Application No.: _____

Exhibit No.: _____

Witness: Robert Sparks

Application of San Diego Gas & Electric Company (U902 E) for Authority to Enter into Purchase Power Tolling Agreements with Escondido Energy Center, Pio Pico Energy Center and Quail Brush Power	Application 11-05-023

TESTIMONY OF ROBERT SPARKS
ON BEHALF OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of San Diego Gas & Electric Company (U902 E) for Authority to Enter into Purchase Power Tolling Agreements with Escondido Energy Center, Pio Pico Energy Center and Quail Brush Power	Application 11-05-023

TESTIMONY OF ROBERT SPARKS
ON BEHALF OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

Q. What is your name and by whom are you employed?

A. My name is Robert Sparks. I am employed by the California Independent System Operator Corporation (ISO), 250 Outcropping Way, Folsom, California as Manager, Regional Transmission.

Q. Please describe your educational and professional background.

A. I am a licensed Professional Electrical Engineer in the State of California. I hold a Master of Science degree in Electrical Engineering from Purdue University, and a Bachelor of Science degree in Electrical Engineering from California State University, Sacramento.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to describe the San Diego area local capacity needs that the ISO has identified through its annual local capacity assessments and through its once through cooling study, both of which have been conducted as part of the ISO's 2011-2012 transmission planning process. These assessments help identify the minimum amount of resources within transmission constrained areas, including the San Diego local area, that must be available to support the reliable operation of

the transmission system. My testimony addresses the results of three separate studies on this issue. The first study is a 2012 local capacity that addresses local capacity needs for 2012 (the "2012 LCR study"). The second is a longer-term local capacity reliability study that addresses local capacity needs through 2016 (the "2016 LCR study"). The third is a study of local capacity needs in San Diego for 2021 based on transmission planning studies that the ISO conducted as part of its 2011/2012 transmission planning process in connection with different renewable generation resource portfolios, including the ISO's planning studies in connection with implementation of the State of California's policy on the use of ocean and estuarine water for power plant cooling (the OTC policy). This study is typically referred to as the once-through cooling or 'OTC" study. In addition to these studies, I will address a sensitivity study the ISO conducted to assess certain transmission-related impacts of the Pio Pico and Quail Brush resources that SDG&E proposes to procure to address capacity needs in San Diego.

For each of these studies, I will address the preliminary transmission planning study results that were presented at the December 8, 2011 ISO stakeholder meeting and described in the January 18, 2012 Ruling in this proceeding. Additional details about these studies can be found in the draft 2011-2012 Transmission Plan at http://www.caiso.com/Documents/Draft2011_2012TransmissionPlan.pdf and the 2016 Local Capacity Technical Analysis dated January 30, 2012 (2016 LCR study) at http://www.caiso.com/Documents/Final2016LCTStudyReportJan30_2012.pdf.

Q. Have you provided information about local capacity needs in San Diego before any other agencies?

A. Yes. I addressed these issues before the California Energy Commission (CEC) in Docket 07-AFC-06, the Carlsbad Energy Center permitting proceeding on December 12, 2011. My testimony can be found at

http://www.energy.ca.gov/sitingcases/carlsbad/documents/others/2011-08-12_ISO_Robert_Sparks_Testimony.pdf. At that time the ISO had not yet completed its 2011-2012 Transmission Plan, including the OTC studies and the 2016 LCR study.

Q. Do the updated study results and the conclusions that can be drawn from those results differ from the testimony you presented before the CEC?

A. No, not substantially. As I explained in the CEC testimony, the ISO's 2015 LCR study reflected a need for generation in a new Encina local capacity sub-area starting in 2015. The ISO study identified existing units at the Encina Power Station as the qualifying capacity to fulfill this need. I concluded that absent the Carlsbad Energy Center Project, or some comparable project, the ISO would likely need one or more of the units at the Encina Power Station site to continue to operate beyond December 31, 2017 (the final compliance date for the facility in the OTC policy) while additional infrastructure is planned, financed and constructed. As discussed below, the recently completed 2016 LCR and OTC studies, as well as the 2021 RPS studies discussed in Mr. Rothleder's testimony, support the same conclusion.

Q. Please describe the 2012 and 2016 LCR studies.

A. A local capacity technical study determines the minimum amount of resources within a local capacity area needed to address reliability concerns following the occurrence of various contingencies on the electric system. The contingencies that are studied are identified in the ISO's federally-approved tariff and applicable reliability standards adopted by the North American Electric Reliability Corporation and Western Electricity Coordinating Council. Among other parameters, the study requires that the ISO plan for contingencies such as the loss of transmission facilities while local generation is out of service. This planning approach ensures

that the ISO can contain potentially widespread and serious system impacts that might otherwise result from the loss of transmission and generation facilities.

A local capacity area is a geographic area that does not have sufficient transmission import capability to serve the customer demand in the area without the operation of generation located within that area. There must be sufficient generation in that area available for ISO operators serve load in the area under stressed system conditions such as during high demand periods; during outages of up to two transmission lines used to import power into the area; during outages of up to two local generating units; and during outages of one generating unit and one transmission line.

Each year the ISO performs a local capacity technical study for the purposes of providing information for resource adequacy procurement. The 2012 LCR study was performed last year. In addition to this annual, year-ahead LCR study, the ISO performs a long-term LCR study as part of the transmission planning cycle. As I noted above, the 2016 LCR study was posted on January 31, 2012.

Q. What did these studies show about local resource needs in San Diego local capacity area and in the Encina sub-area?

A. The 2012 LCR study identifies capacity needs in the San Diego local capacity area and identifies existing units at the Encina Power Station as qualifying capacity to fulfill this need. The 2016 LCR study finds that, for 2016, the most critical contingency for the Encina sub-area of the San Diego local capacity area is the loss of Encina 230/138 kV transformer followed by the loss of the Sycamore-Santee 138 kV line which could thermally overload the Sycamore-Chicarita 138 kV line. This limiting contingency event establishes a local capacity need of 150 MW as the minimum capacity necessary for reliable load serving capability in the sub-area. The 2016 LCR study finds that this local capacity need is fulfilled with the Encina generating units which provide 950 MWs of nameplate capacity. However,

SDG&E proposed a project in the 2011-2012 ISO Transmission Planning Process to reconductor the limiting segment of the Sycamore-Chicarita 138 kV line which would eliminate the need for local capacity in the Encina sub-area. Because Encina generation is expected to continue to be available through 2016 and because a repowering project is under development at Encina, the ISO assumed the Encina generation would be available for dispatch through 2016 in its reliability planning model and did not see a need to approve this reconductoring project at this point in time.

Q. Please describe the OTC study.

A. The OTC policy establishes uniform, technology-based standards to implement federal Clean Water Act section 316(b), which requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. Generating units at Encina Power Station must comply with this requirement by December 31, 2017. The ISO anticipates that the OTC policy will ultimately force the existing units at the Encina Power station to retire. The policy may also have an impact on the relicensing of units at San Onofre Nuclear Generating Station, which also serves to support imports of power into the San Diego local capacity area.

For purposes of the 2011-2012 transmission planning process, the ISO continued its collaborative study efforts with various state agencies and stakeholders. In 2010, with assistance from the CPUC and the CEC, the ISO posted a load and resources tool. The ISO used this tool to screen and identify potential time frames in which local resources are forecasted to be less than the projected resources needed to maintain local reliability under a range of resource scenarios. The ISO also performed technical evaluations using power flow and transient stability programs for various RPS scenarios (i.e., trajectory, environmentally constrained, ISO base case/ cost-constrained and time-constrained) to determine long-term (2021) local

capacity area requirements for areas that currently have OTC generating units. These areas include the San Diego area.

Q. How were the local capacity needs in San Diego assessed?

A. Using a 2021 case prepared for the analysis of LCR in the San Diego local area, the ISO performed a reliability assessment. The assessment determined the range of generation-including OTC generation- needed to maintain applicable LCR capability for the area under the four RPS portfolio scenarios. The ISO also performed a load and resource evaluation using the tool to determine which years would have a deficiency of resources for local capacity areas. For this effort, the ISO evaluated the unavailability of each affected generating unit based on the following: the compliance year for the unit as set forth in the SWRCB policy or the year the generator owner has identified in its implementations plans for the unit to come off-line to take steps to comply with the policy. The ISO evaluated the following mitigation measures on a high level in order to maintain zonal and local reliability: generation need; potential transmission mitigation measures; potential demand side management or other contracted resources such as combined heat and power.

Q. What were the OTC local capacity area study results for San Diego?

A. The local capacity needs for 2021 in the San Diego and Great San Diego and Imperial Valley areas are set forth in the table below:

LCR Area	Trajectory (MW)	Environmentally Constrained (MW)	ISO Base (MW)	Time- Constrained (MW)
San Diego	2,883** 2	,859**	2,900**	2,856**
IV – San Diego	3,291 3,	104	2,968	3,272
OTC Range*	531* - 950	231* - 650	231* - 650	421* - 840

*Lower OTC range value corresponds to the use of SDG&E-proposed generation included in the Long-Term Procurement Plan.

**Load curtailment of approximately 370 MW was simulated to achieve stability under G-1/N-2 contingency.

The first two rows present the total local area capacity needs for the San Diego and the Greater Imperial Valley-San Diego areas under each of the four RPS portfolio scenarios. The third row identifies ranges of the amount of currently existing OTC generation in the local area that would be needed under each of the RPS portfolio scenarios.

Q. Please explain why there is a range of OTC needs for each RPS scenario.

A. The lower end of the OTC range value corresponds to the use of SDG&E-proposed generation included in the Long-Term Procurement Plan, and the higher value does not include the SDG&E proposed generation.

Q. The ISO studies that you have described show that the local capacity needs in 2016 are being met by Encina generation but that in 2021 there is a need for substantial amounts of local generation in the San Diego area. When will the need for generation in this area arise?

A. It is likely that the OTC requirements will cause the Encina generating units, which use coastal waters for cooling, to retire or be re-powered by the end of 2017. As a

result, the need for additional generation resources is forecast to begin to arise in 2018. The CPUC should authorize SDG&E to procure sufficient generation in this area to meet local needs by no later than 2018. As shown in the above table, the need in the 2018 through 2021 time frame is approximately 650 MW to 950 MW. Assuming that the approximately 400 MW SDG&E-proposed generation included is authorized for procurement in this proceeding and completed, then this need is reduced to 231 MW to 531 MW.

Q. Please describe the most limiting contingencies in the San Diego and Greater Imperial Valley-San Diego areas that underlie these study results.

A. The most limiting contingency in the San Diego area is described by the outage of the 500 kV Sunrise Powerlink and Southwest Powerlink (SWPL) overlapping with an outage of the Otay Mesa combined-cycle power plant (603 MW). The limiting constraint for this contingency is the South of SONGS Separation Scheme. The ISO is working with the PTOs to investigate modifying this scheme and reducing the LCR needs by up to approximately 300 MW. The most limiting contingency in the Greater Imperial Valley-San Diego (IV-San Diego) area is described by the outage of 500 kV SWPL between Imperial Valley and N. Gila substations overlapping with an outage of the Otay Mesa combined-cycle power plant (603 MW), while staying within the South of San Onofre (WECC Path 44) non-simultaneous import capability rating of 2,500 MW. This constraint was binding in the Time Constrained scenario because it had 0 MW of renewable generation in the Imperial Valley area, and was not binding in the other three portfolios which each had at least 350 MW of renewable generation in the Imperial Valley area. This constraint required 210 MW of new generation in the Greater Imperial Valley-San Diego area in the Time Constrained scenario in 2021, but did not drive the need for new generation in this area in the other three scenarios.

Q. Are there any feasible transmission mitigation solutions that can meet the 650 MW to 950 MW need?

A. As described above, the constraint driving these needs is the transmission system limitations between the SCE and SDG&E systems south of SONGS. During studies of the Sunrise Powerlink, the ISO studied transmission options to increase the transmission capability between these two systems in order to further reduce local generation needs in San Diego. However, the scope of the upgrades needed to meet a 650 MW to 950 MW need was essentially a new 500 kV line connecting the SDG&E system to the SCE system. In addition, the reduction in generation available in the San Diego area was found to increase the generation needs in the Los Angeles area in order to mitigate constraints on the South of Lugo and Midway-Vincent Paths. The Los Angeles area is already expected to be a generation deficient area in 2021.

Q. What additional studies were performed by the ISO during the 2011-2012 transmission planning process?

A. An important aspect of the ISO's transmission planning process is to determine whether there is a need for transmission additions or upgrades to meet public policies established by the state of California or by federal law or directives. For the 2011-2012 planning cycle, the ISO evaluates the transmission network, once needed reliability projects have been identified, to determine whether additional transmission is needed to meet the 33% RPS goals established by state law. The ISO also conducts a deliverability study to evaluate the capacity of the system to deliver the generation in the renewable portfolios during summer peak load conditions, including imported renewable energy from outside the ISO area, to meet resource adequacy needs. The ISO's evaluation is based on renewable resource portfolios provided by the CPUC and further developed in an open stakeholder process. For the 2011-2012 planning cycle the CPUC proposed four renewable

generation scenarios, one of which (the cost constrained scenario) was studied as the ISO base case. A further description of the ISO scenarios and the RPS portfolio studies can be found at Chapter 4 of the 2011-2012 draft transmission plan.

To conduct the 33% RPS studies, the ISO conducts power flow and stability analyses for the PG&E, SCE and SDG&E areas in addition to the deliverability studies described above. A production cost simulation is performed after additional policy-driven needs, if any, are identified.

Q. Did the ISO consider the impacts of the SDG&E proposed generation that is the subject of this proceeding in connection with its 33% RPS evaluation?

A. Yes. In addition to the OTC study results provided above with and without this proposed generation, as part of the 33% RPS evaluation for the San Diego area, a deliverability sensitivity assessment was performed for minimum OTC generation. The sensitivity study assumed that Encina units 1-5 and the gas turbine are retired (964 MW total). Based on publicly available resource procurement information- the resources for which SDG&E is seeking PPA approval-300MW were added at Otay Mesa, and 100 MW were added at the Mission-Miguel 230 kV line to replace the retired generation. The sensitivity study found that the addition of this generation creates N-0 and N-1 violations in the Otay Mesa area, a reconfiguration project was also modeled to reconfigure TL23041, Otay Mesa-Miguel Tap-Sycamore 230 kV and TL23042, Otay Mesa-Miguel kV lines. The addition of generation at Otay Mesa also requires a modification of the existing Otay Mesa SPS to include generation tripping for N-1 outages of Otay Mesa-Miguel 230 kV lines.

The sensitivity study also identified an N-0 overload on Miguel-Bay Boulevard 230 kV line. The overload can be mitigated by stringing additional conductor on the currently empty side of the double circuit tower line to double the conductor capacity of the existing circuit.

The sensitivity study also identified an N-0 overload on Old Town-Penasquitos 230 kV line. This overload can be mitigated by reconductoring the line. It can also be mitigated by a transmission project submitted by SDG&E through the 2010 Request Window, which was not found to be needed at that time and was not approved. The project would reconfigure TL23013, Old Town-Penasquitos 230 kV and TL23028, Silvergate-Old Town-Mission 230 kV.

SDG&E's proposed reconfiguration project would also solve the N-1 overload on Doublet Tap-Friars 138 kV. Another way to mitigate this overload is to reconductor the line or to install an SPS to trip generation.

The sensitivity study also identified an overload on the Chicarita-Sycamore 138 kV line following the outage of Encina 230/138 kV transformer. This overload was not seen in the base portfolio deliverability assessment because it was mitigated by the dispatch of Encina generation. As described above, this overload can be mitigated by reconductoring the line.

The sensitivity study also identified an overload on Pomerado-Poway 69 kV line following an N-2 outage. The mitigation for this overload is to revise the scope of a previously approved transmission project to reconductor the line. The previously approved reconductoring increases the rating to 174 MVA, and mitigating the identified overload would require a rating of at least 180 MVA.

The sensitivity study also identified overloads on Poway-Rancho Carmel 69 kV, and Bernardo-Rancho Carmel 69 kV lines following an N-2 outage. This overload were also identified in the base portfolio deliverability study and the mitigations are the same as listed in that section.

The study also identified an overload on Silvergate-Old Town 230 kV line following an N-2 outage. The overload can be mitigated by reconductoring the line or installing an SPS to trip generation.

Because Encina can continue to operate as a once-through cooled power plant until 2017, there was no need to further consider any of the upgrades identified in this sensitivity study, in the 2011-2012 planning cycle.

Q. What do you conclude from the sensitivity study conducted in the transmission planning process?

A. The resources under consideration in this proceeding will require transmission upgrades to make the capacity fully deliverable to load, due to the location of these resources. Other proposed resources, such as the Carlsbad Energy Center, do not require similar transmission upgrades.

Q. Do the RPS scenarios analyzed in the OTC studies correspond with the RPS scenarios used by the ISO to determine the need for policy-driven transmission elements?

A. Yes. Information about the ISO's studies that analyze the need for additional transmission to meet the state's 33% RPS goals by 2020 can be found at Chapter 4 of the 2011-2012 draft transmission plan.

Q. How do the OTC RPS scenarios compare to the RPS scenarios used for the renewable integration studies?

A. Mr. Rothleder is providing testimony about the renewable integration studies, but it is my understanding that the three of the four CPUC scenarios analyzed by the ISO for the purposes of the LTPP proceeding are same portfolios that were used for the

ISOs 33% RPS studies and OTC studies. The fourth portfolio, the Cost Constrained portfolio, was updated in July 2011 to incorporate new stakeholder input. The original version of the Cost Constrained portfolio was used in the renewable integration studies and the updated version was used in the 33% RPS studies and in the OTC studies. Another difference is the renewable integration used a mid net load that included uncommitted demand side management (DSM) programs. For the ISO LTPP case, as well as the OTC and 33% RPS studies we used the CEC projected 1-in-10 load level without uncommitted DSM.

Q. Does the ISO have a recommendation as to whether the CPUC should authorize SDG&E to enter into power purchase agreements with the Pio Pico, Escondido and Quail Brush proposed generating units?

A. The ISO's studies have identified substantial local area resource needs in San Diego. It is important that resources be procured in the area as quickly as possible, and these units partially meet such needs. However, as long as flexible and deliverable thermal resources are made available in the San Diego area by the end of 2017, the ISO does not have a recommendation as to the specific units that should be procured by the LSEs. There are no viable transmission mitigation solutions that will meet these needs. I would also note that even with the procurement of the resources at issue in this proceeding, there are still local area needs.

Q. Does this conclude your testimony?

A. Yes, it does.