection systems on major transmission lines and interconnections with neighboring Generator Operators, Transmission Operators, and Balancing Authorities.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule PRC-001-1

Requirement and Sub-requirements:

R5. A Generator Operator or Transmission Operator shall coordinate changes in generation, transmission, load or operating conditions that could require changes in the protection systems of others:
R5.2. Each Transmission Operator shall notify neighboring Transmission Operators in advance of changes in generation, transmission, load, or operating conditions that could require changes in the other Transmission Operators' protection systems.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall coordinate changes in generation, transmission, load or operating conditions for its system that could require changes in the protection systems of others as required for the planning timeframe. For real time or near real time conditions, the coordination responsibility remains at the CAISO.

Schedule PRC-001-1

Requirement and Sub-requirements:

R6. Each Transmission Operator and Balancing Authority shall monitor the status of each Special Protection System in their area, and shall notify affected Transmission Operators and Balancing Authorities of each change in status.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will monitor the Special Protection Systems in its area and notify the CAISO of each change in status.

Schedule PRC-007-0

Requirement and Sub-requirements:

R2. The Transmission Owner, Transmission Operator, Distribution Provider, and Load-Serving Entity that owns or operates a UFLS program (as required by its Regional Reliability Organization) shall provide, and annually update, its underfrequency data as necessary for its Regional Reliability Organization to maintain and update a UFLS program database.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule PRC-009-0

Requirement and Sub-requirements:

R1. The Transmission Owner, Transmission Operator, Load-Serving Entity and Distribution Provider that owns or operates a UFLS program (as required by its Regional Reliability Organization) shall analyze and document its UFLS program performance in accordance with its Regional Reliability Organization's UFLS program. The analysis shall address the performance of UFLS equipment and program effectiveness following system events resulting in system frequency excursions below the initializing set points of the UFLS program. The analysis shall include, but not be limited to:
R1.1. A description of the event including initiating conditions.
R1.2. A review of the UFLS set points and tripping times.
R1.3. A simulation of the event.
R1.4. A summary of the findings.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule PRC-009-0

Requirement and Sub-requirements:

R2. The Transmission Owner, Transmission Operator, Load-Serving Entity, and Distribution Provider that owns or operates a UFLS program (as required by its Regional Reliability Organization) shall provide documentation of the analysis of the UFLS program to its Regional Reliability Organization and NERC on request 90 calendar days after the system event.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule PRC-010-0

Requirement and Sub-requirements:

R1. The Load-Serving Entity, Transmission Owner, Transmission Operator, and Distribution Provider that owns or operates a UVLS program shall periodically (at least every five years or as required by changes in system conditions) conduct and document an assessment of the effectiveness of the UVLS program. This assessment shall be conducted with the associated Transmission Planner(s) and Planning Authority(ies).
R1.1. This assessment shall include, but is not limited to:
R1.1.1. Coordination of the UVLS programs with other protection and control systems in the Region and with other Regional Reliability Organizations, as appropriate.
R1.1.2. Simulations that demonstrate that the UVLS programs performance is consistent with Reliability Standards TPL-001-0, TPL-002-0, TPL-003-0 and TPL-004-0.
R1.1.3. A review of the voltage set points and timing.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule PRC-010-0

Requirement and Sub-requirements:

R2. The Load-Serving Entity, Transmission Owner, Transmission Operator, and Distribution Provider that owns or operates a UVLS program shall provide documentation of its current UVLS program assessment to its Regional Reliability Organization and NERC on request (30 calendar days).

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule PRC-022-1

Requirement and Sub-requirements:

R1. Each Transmission Operator, Load-Serving Entity, and Distribution Provider that operates a UVLS program to mitigate the risk of voltage collapse or voltage instability in the BES shall analyze and document all UVLS operations and Misoperations. The analysis shall include:
R1.1. A description of the event including initiating conditions.
R1.2. A review of the UVLS set points and tripping times.
R1.3. A simulation of the event, if deemed appropriate by the Regional Reliability Organization. For most events, analysis of sequence of events may be sufficient and dynamic simulations may not be needed.
R1.4. A summary of the findings.
R1.5. For any Misoperation, a Corrective Action Plan to avoid future Misoperations of a similar nature.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule PRC-022-1

Requirement and Sub-requirements:

R2. Each Transmission Operator, Load-Serving Entity, and Distribution Provider that operates a UVLS program shall provide documentation of its analysis of UVLS program performance to its Regional Reliability Organization within 90 calendar days of a request.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule TOP-003-1

Requirement and Sub-requirements:

R1. Generator Operators and Transmission Operators shall provide planned outage information.
R1.1. Each Generator Operator shall provide outage information daily to its Transmission Operator for scheduled generator outages planned for the next day (any foreseen outage of a generator greater than 50 MW). The Transmission Operator shall establish the outage reporting requirements.
R1.2. Each Transmission Operator shall provide outage information daily to affected Balancing Authorities and Transmission Operators for scheduled generator and bulk transmission outages planned for the next day (any foreseen outage of a transmission line or transformer greater than 100 kV or generator greater than 50 MW) that may collectively cause or contribute to an SOL or IROL violation or a regional operating area limitation.
R1.3. Such information shall be available by 1200 Central Standard Time for the Eastern Interconnection and 1200 Pacific Standard Time for the Western Interconnection.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule TOP-003-1

Requirement and Sub-requirements:

R2. Each Transmission Operator, Balancing Authority, and Generator Operator shall plan and coordinate scheduled outages of system voltage regulating equipment, such as automatic voltage regulators on generators, supplementary excitation control, synchronous condensers, shunt and series capacitors, reactors, etc., among affected Balancing Authorities and Transmission Operators as required.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall request planned outages of TE system voltage regulating equipment with the CAISO.

Schedule TOP-003-1

Requirement and Sub-requirements:

R3. Each Transmission Operator, Balancing Authority, and Generator Operator shall plan and coordinate scheduled outages of telemetering and control equipment and associated communication channels between the affected areas.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒ CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☒ TE
☐ None for this standard

DELEGATED TASKS

The TE shall request planned outages of TE telemetry and control equipment with the CAISO.

Nancy A. Traweek — 9-30-11

CAISO
Authorized Representative — Date

9-29-11

TE
Authorized Representative — Date

Schedule TOP-004-2

Requirement and Sub-requirements:

R1. Each Transmission Operator shall operate within the Interconnection Reliability Operating Limits (IROLs) and System Operating Limits (SOLs).

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule TOP-004-2

Requirement and Sub-requirements:

R2. Each Transmission Operator shall operate so that instability, uncontrolled separation, or cascading outages will not occur as a result of the most severe single contingency.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule TOP-004-2

Requirement and Sub-requirements:

R3. Each Transmission Operator shall operate to protect against instability, uncontrolled separation, or cascading outages resulting from multiple outages, as specified by Reliability Coordinator.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule TOP-004-2

Requirement and Sub-requirements:

R4. If a Transmission Operator enters an unknown operating state (i.e. any state for which valid operating limits have not been determined), it will be considered to be in an emergency and shall restore operations to respect proven reliable power system limits within 30 minutes.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule TOP-004-2

Requirement and Sub-requirements:

R5. Each Transmission Operator shall make every effort to remain connected to the Interconnection. If the Transmission Operator determines that by remaining interconnected, it is in imminent danger of violating an IROL or SOL, the Transmission Operator may take such actions, as it deems necessary, to protect its area.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will always attempt to remain connected to the interconnection. If in the judgment of the TE, remaining interconnected puts it in imminent danger of violating an IROL or SOL, the TE may take such actions, as it deems necessary, to protect its area. If time permits, the TE will coordinate its action with the CAISO.

Schedule TOP-004-2

Requirement and Sub-requirements:

R6. Transmission Operators, individually and jointly with other Transmission Operators, shall develop, maintain, and implement formal policies and procedures to provide for transmission reliability. These policies and procedures shall address the execution and coordination of activities that impact inter- and intra-Regional reliability, including:
R6.1. Monitoring and controlling voltage levels and real and reactive power flows.
R6.2. Switching transmission elements.
R6.3. Planned outages of transmission elements.
R6.4. Responding to IROL and SOL violations.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE is responsible to develop operating procedures for its system that meet R6 and the sub-requirements below:
R6.1. Monitoring and controlling voltage levels and reactive power flows. Real power flows are the CAISO responsibility.
R6.2. Switching transmission elements.

Schedule TOP-004-2

CAISO Authorized Representative	10/1/09 Date
TE Authorized Representative	9-25-09 Date

Schedule TOP-006-2

Requirement and Sub-requirements:

R1. Each Transmission Operator and Balancing Authority shall know the status of all generation and transmission resources available for use.
R1.2. Each Transmission Operator and Balancing Authority shall inform the Reliability Coordinator and other affected Balancing Authorities and Transmission Operators of all generation and transmission resources available for use.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will know the status of the transmission resources in its system.

Schedule TOP-006-2

Requirement and Sub-requirements:

R2. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall monitor applicable transmission line status, real and reactive power flows, voltage, load-tap-changer settings, and status of rotating and static reactive resources.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will monitor the transmission resources in its system.

Schedule TOP-006-2

Requirement and Sub-requirements:

R3. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall provide appropriate technical information concerning protective relays to their operating personnel.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will provide appropriate technical information regarding protective relays to its operating personnel.

Schedule TOP-006-2

Requirement and Sub-requirements:

R4. Each Transmission Operator, and Balancing Authority shall have information, including weather forecasts and past load patterns, available to predict the system's near-term load pattern.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall have the information needed for near term load patterns and forecasting information for its system.

Schedule TOP-006-2

Requirement and Sub-requirements:

R5. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall use monitoring equipment to bring to the attention of operating personnel important deviations in operating conditions and to indicate, if appropriate, the need for corrective action.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall use the monitoring equipment required for compliance with R5 for its system.

Schedule TOP-006-2

Requirement and Sub-requirements:

R6. Each Balancing Authority and Transmission Operator shall use sufficient metering of suitable range, accuracy and sampling rate (if applicable) to ensure accurate and timely monitoring of operating conditions under both normal and emergency situations.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall have sufficient metering for monitoring operating conditions in its system under both normal and emergency situations.

Schedule TOP-006-2

Requirement and Sub-requirements:

R7. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall monitor system frequency.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall monitor system frequency from location(s) in its system.

Nancy A. Traweek — 9-30-11
CAISO Authorized Representative — Date

9-29-11
TE Authorized Representative — Date

Schedule TOP-007-0

Requirement and Sub-requirements:

R1. A Transmission Operator shall inform its Reliability Coordinator when an IROL or SOL has been exceeded and the actions being taken to return the system to within limits.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule TOP-007-0

Requirement and Sub-requirements:

R2. Following a Contingency or other event that results in an IROL violation, the Transmission Operator shall return its transmission system to within IROL as soon as possible, but not longer than 30 minutes.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule TOP-007-0

Requirement and Sub-requirements:

R3. A Transmission Operator shall take all appropriate actions up to and including shedding firm load, or directing the shedding of firm load, in order to comply with Requirement R 2.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule TOP-008-1

Requirement and Sub-requirements:

R1. The Transmission Operator experiencing or contributing to an IROL or SOL violation shall take immediate steps to relieve the condition, which may include shedding firm load.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall take action unilaterally to protect its equipment if there is insufficient time to coordinate with the CAISO.

Schedule TOP-008-1

Requirement and Sub-requirements:

R2. Each Transmission Operator shall operate to prevent the likelihood that a disturbance, action, or inaction will result in an IROL or SOL violation in its area or another area of the Interconnection. In instances where there is a difference in derived operating limits, the Transmission Operator shall always operate the Bulk Electric System to the most limiting parameter.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule TOP-008-1

Requirement and Sub-requirements:

R3. The Transmission Operator shall disconnect the affected facility if the overload on a transmission facility or abnormal voltage or reactive condition persists and equipment is endangered. In doing so, the Transmission Operator shall notify its Reliability Coordinator and all neighboring Transmission Operators impacted by the disconnection prior to switching, if time permits, otherwise, immediately thereafter.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall take action unilaterally to protect its equipment if there is insufficient time to coordinate with the CAISO. The TE shall notify the CAISO as soon as possible after to allow the CAISO to inform the WECC RC and affected BAs and TOPs.

Schedule TOP-008-1

Requirement and Sub-requirements:

R4. The Transmission Operator shall have sufficient information and analysis tools to determine the cause(s) of SOL violations. This analysis shall be conducted in all operating timeframes. The Transmission Operator shall use the results of these analyses to immediately mitigate the SOL violation.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

CAISO
Authorized Representative — Date: 10/1/09

TE
Authorized Representative — Date: 9-25-09

Schedule VAR-001-2

Requirement and Sub-requirements:

R1. Each Transmission Operator, individually and jointly with other Transmission Operators, shall ensure that formal policies and procedures are developed, maintained, and implemented for monitoring and controlling voltage levels and Mvar flows within their individual areas and with the areas of neighboring Transmission Operators.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall have local procedures for monitoring and controlling voltage levels and MVAR flows in its system and shall cooperate with the CAISO in the development of formal policies and procedures for monitoring and controlling voltage levels and Mvar flows with the areas of neighboring Transmission Operators.

Schedule VAR-001-2

Requirement and Sub-requirements:

R2. Each Transmission Operator shall acquire sufficient reactive resources – which may include, but is not limited to, reactive generation scheduling; transmission line and reactive resource switching; and controllable load - within its area to protect the voltage levels under normal and Contingency conditions. This includes the Transmission Operator's share of the reactive requirements of interconnecting transmission circuits.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall acquire static reactive reserves for its system.

Schedule VAR-001-2

Requirement and Sub-requirements:

R3. The Transmission Operator shall specify criteria that exempts generators from compliance with the requirements defined in Requirement 4, and Requirement 6.1. **R3.1.** Each Transmission Operator shall maintain a list of generators in its area that are exempt from following a voltage or Reactive Power schedule. **R3.2.** For each generator that is on this exemption list, the Transmission Operator shall notify the associated Generator Owner.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule VAR-001-2

Requirement and Sub-requirements:

R4. Each Transmission Operator shall specify a voltage or Reactive Power schedule at the interconnection between the generator facility and the Transmission Owner's facilities to be maintained by each generator. The Transmission Operator shall provide the voltage or Reactive Power schedule to the associated Generator Operator and direct the Generator Operator to comply with the schedule in automatic voltage control mode (AVR in service and controlling voltage). 1. The voltage schedule is a target voltage to be maintained within a tolerance band during a specified period.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule VAR-001-2

Requirement and Sub-requirements:

R6. The Transmission Operator shall know the status of all transmission Reactive Power resources, including the status of voltage regulators and power system stabilizers.
R6.1. When notified of the loss of an automatic voltage regulator control, the Transmission Operator shall direct the Generator Operator to maintain or change either its voltage schedule or its Reactive Power schedule.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall know the status of all static reactive devices in its system.

Upon notification of the loss of an automatic voltage regulator control by the CAISO or a Generator Operator, the TE shall direct the Generator Operator to maintain or change either its voltage schedule or its Reactive Power schedule.

Schedule VAR-001-2

Requirement and Sub-requirements:

R7. The Transmission Operator shall be able to operate or direct the operation of devices necessary to regulate transmission voltage and reactive flow.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall be able to operate or direct the operation of its static voltage control devices necessary to regulate the transmission voltage and reactive flow.

Schedule VAR-001-2

Requirement and Sub-requirements:

R8. Each Transmission Operator shall operate or direct the operation of capacitive and inductive reactive resources within its area – which may include, but is not limited to reactive generation scheduling; transmission line and reactive resource switching; controllable load; and, if necessary, load shedding – to maintain system and Interconnection voltages within established limits.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall operate static devices for voltage control in its system. The TE shall drop load unilaterally to prevent voltage collapse if there is insufficient time to coordinate with the CAISO first.

Schedule VAR-001-2

Requirement and Sub-requirements:

R9. Each Transmission Operator shall maintain reactive resources – which may include, but is not limited to, reactive generation scheduling; transmission line and reactive resource switching;, and controllable load - to support its voltage under first Contingency conditions.
R9.1. Each Transmission Operator shall disperse and locate the reactive resources so that the resources can be applied effectively and quickly when Contingencies occur.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall maintain sufficient dispersed static reactive resources in its system to support its voltage under first Contingency conditions to comply with R9 and its sub-requirement.

Schedule VAR-001-2

Requirement and Sub-requirements:

R10. Each Transmission Operator shall correct IROL or SOL violations resulting from reactive resource deficiencies (IROL violations must be corrected within 30 minutes) and complete the required IROL or SOL violation reporting.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule VAR-001-2

Requirement and Sub-requirements:

R11. After consultation with the Generator Owner regarding necessary step-up transformer tap changes, the Transmission Operator shall provide documentation to the Generator Owner specifying the required tap changes, a timeframe for making the changes, and technical justification for these changes.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☐ CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☒ None for this standard

DELEGATED TASKS

Schedule VAR-001-2

Requirement and Sub-requirements:

R12. The Transmission Operator shall direct corrective action, including load reduction, necessary to prevent voltage collapse when reactive resources are insufficient.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE shall coordinate with the CAISO the need for load reduction to prevent voltage collapse if there is sufficient time. If there is insufficient time to coordinate with the CAISO, the TE shall act unilaterally to prevent voltage collapse in its system.

Nancy A. Saracik — 9-30-11

CAISO
Authorized Representative — Date

9-29-11

TE
Authorized Representative — Date

Schedule PRC-004-WECC-1

Requirement and Sub-requirements:

R2.3.2. When FERAS is not available, then
R2.3.2.2. Transmission Operators shall adjust the SOL and operate the facilities within established limits.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☒TE
☐None for this standard

DELEGATED TASKS

The TE will notify the CAISO when FERAS is not available.

Nancy A. Hawrik — 9-30-11

CAISO
Authorized Representative

Date

[signature] — 9-29-11

TE
Authorized Representative

Date

Schedule TOP-007-WECC-1

Requirement and Sub-requirements:

R1. When the actual power flow exceeds an SOL for a Transmission path, the Transmission Operators shall take immediate action to reduce the actual power flow across the path such that at no time shall the power flow for the Transmission path exceed the SOL for more than 30 minutes.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

Schedule TOP-007-WECC-1

Requirement and Sub-requirements:

R2. The Transmission Operator shall not have the Net Scheduled Interchange for power flow over an interconnection or Transmission path above the path's SOL when the Transmission Operator implements its real-time schedules for the next hour. For paths internal to a Transmission Operator Area that are not scheduled, this requirement does not apply.
R2.1. If the path SOL decreases within 20 minutes before the start of the hour, the Transmission Operator shall adjust the Net Scheduled Interchange within 30 minutes to the new SOL value. Net Scheduled Interchange exceeding the new SOL during this 30-minute period will not be a violation of R2.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☐ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☒None for this standard

DELEGATED TASKS

CAISO
Authorized Representative — 6/30/11 Date

TE
Authorized Representative — 6-27-11 Date

The entity responsible for performing the Delegated Tasks set forth below:

☐ CAISO
☐ TE
☐ None for this standard

DELEGATED TASKS

Each party is separately and wholly responsible for compliance with this standard to the extent it operates a synchronous condenser(s).

Schedule VAR-002-WECC-1

Requirement and Sub-requirements:

R2. Generator Operators and Transmission Operators shall have documentation identifying the number of hours excluded for each requirement in R1.1 through R1.10.

RESPONSIBLE ENTITY

The entity responsible for Compliance, including Compliance Audits, for this requirement and any sub-requirements is:

☒CAISO
☒ TE

SUPPORTING ENTITY

The entity responsible for performing the Delegated Tasks set forth below:

☐CAISO
☐TE
☐None for this standard

DELEGATED TASKS

Each party is separately and wholly responsible for compliance with this standard to the extent it operates a synchronous condenser(s).

CAISO
Authorized Representative

6/30/11
Date

TE
Authorized Representative

6-27-11
Date

Schedule Matrix

		Responsible Entity	
Standard	Requirement	CAISO	TE
BAL-005-0.1b	R1	X	
CIP-001-2	R1		X
	R2		X
	R3		X
	R4		X
CIP-002-3	R1		X
	R2		X
	R3		X
	R4		X
CIP-003-3	R1		X
	R2		X
	R3		X
	R4		X
	R5		X
	R6		X
CIP-004-3	R1		X
	R2		X
	R3		X
	R4		X
CIP-005-3	R1		X
	R2		X
	R3		X
	R4		X
	R5		X
CIP-006-3	R1		X
	R2		X
	R3		X
	R4		X
	R5		X
	R6		X
	R7		X
	R8		X
CIP-007-3	R1		X
	R2		X

Schedule Matrix

		Responsible Entity	
Standard	Requirement	CAISO	TE
	R3		X
	R4		X
	R5		X
	R6		X
	R7		X
	R8		X
	R9		X
CIP-008-3	R1		X
	R2		X
CIP-009-3	R1		X
	R2		X
	R3		X
	R4		X
	R5		X
COM-001-1.1	R1	X	
	R2	X	
	R3	X	
	R4	X	
	R5	X	
COM-002-2	R1	X	
	R2		X
EOP-001-0	R2	X	
	R3	X	
	R4	X	
	R5	X	
	R6	X	
	R7	X	
EOP-003-1	R1	X	
	R2		X
	R3	X	
	R4		X
	R5	X	
	R6	X	
	R7		X
	R8	X	
EOP-004-1	R2	X	

Schedule Matrix

		Responsible Entity	
Standard	Requirement	CAISO	TE
	R3	X	
EOP-005-1	R1	X	
	R2	X	
	R3	X	
	R4	X	
	R5	X	
	R6	X	
	R7	X	
	R8	X	
	R9	X	
	R10	X	
	R11	X	
EOP-008-0	R1	X	
FAC-014-2	R2	X	
	R5	X	
INT-004-2	R1	X	
IRO-001-1.1	R8	X	
IRO-002-2	R2	X	
IRO-004-2	R1	X	
IRO-005-3	R5	X	
	R9	X	
	R10	X	
IRO-010-1	R3	X	
MOD-001-1	R1	X	
	R6	X	
MOD-029-1	R1	X	
	R2	X	
	R3	X	
	R4	X	
NUC-001-2	R2	X	

Schedule Matrix

		Responsible Entity	
Standard	Requirement	CAISO	TE
	R4	X	
	R6	X	
	R8	X	
	R9	X	
PER-001-0	R1	X	
PER-002-0	R1		X
	R2		X
	R3		X
PER-003-0	R1		X
PER-005-1	R3	X	X
PRC-001-1	R1	X	
	R2	X	
	R3		X
	R4		X
	R5	X	
	R6	X	
PRC-007-0	R2		X
PRC-009-0	R1		X
	R2		X
PRC-010-0	R1		X
	R2		X
PRC-022-1	R1		X
	R2		X
TOP-001-1	R1	X	
	R2	X	
	R3	X	
	R5	X	
	R6	X	
	R7	X	
	R8	X	
TOP-002-2	R1	X	

Schedule Matrix

		Responsible Entity	
Standard	Requirement	CAISO	TE
	R2	X	
	R4	X	
	R5	X	
	R6	X	
	R10	X	
	R11	X	
	R16	X	
	R17	X	
	R18	X	
	R19	X	
TOP-003-1	R1	X	
	R2	X	
	R3	X	
TOP-004-2	R1	X	
	R2	X	
	R3	X	
	R4	X	
	R5	X	
	R6	X	
TOP-005-2	R2	X	
TOP-006-2	R1	X	
	R2	X	
	R3	X	
	R4	X	
	R5	X	
	R6	X	
	R7	X	
TOP-007-0	R1	X	
	R2	X	
	R3	X	
TOP-008-1	R1	X	
	R2	X	
	R3	X	
	R4	X	
VAR-001-2	R1	X	

Schedule Matrix

		Responsible Entity	
Standard	Requirement	CAISO	TE
	R2	X	
	R3	X	
	R4		X
	R6	X	
	R7	X	
	R8	X	
	R9	X	
	R10	X	
	R11		X
	R12	X	
PRC-004-WECC-1	R2	X	
TOP-007-WECC-1	R1	X	
	R2	X	
VAR-002-WECC-1	R1	X	X
	R2	X	X

Nancy A. Saracino
CAISO
Authorized Representative

9-30-11
Date

TE
Authorized Representative

9-29-11
Date

Schedule Revision History

Version	Schedule	Change	Date
1.0	All Original	Original Schedule Developed	5/31/2007
1.1	Matrix	Matrix updated due to Schedule additions and revisions	10/19/2007
1.0	WECC-IRO-STD-006-0	New Schedule	10/19/2007
1.0	WECC-PRC-STD-001-1	New Schedule	10/19/2007
1.0	WECC-PRC-STD-003-1	New Schedule	10/19/2007
1.0	WECC-PRC-STD-005-1	New Schedule	10/19/2007
1.0	WECC-TOP-STD-007-0	New Schedule	10/19/2007
1.1	EOP-004-1	Revised R2 & R3.	10/19/2007
1.1	TOP-004-1	Updated to reflect new NERC Version.	10/19/2007
1.1	VAR-001-1	R6 revised and R7 added.	10/19/2007
1.1	INT-004-1	Deleted R2 and sub-requirements as non-applicable to TOP	11/14/2007
1.1	IRO-002-1	Deleted R4 as non-applicable to TOP	11/14/2007
1.1	TOP-002-2	Deleted R15 as non-applicable to TOP	11/14/2007
1.2	Matrix	Updated due to removing requirements not applicable to TOP	11/14/2007
1.0	CIP-002-1	New Schedule	9/29/2008
1.0	CIP-003-1	New Schedule	9/29/2008
1.0	CIP-004-1	New Schedule	9/29/2008
1.0	CIP-005-1	New Schedule	9/29/2008
1.0	CIP-006-1	New Schedule	9/29/2008
1.0	CIP-007-1	New Schedule	9/29/2008
1.0	CIP-008-1	New Schedule	9/29/2008
1.0	CIP-009-1	New Schedule	9/29/2008
1.0	FAC-014-1	New Schedule	9/29/2008
1.2	INT-004-2	Substituted INT-004-2 for INT-004-1	9/29/2008
1.1	BAL-005-0.1b	Substituted BAL-005-0.1b for BAL-005-0	9/8/2009
1.1	COM-001-1.1	Substituted COM-001-1.1 for COM-001-1	9/8/2009
1.1	FAC-014-2	Substituted FAC-014-2 for FAC-014-1	9/8/2009
1.1	IRO-001-1.1	Substituted IRO-001-1.1 for IRO-001-1	9/8/2009
1.1	PRC-STD-001-1	Updated Path Table	9/8/2009
1.1	TOP-001-1	Changed language from CMRC to WECC RC in R3 & R5	9/8/2009
1.2	TOP-004-2	Substituted TOP-004-2 for TOP-004-1	9/8/2009
1.1	TOP-005-1.1	Substituted TOP-005-1.1 for TOP-005-1	9/8/2009
1.1	TOP-008-1	Changed language from CMRC to WECC RC in R3	9/8/2009

Version	Schedule	Change	Date
1.0	NUC-001-2	New Schedule	3/26/2010
1.1	CIP-002-2	Substituted CIP-002-2 for CIP-002-1	7/21/2010
1.1	CIP-003-2	Substituted CIP-003-2 for CIP-003-1	7/21/2010
1.1	CIP-004-2	Substituted CIP-004-2 for CIP-004-1	7/21/2010
1.1	CIP-005-2	Substituted CIP-005-2 for CIP-005-1	7/21/2010
1.1	CIP-006-2	Substituted CIP-006-2 for CIP-006-1	7/21/2010
1.1	CIP-007-2	Substituted CIP-007-2 for CIP-007-1	7/21/2010
1.1	CIP-008-2	Substituted CIP-008-2 for CIP-008-1	7/21/2010
1.1	CIP-009-2	Substituted CIP-009-2 for CIP-009-1	7/21/2010
1.2	TOP-002-2	Changed language from CRMC to WECC RC in R17	7/21/2010
1.2	CIP-002-3	Substituted CIP-002-3 for CIP-002-2	1/27/2011
1.2	CIP-003-3	Substituted CIP-003-3 for CIP-003-2	1/27/2011
1.2	CIP-004-3	Substituted CIP-004-3 for CIP-004-2	1/27/2011
1.2	CIP-005-3	Substituted CIP-005-3 for CIP-005-2	1/27/2011
1.2	CIP-006-3	Substituted CIP-006-3 for CIP-006-2	1/27/2011
1.2	CIP-007-3	Substituted CIP-007-3 for CIP-007-2	1/27/2011
1.2	CIP-008-3	Substituted CIP-008-3 for CIP-008-2	1/27/2011
1.2	CIP-009-3	Substituted CIP-009-3 for CIP-009-2	1/27/2011
1.0	MOD-001-1	New Schedule	3/22/2011
1.0	MOD-029-1	New Schedule	3/22/2011
1.0	PER-005-1	New Schedule	3/28/2011
1.1	TOP-007-WECC-1	Substituted TOP-007-WECC-1 for TOP-STD-007-0	6/23/2011
1.0	VAR-002-WECC-1	New Schedule	6/23/2011
1.0	PRC-STD-005-1	Deleted Schedule. Replaced by FAC-501-WECC-1, not applicable to TOP	6/23/2011
1.0	IRO-STD-006-0	Deleted Schedule. Replaced by IRO-006-WECC-1, not applicable to TOP	6/23/2011
1.1	CIP-001-2	Substituted CIP-001-2 for CIP-001-1	9/28/2011
1.2	IRO-002-2	Substituted IRO-002-2 for IRO-002-1	9/28/2011
1.1	IRO-004-2	Substituted IRO-004-2 for IRO-004-1	9/28/2011
1.1	IRO-005-3	Substituted IRO-005-3a for IRO-005-2	9/28/2011
1.0	IRO-010-1	New Schedule	9/28/2011
1.1	PER-002-0	Deleted R4. R4 retired and replaced by PER-005-1 R3	9/28/2011
1.0	PRC-004-WECC-1	New Schedule	9/28/2011
1.1	PRC-STD-001-1	Deleted Schedule. Replaced by PRC-004-WECC-1	9/28/2011
1.0	PRC-STD-003-1	Deleted Schedule. Replaced by PRC-004-WECC-1	9/28/2011
1.1	TOP-003-1	Substituted TOP-003-1 for TOP-003-0	9/28/2011
1.2	TOP-005-2	Substituted TOP-005-2 for TOP-005-1.1	9/28/2011
1.1	TOP-006-2	Substituted TOP-006-2 for TOP-006-1	9/28/2011
1.2	VAR-001-2	Substituted VAR-001-2 for VAR-001-1	9/28/2011

Nancy A. Saracino 9-30-11

CAISO
Authorized Representative

Date

9-29-11

TE
Authorized Representative

Date

DECLARATION OF SERVICE

I, Kerry Siekmann, declare that on, December 5, 2011, I served and filed copies of the attached Testimony, Exhibits, Witness List, TimeTable for Testimony & Rebuttal dated Dec. 5, 2011. The original document, filed with the Docket Unit or the Chief Counsel, as required by the applicable regulation, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[www.energy.ca.gov/sitingcases/carlsbad/ index.html].**

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(Check all that Apply)

For service to all other parties:

✓ Served electronically to all e-mail addresses on the Proof of Service list;

____ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses marked "hard copy required."

AND

For filing with the Docket Unit at the Energy Commission:

✓ by sending an original paper copy and one electronic copy, mailed with the U.S. Postal Service with first class postage thereon fully prepaid and e-mailed respectively, to the address below (preferred method); ***OR***

____ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 07-AFC-6
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

____ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
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mlevy@energy.state.ca.us

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Kerry Siekmann

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

APPLICATION FOR CERTIFICATION FOR THE *CARLSBAD ENERGY CENTER PROJECT*

Docket No. 07-AFC-6
PROOF OF SERVICE
(Revised 11/29/2011)

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