



FRONTLINES

FOREST RESIDENTS OPPOSING NEW TRANSMISSION LINES

February 22, 2019

The Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426
Electronic submittal of 31 pages

Subject: Comments by Forest Residents Opposing New Transmission Lines Regarding
the "Request for Additional Information and Comments on Study Plans"
Issued by the Commission to The Nevada Hydro Company

Reference: Commission Letter Dated January 22, 2019 in Docket P-14227

Dear Secretary Bose;

On January 22, 2019, the Federal Energy Regulatory Commission ("Commission") issued the referenced letter to The Nevada Hydro Company ("TNHC") requesting additional Information and providing comments on various "Study Plans" that TNHC has submitted in Docket P-14227 pursuant to the "Lake Elsinore Advanced Pumped Storage" ("LEAPS") hydro-electric project. LEAPS is a 500 MW pumped storage project that is proposed with two connections to the California transmission grid; one connection will be at a new substation lying south of LEAPS within the San Diego Gas & Electric ("SDGE") service territory, and the other connection will be at a second new substation lying north of LEAPS within the Southern California Edison ("SCE") territory. TNHC proposes to operate LEAPS with a "closed" transmission line interconnecting the SCE and SDGE service territories.

Forest Residents Opposing New Transmission Lines ("FRONTLINES") and other parties in the LEAPS proceeding have pointed out that constructing LEAPS with two "closed" grid connections will create a transmission interconnection between SDGE and SCE that will carry non-LEAPS power between SCE's and SDGE's systems. This issue is of fundamental importance because the Commission is unable to license facilities under the Federal

Powers Act ("FPA") if they will carry non-project power because they are not designated as "primary" to the project purpose. In other words, transmission facilities may not be licensed pursuant to the FPA if they serve a purpose beyond bringing project power to the grid. An interconnection that transfers power between the SCE and SDGE systems via substations operated by the California Independent System's Operator ("CAISO") would serve a transmission grid function and thus be beyond the Commission's hydroelectric licensing scope.

Correspondingly, and in regards to the LEAPS license, the Commission must know with absolute certainty that the facilities approved with the LEAPS license will carry only LEAPS power and not serve a transmission grid function by transferring non-LEAPS power (also referred to as "grid power") between SCE and SDGE. Recognizing this concern, the Commission has directed TNHC to prepare a study plan that sets forth the operating procedures that will be implemented to prevent the flow of non-LEAPS power through the proposed SCE/SDGE interconnection. According to TNHC, the transfer of non-LEAPS power between SCE and SDGE will be "limited" by three phase shifting transformers that will be installed at the new substation constructed in SDGE's territory¹. Notably, TNHC states that the phase shifters will merely *limit* the flow of non-LEAPS power on the proposed SDGE/SCE interconnect; TNHC does not state that the phase shifters will *prevent* the flow of non-LEAPS power. The distinction is important, because neither the phase shifters nor the "closed" interconnection between SCE and SDGE can be authorized with the LEAPS license if there is a possibility that these facilities will carry non-LEAPS power.

The information set forth below demonstrates that the phase shifters will neither prevent, prohibit, nor eliminate the flow of non-LEAPS power on the SDGE/SCE interconnection that TNHC proposes to construct as part of the LEAPS project; at best, the phase shifters will only *minimize* non-LEAPS power flows. This conclusion is based on a clear understanding of what phase shifters are and how they are used in transmission grid operations. It is also based on a comprehensive review of the testimony, statements, briefs, and written documentation that has been prepared by TNHC and others over the last 13+ years and filed with state and federal agencies including the Commission and the California Public Utilities Commission ("CPUC"). These documents (cited below and provided in links or attachments) reveal that the phase shifters and the SDGE/SCE interconnect are designed with a transmission capacity of 1,500+ MW; this is more than three times the power that LEAPS will ever produce even at *maximum* capacity. The documents also reveal that the real purpose of the phase shifters is to *facilitate* the transfer of non-LEAPS power between SDGE and SCE regardless of LEAPS operation, and that THNC expects to use them for this purpose *before* LEAPS construction is even completed.

¹ Page 1 of TNHC's "Study Plan 34b" submitted to the Commission October 17, 2018.

As discussed below, the phase shifters will not prevent non-LEAPS power flows on the "closed" SCE/SDGE transmission interconnect. Thus, the FPA prevents the Commission from approving either the "closed" SCE/SDGE interconnect or the phase shifters in the LEAPS license. Fortunately, this restriction will not impair TNHC's ability to bring all of LEAPS power to market because a single 230 kV connection to SDGE is sufficient to deliver 100% of LEAPS power to the grid². Indeed, because a 230-kV connection to SDGE is all that is necessary to deliver LEAPS power, it does not seem that either an SCE connection or an operating voltage of 500-kV can even be licensed under the FPA³.

The fact remains that there is only one way to configure LEAPS with two connections in a manner that avoids the transfer of non-LEAPS power between SDGE and SCE; this configuration is described below. Correspondingly, if the Commission does authorize two grid connections for LEAPS, then the facilities included in the LEAPS license must comport with the configuration set forth below.

CONFIGURING LEAPS WITH TWO CONNECTIONS TO AVOID TRANSFERS OF NON-LEAPS POWER

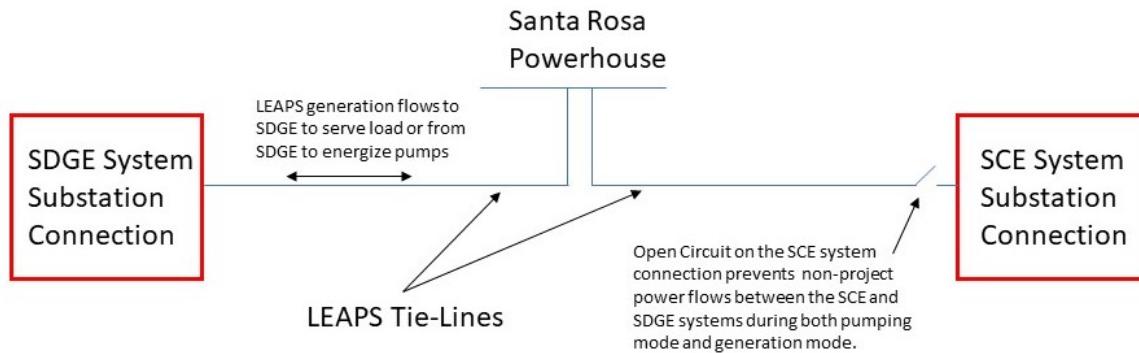
It is axiomatic that power does not flow on a transmission line if one end of the line is "open" because an "open" circuit does not permit power to flow. "Closing" and "opening" a transmission line is typically done with circuit breakers and switches; "open" circuit breakers prevent power flow and "closed" circuit breakers permit power flow. By extension, power will flow between two connection points when both connections are "closed" and it is inhibited when one connection is "opened". Accordingly, the only way to license LEAPS with two connections and prevent non-LEAPS power flows between these connections (as mandated by the FPA) is to require that at least one connection remain open at all times. This configuration will result in the following operating profiles:

² The Commission previously determined that LEAPS power can be delivered via a single 230-kV connection to SDGE; two connections are unnecessary [Pages B4-B6 of the 2007 LEAPS FEIS issued in Docket P-11858: <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11239494>]. In fact, the Commission concluded that, with both the SDGE and SCE connections, "the complete line would be able to carry non-project power" and would thus be impermissible per the FPA [Id. at B-5]

³ The Commission considers transmission facilities to be "primary" to the project (as that term is contemplated by the FPA) if they are necessary to get all of the project power to market [Id. at B-4]. Correspondingly, if only one 230-kV connection is needed to get all of LEAPS power to market, then only one 230-kV connection qualifies as a "primary" project facility. And, while a second LEAPS connection and a 500-kV transmission line may be desirable for TNHC, neither qualify as "primary" project facilities because neither are needed to deliver LEAPS power. Thus, the FPA prevents the Commission from licensing LEAPS with either the SCE connection or the 500-kV operating voltage level. To build these facilities, TNHC will have to pursue a different approval path.

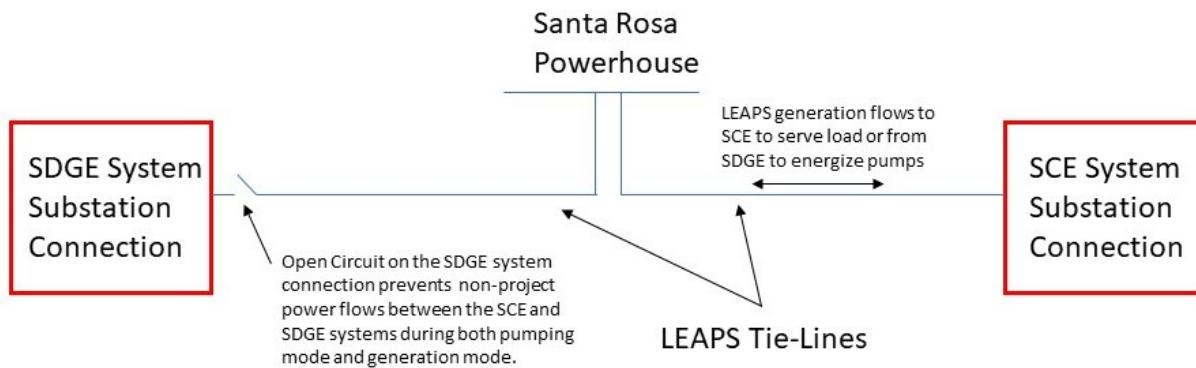
Transmitting Power to and From SDGE's System:

Closing the SDGE connection to LEAPS while maintaining the SCE connection in an open configuration will send LEAPS power to SDGE and provide LEAPS with power from SDGE to recharge the upper reservoir without transferring "grid" (non-LEAPS) power between SCE and SDGE.



Transmitting Power to and From SCE's System:

Closing the SCE connection to LEAPS while maintaining the SDGE connection in an open configuration will send LEAPS-generated power to SCE and provide LEAPS with power from SCE to recharge the upper reservoir without transferring "grid" (non-LEAPS) power between SCE and SDGE.



Configuring LEAPS with circuit breakers and switches to ensure that only one connection is "open" at any time guarantees that all facilities operate as "project primary" facilities which carry only LEAPS power. Unlike the LEAPS project configuration proposed by TNHC, this

"open" configuration properly complies with the FPA; it is also considerably cheaper because it does not include costly phase shifters.

PHASE SHIFTERS WILL NOT PREVENT THE FLOW OF NON-LEAPS POWER; IN FACT, THEY ARE INTENDED TO FACILITATE TRANSFERS OF GRID POWER BETWEEN SCE AND SDGE.

The primary use for a phase shifter is to control grid power transfers on a "closed" transmission path between two substations that serve parallel transmission systems; phase shifters are particularly useful during contingency events. For instance, CAISO recently approved the installation of two (2) phase shifting transformers to control grid power transfers between SDGE's 230-kV Imperial Valley substation and the 230-kV La Rosita substation operated by Comisión Federal de Electricidad (CFE)⁴. The SDGE system and the CFE system operate in parallel and have a "closed" transmission interconnection between the Imperial Valley and La Rosita substations. Correspondingly, a contingency event on SDGE's system will cause substantial increases in grid power flows on the "closed" transmission path connecting Imperial Valley with La Rosita. This creates an overload risk that can be eliminated in one of two ways, either: 1) terminate grid power transfers between SDGE and CFE by "opening" the transmission line at either Imperial Valley or La Rosita and thereby drop significant load on the SDGE system; or 2) Use phase shifters to maintain grid power flows below the thermal rating of the SDGE/CFE interconnection line between Imperial Valley and La Rosita, thereby enabling the 230-kV path to remain in service. CAISO approved the latter because it does not prevent or inhibit power transfers between CFE and SDGE, rather it facilitates such transfers and permits SDGE to continue serving load even during stressed (contingency) conditions.

The phase shifters proposed by TNHC as part of the "closed" SCE/SDGE interconnect will operate in a manner similar to the phase shifters approved by CAISO to limit grid transfers between the SDGE and CFE systems. Like the CAISO-approved phase shifters, TNHC's phase shifters will control non-LEAPS power flows (grid transfers) but **not** eliminate them. TNHC affirms this on page 2 of its "Study Plan" by clarifying that the phase shifters will only *minimize* the flow of non-LEAPS power between SDGE and SCE; TNHC does not state that the phase shifters will prevent or inhibit the flow of non-LEAPS power. This is because grid power transfers (whether between SDGE and CFE on the Imperial Valley/La Rosita interconnect or between SCE and SDGE on TNHC's proposed "closed" interconnect) are *not* terminated by phase shifters; they are only terminated by opening up one end of the interconnect.

⁴ Cook, Bill; Thompson, Michael J; Garg, Kamal; Malichkar, Milind; "Phase-Shifting Transformer Control and Protection Settings Verification". March 28, 2018; 71st Annual Conference for Protective Relay Engineers. http://prorelay.tamu.edu/wp-content/uploads/sites/3/2018/03/PhaseShiftingTransformer_6853_20180309.pdf

With this understanding, it becomes clear that the phase shifters identified in the LEAPS project scope are an essential element of the "closed" SCE/SDGE interconnection and are included to regulate the flow of non-LEAPS power between SCE and SDGE. In other words, it is TNHC's proposed "closed" transmission interconnect between the SCE and SDGE service territories which gives rise to the phase shifter element of the project scope; the phase shifters are neither necessary for, nor integral to, the LEAPS project itself. This fact was firmly established by TNHC in representations to the CPUC that the phase shifters are essential components of the SCE/SDGE interconnection, not LEAPS⁵. TNHC further stated that the LEAPS generation project is separate and distinct from the SCE/SDGE interconnect project and that these two stand-alone projects will have separate contractual arrangements, different financing and ownership interests, independent construction schedules, and will be constructed, operated, and maintained as separate and "stand-alone" activities⁶. TNHC's statements support FRONTLINES' threefold contention that all LEAPS power can be delivered to market without a "closed" SCE/SDGE interconnection, that the "closed" SCE/SDGE interconnect will rely on the phase shifters to transfer non-LEAPS power between SCE and SDGE, and that the phase shifters will play no role in delivering LEAPS power to the grid. Thus, neither the SCE/SDGE interconnect nor the phase shifters qualify as "project primary" facilities and they cannot be included in any LEAPS license.

Remarkably, TNHC's "Study Plan" materially misstates the truth and deliberately misleads the Commission and the public regarding the purpose of the phase shifters by stating that "both the Case Springs [SDGE] Substation and Alberhill [SCE] Substation ends of the Transmission line must be closed for the phase shifting transformers to ensure non-project power does not flow from Case Springs [SDGE] to Alberhill [SCE] (or from Alberhill [SCE] to Case Springs [SDGE])"⁷. This statement is factually incorrect because 1) It is the "closed" SCE and SDGE ends of the LEAPS line which create non-project power flows in the first place; and 2) the phase shifters will not prevent the flow of non-project power, thus they cannot "ensure non-project power does not flow". FRONTLINES contends that it is the *inverse* of TNHC's statement which actually conveys the truth; namely, that if the SDGE end

⁵ In CPUC proceeding A.10-07-001, TNHC explicitly identifies the phase shifters to be elements of the closed SCE/SDGE transmission interconnection project (referred to as the Talega-Escondido/ Valley Serrano "TE/VS" project). The phase shifters are NOT a part of, nor essential to, the LEAPS project). See Page 3-98 of the PEA document filed with the CPUC by TNHC

[http://www.cpuc.ca.gov/Environment/info/aspen/Nevadahydro/pea5/ch3_proj_desc.pdf]

⁶ In CPUC proceeding A.10-07-001, TNHC explicitly states that the LEAPS project is separate and distinct from the "closed" SCE/SDGE interconnection project (referred to as the Talega-Escondido/ Valley Serrano "TE/VS" project). [*Id.* at 3-5]

⁷ Page 1 of "Study 34b" filed by TNHC in Docket P-14227 on October 17, 2018.

or the SCE end of the transmission line is not "closed", then the phase shifters will not operate because there will be no non-LEAPS power flows to control. When properly stated, these facts demonstrate that it is solely the "closed" interconnection proposed by TNHC which creates the potential for non-project power flows and drives the artificial "need" for phase shifters.

It is only by understanding how phase shifters are used and why they are deployed on the transmission grid that one properly perceives TNHC's intention in proposing them. TNHC has made it clear that reducing the flow of non-LEAPS power on the LEAPS transmission line is *not* the purpose of the phase shifters, and that is *not* how they will be used. To the contrary, TNHC has informed the CPUC that the phase shifters are intended to transfer at least 1,000 MW of power between SCE and SDGE⁸ and are capable of even 800 MW more than that⁹. This is far more power than LEAPS could ever produce and it is certainly indicative of TNHC's true purpose in proposing the phase shifters; namely, that TNHC intends to construct a "closed" transmission line between SCE and SDGE and operate it as a fully integrated CAISO transmission grid path ***before*** LEAPS is built¹⁰, *and it is the phase shifters that make this plan possible*. Specifically, it is the phase shifter elements of the project scope that will permit TNHC to use the "closed" transmission path to control power

⁸ Pages 18-20 of TNHC's Phase 2 Reply Brief filed in the CPUC's Sunrise Powerlink Proceeding (A.06-08-010) found here: <http://docs.cpuc.ca.gov/PublishedDocs/EFILE/BRIEF/84434.PDF>.

⁹ Page 30 of TNHC's Phase 2 Initial Brief filed in the CPUC's Sunrise Powerlink Proceeding (A.06-08-010) found here: <http://docs.cpuc.ca.gov/PublishedDocs/EFILE/BRIEF/83739.PDF>.

¹⁰ TNHC has stated its intent to operate the SCE/SDGE interconnection separately from, and in advance of, the LEAPS project in several venues, including CPUC Proceeding A.10-07-001 where TNHC stated that the SCE/SDGE interconnect (referred to as TE/VS) is a stand-alone project that is separate from LEAPS [Page 3-74 of TNHC's Proponents Environmental Assessment document [http://www.cpuc.ca.gov/Environment/info/aspen/Nevadahydro/pea5/ch3_proj_desc.pdf] and will be energized 3 years before LEAPS is completed [*Id.* Table 3.8.7-1] and that the phase shifters are part of the TE/VS project because their function is to control power flows between SCE and SDGE [*Id.* at 3-95 and 3-96] thus they are not an element of LEAPS. TNHC's intent to operate the SCE/SDGE transmission line interconnect before LEAPS is also revealed in CPUC Proceeding A.06.08-010 convened for the Sunrise Project where TNHC's witness Wait testifies that TNHC's objective is to operate the SCE/SDGE interconnect (aka TE/VS) at least two years before LEAPS [see Attachment 1 Phase 1 Testimony by Wait - page 3 at 21 to page 4 at 2]. TNHC has also made its intention to construct the SCE/SDGE interconnect in advance of LEAPS very clear to the Commission. For instance, page 2-7 of the FEIS issued in Docket P-11858 states that the SCE/SDGE interconnect will be completed by the end of the second year, but LEAPS will not be completed until year 4 [<https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11239486>]. Even the schedule proposed in the instant proceeding states that the SCE/SDGE interconnect will be completed before the end of year 2, but LEAPS will not be completed until the end of year 4 [see Exhibit C of TNHC's LEAPS License Application submitted in Docket P-14227]. transfers between the parallel SCE and SDGE systems. TNHC actually makes this very clear

transfers between the parallel SCE and SDGE systems. TNHC actually makes this very clear in the LEAPS License Application submitted in Docket P-14227 by stating that the phase shifters will "ultimately control system flow from SCE to SDGE and from SDGE to the SCE control areas"¹¹.

The fact that TNHC has even included phase shifters in the LEAPS project scope is "proof positive" that TNHC intends to operate the "closed" LEAPS transmission line as a "stand-alone" CAISO grid pathway which will operate before LEAPS is completed and carry non-LEAPS power between SCE and SDGE *from inception*. The manner in which TNHC will accomplish this is explained on page B-5 of the 2007 FEIS issued by the Commission in Docket P-11858: After the "closed" transmission interconnection between SCE and SDGE is constructed with phase shifters, TNHC will simply file an application to amend the LEAPS license and exclude the "closed" transmission facilities from the license. This will allow non-LEAPS power to flow on the "closed" transmission path between SCE and SDGE before LEAPS is even built, and it will permit TNHC to sidestep all the FPA requirements which restrict licensed facilities to carry only project power. And *all of this will be made possible* if the Commission includes the phase shifters in the LEAPS license. Fortunately, the Commission is barred by the FPA from including phase shifters in the LEAPS license because (as discussed above) they play no role in bringing LEAPS power to market and are thus not "project primary" facilities. To the contrary, the role of the phase shifters is to control flows of non-LEAPS power on the SCE/SDGE interconnect, thus they are the antithesis of "project primary" facilities and are expressly prohibited by the FPA. Stated more plainly, TNHC's proposed phase shifters cannot be included in the LEAPS license because their purpose is not to deliver LEAPS power to the grid, rather it is to direct non-LEAPS power flows between SCE and SDGE.

From the information set forth above, four inescapable facts emerge:

1. There is no purpose for operating LEAPS at 500-kV with two "closed" connections to SCE and SDGE because one 230 kV "closed" connection to SDGE is more than sufficient to deliver all LEAPS power to market;
2. Constructing LEAPS with two "closed" connections to SCE and SDGE will establish non-LEAPS power flows and grid power transfers between SCE and SDGE in a manner that utterly violates the FPA;
3. The only purpose for constructing a "closed" transmission interconnection between SCE and SDGE is to facilitate the transfer of grid power between these two systems, and phase shifters are essential to this purpose.

¹¹ Section 4.4.1 of Section A of TNHC's LEAPS License Application filed May 31, 2017.

4. TNHC's LEAPS license application includes extensive transmission facilities that have *nothing* to do with delivering LEAPS power to the grid (such as phase shifters and "closed" connections to SCE and SDGE) and *everything* to do with the transfer of grid power on the CAISO grid in a manner that is expressly prohibited by the FPA.

These facts prevent the Commission from authorizing either phase shifters or two "closed" LEAPS connections to SCE and SDGE in any license that is issued in Docket P-14227.

THE LEAPS TRANSMISSION SYSTEM RELIABILITY BENEFITS CLAIMED BY TNHC SUGGEST THAT THE LEAPS PROJECT CANNOT BE LICENSED UNDER THE FPA

The Commission has firmly established that facilities which serve a transmission grid function (such as enhancing reliability or reducing transmission congestion) or perform some other power system function are classified as elements of the interconnected transmission system and thus do not qualify as "project primary" facilities that can be licensed under the FPA¹². In other words, electrical facilities that serve a transmission need or resolve a transmission grid problem are, by definition, not "project primary" facilities that can be approved pursuant to the FPA. By extension, the Commission cannot license any facilities under the FPA without first concluding that they are not needed to serve the transmission grid and thus qualify as "project primary" facilities. Notably, TNHC has repeatedly argued before the Commission that LEAPS serves an essential transmission grid function and resolves extant transmission grid problems¹³ and thus warrants cost-recovery under the "Transmission Access Charge ("TAC") paid by all California ratepayers¹⁴. The inherent contradiction in TNHC's contemporaneous positions before the Commission are plainly obvious: In Docket EL-18-131, TNHC argues that LEAPS is an essential transmission grid asset which is so important to proper grid function that it warrants cost recovery under the TAC; meanwhile, in Docket P-14227, TNHC argues that LEAPS is not a transmission grid asset at all, rather it is merely a 500 MW generation project that qualifies for licensing as a "project primary" facility under the FPA. TNHC cannot have it both ways because LEAPS cannot "be" transmission and simultaneously "not be" transmission.

¹² Pages B4 of the 2007 LEAPS FEIS issued in Docket P-11858:
<https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11239494>.

¹³ See Commission Docket EL-18-131 and ER-06-278.

¹⁴ The purpose of the TAC is to permit utilities to recover the construction cost of facilities that provide reliability benefits, reduce grid congestion, or otherwise secure proper functioning of the CAISO-controlled transmission grid; the costs are spread among all California ratepayers because all California ratepayers ostensibly benefit from improvements to the CAISO grid.

The contradictions in TNHC's assertions are not lost on FRONTRINES; however, they seem to be lost on the Commission. For instance, in the Order issued September 20, 2018 in Docket EL 18-131, the Commission refers to the LEAPS license [164 FERC ¶ 61,197 at P 5] but does not remark on the inconsistencies between TNHC's request in Docket EL 18-131 that LEAPS be deemed "transmission" for rate recovery under the TAC and its request in Docket P-14227 that LEAPS be deemed "generation" under the FPA. Instead, the Commission simply finds that "a request to designate LEAPS as a transmission facility is premature at this time" [164 FERC ¶ 61,197 at P 22]. Similarly, none of the issuances in Docket P-14227 refer to TNHC claims made in Docket EL 18-131 that LEAPS is "needed" as a transmission grid asset, nor do they address the fact that the claims made in Docket EL 18-131 render invalid the very foundations of TNHC's LEAPS license application. Perhaps this is by design, because one cannot reconcile the irreconcilable. In any event, FRONTRINES respectfully requests that the Commission direct TNHC to address the contradictory stances that it has assumed in Dockets P-14227 and EL 18-131 and explain why such contradictions do not invalidate the LEAPS License Application in its entirety.

TNHC'S "STUDY PLAN" PROVES THAT THE SCE/SDGE INTERCONNECT IS INTENDED TO CARRY NON-LEAPS POWER BETWEEN SCE AND SDGE.

There are several items set forth in TNHC's "Study Plan" which demonstrate that TNHC has configured the LEAPS project to carry non-LEAPS power and transfer grid power between SCE's and SDGE's systems. These items are set forth below, and they constitute further proof that TNHC's LEAPS license application includes facilities that are not necessary to deliver LEAPS power to market.

Page 1: According to TNHC's "Study Plan", three 500 MVA phase shifters (with a combined capacity of 1,500 MVA) will be installed at the substation that will be constructed in SDGE's service territory. This capacity is substantially more than is needed to accommodate the 500 MW of LEAPS generation. In fact, TNHC has stated that these phase shifters have a 620 MVA emergency rating¹⁵, and are thus sufficient to accommodate grid power transfers between SCE and SDGE of up to 1,860 MW during emergencies. And, as indicated previously, TNHC has stated categorically that the intent of the three phase shifting transformers is to transfer more than 1,000 MW of power between the SCE and SDGE systems. The very fact that TNHC is proposing three phase shifters with a capacity that is greater than three times the LEAPS generation rate is indisputable proof that the role of the phase shifters is not to deliver LEAPS power to market, rather it is to control grid (non-LEAPS) power flows between SDGE and SCE. As such, inclusion of the phase shifters in the LEAPS license is expressly prohibited by the FPA.

¹⁵ Page 3-98 of the Proponent's Environmental Assessment filed by TNHC in CPUC Docket A.10-07-001 [http://www.cpuc.ca.gov/Environment/info/aspen/Nevadahydro/pea5/ch3_proj_desc.pdf]

Page 2: In the "Study Plan", TNHC refers to a "Normal Operation" study to configure the phase shifting transformers to operate such that "through-flow" from SCE to SDGE that is "net of power from or to the LEAPS Project, is minimized" and that the study will review the required operation of the phase shifters to "give minimum net through-flow". The "net through-flow" referred to in these carefully worded statements means non-LEAPS power flow (aka grid power flow). These statements openly affirm that, during normal operation, the phase shifters will only *minimize* the "through flows" of non-LEAPS power; they will not be prevented or inhibited. These statements conclusively prove that TNHC is fully aware that non-LEAPS power will flow through the proposed LEAPS facilities and that such flows cannot be prevented, they can only be minimized. Stated more plainly, TNHC is entirely mindful of the fact that, *no matter how the phase shifters are configured, and no matter how many phase shifters there are, they will not prevent the transfer of non-LEAPS power on a "closed" interconnection between SCE and SDGE.* Yet, and incredibly, TNHC obfuscates this truth and prevaricates by using vague terms such as "minimum net through flow". TNHC's evasiveness regarding the true inability of phase shifters to prevent non-LEAPS power flows suggests an awareness that this truth will compel the Commission to omit the phase shifters AND the "closed" SCE/SDGE interconnection from the LEAPS license. This is because the *only* way to prevent the transfer of non-LEAPS power is to operate the the LEAPS line with a single "closed" connection to either SDGE or SCE; this configuration does not require phase shifters and it is the only configuration that complies with the FPA.

Pages 2-3: The TNHC "Study Plan" sets forth an array of transmission grid operating scenarios and contingency events to "test the effects of east-west power delivery changes through a variety of load and generation scenarios that would impact the operation" of the phase shifters. Notably, these transmission grid scenarios are only relevant because TNHC proposes to operate the LEAPS transmission line as a "closed" interconnection between SCE and SDGE which will function as a high voltage, grid-imbedded, CAISO transmission pathway capable of significant (1,000+ MW) grid power transfers controlled via phase shifters having a combined capacity exceeding 1,500 MVA. Correspondingly, its impact on east-west power transfers and other California grid operations will be far reaching. In other words, the need to assess grid operations under the various scenarios set forth in TNHC's "Study Plan" is not driven by LEAPS generation, rather it is driven by the "closed" SCE/SDGE interconnection which TNHC seeks to "bootstrap" from the LEAPS project. The very nature of the study scenarios proposed in TNHC's "Study Plan" reveals TNHC's clear intent to operate the "closed" SCE/SDGE interconnection as a CAISO transmission path *from inception* and irrespective of LEAPS generation. There would be no need to study any of the grid operating scenarios identified in TNHC's "Study Plan" if LEAPS were configured to operate with a single "closed" connection to the grid because this configuration does not create a new CAISO transmission pathway.

COMMENTS PROVIDED BY SDGE AND CAISO PROVE THAT LEAPS IS CONFIGURED TO CARRY NON-LEAPS POWER AND TRANSFER GRID POWER BETWEEN SCE AND SDGE.

Further indicators that TNHC's LEAPS license application includes facilities that are barred by the FPA because they are intended to carry non-LEAPS power and achieve grid power transfers between SCE and SDGE are set forth in comments on TNHC's "Study Plan" that were issued by SDGE and the CAISO and submitted to the FERC (see Attachment 2). These indicators are presented in detail here:

CAISO's Comments on TNHC's "Study Plan"

In its comments on TNHC's "Study Plan", CAISO indicates that the performance of TNHC's proposed phase shifters will be impacted by the angular differences between the "closed" LEAPS connection to SCE's system and the "closed" LEAPS connection to SDGE's system. CAISO further points out that these angular differences correlate closely with power flows emanating from the SONGS switchyard (where the SCE and SDGE systems are already interconnected); CAISO specifically recommends that TNHC study a 1400-1600 MW "south to north" power flow (from SDGE to SCE) and a 1,000-1,300 MW "north to south" power flow (from SCE to SDGE) at the SONGS switchyard. In plain language, CAISO is saying that the ability of the phase shifters to limit non-LEAPS (grid) power flows between SCE and SDGE will depend on how much power is already flowing between SCE and SDGE elsewhere on the grid. CAISO's comments affirm that the flow of non-LEAPS (grid) power between SCE and SDGE resulting from phase shifter operation is not an artifact of LEAPS generation, rather it will depend on events occurring elsewhere on the CAISO system. CAISO's comments corroborate FRONTLINES' assertion that the power shifters serve a grid function and not a LEAPS generation function, and thus are precluded from licensing under the FPA.

SDGE's Comments on TNHC's "Study Plan"

SDGE's comments on TNHC's "Study Plan" address a number of issues, including the amount of "net through flow" from SCE to SDGE that will occur on the proposed LEAPS facilities which TNHC claims will be "minimized" by the phase shifters. As indicated above, the phrase "net through flow" from SCE to SDGE is a euphemism for non-LEAPS (grid) power transfers that will occur via the "closed" SCE/SDGE interconnection which TNHC proposes to "bootstrap" with the LEAPS license. SDGE's affirmation that "net through flows" will occur explicitly confirms FRONTLINES' assertion that phase shifters will not prevent non-LEAPS power flows on the "closed" SCE/SDGE interconnection. However, SDGE's comments go much further; in fact, they actually direct TNHC to specify upfront "what would be an acceptable range for the 'minimum net through-flow' ". This statement is *remarkable* in that it asks TNHC to establish an acceptable lower bound for the "net flow through" on the "closed" SCE/SDGE interconnect and thereby reveal the minimum amount of non-LEAPS power that is expected to flow through operation of the phase shifters! The fact that SDGE is even *asking* this question is proof positive that both SDGE and TNHC are

fully aware that the "closed" SCE/SDGE interconnection will carry non-LEAPS (grid) power and that the phase shifters will *never* prevent these grid power flows. Fortunately, the Commission is now aware of this fact too, and will take steps to ensure that the LEAPS license (if issued) will not include either a "closed" SCE/SDGE interconnection or phase shifters because they will facilitate non-project power flows and are thus prohibited by the FPA.

TNHC HAS CONFIRMED THAT LEAPS POWER CAN BE DELIVERED VIA A SINGLE CONNECTION TO SDGE

In the previous LEAPS proceeding (P-11858), the Commission determined that LEAPS power can be delivered to the transmission grid via a single CAISO connection operated at 230 kV¹⁶; there is no evidence in the current proceeding which justifies a reversal of this determination. However, what is noteworthy is TNHC's recent affirmation that LEAPS power can be delivered to the grid without a connection to SCE¹⁷. Specifically, TNHC acknowledged that a single CAISO connection to SDGE will suffice to deliver LEAPS power to the grid. This affirmation occurred during evidentiary hearings convened by the CPUC in the Alberhill Proceeding [A.09-09-022] in which TNHC stated that it was the Commission who laid out a LEAPS "method of service" that involves two grid connections o SCE and SDGE and that the current LEAPS license application simply complies with this "method of service" set forth by the Commission¹⁸. Taken together, these facts demonstrate that there is no need to provide two CAISO connections to deliver LEAPS power to the CAISO grid, and that a feasible alternative is one in which LEAPS power is delivered via a single 230-kV connection in SDGE's service territory.

SUMMARY AND CONCLUSION

The facts and conclusions distilled from the technical information provided above are:

1. The FPA prohibits the Commission from licensing facilities that carry non-project power; only "project primary" facilities that are necessary to deliver all LEAPS power to market can be licensed under the FPA.

¹⁶ Pages B3-B6 of the 2007 LEAPS FEIS issued in Docket P-11858:
<https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11239494>.

¹⁷ Transcript of Evidentiary hearings convened by the CPUC on October 19, 2017 for the Alberhill Proceeding (A.09-09-022) TR 374 at 18-21.

¹⁸ Id. TR 373 at 10-21.

2. The purpose of operating phase shifters on a "closed" transmission line that connects two parallel transmission systems is to control the flow of grid power between these systems.
3. TNHC's LEAPS application proposes to create a "closed" transmission interconnection between the parallel SCE and SDGE systems.
4. The "closed" SCE/SDGE interconnection proposed by TNHC in the LEAPS license application will result in grid (non-LEAPS) power transfers between SCE and SDGE and therefore cause non-LEAPS power to be carried on LEAPS facilities.
5. Phase shifters will not prevent or eliminate non-LEAPS (grid) power transfers between SCE and SDGE on the proposed LEAPS facilities; the phase shifters will only manage the grid power transfers.
6. Neither the phase shifters nor the "closed" SCE/SDGE interconnection will prevent the flow of non-LEAPS power on LEAPS facilities.
7. The proposed phase shifters will play no role in delivering LEAPS power to the grid, and thus serve no purpose established by the FPA.
8. Only one "closed" connection to the CAISO grid is needed to deliver LEAPS power, and a single "closed" CAISO connection guarantees that only LEAPS power is carried by the LEAPS facilities.
9. The ability of LEAPS to deliver power to the grid is not served or enhanced by operating LEAPS with two "closed" connections to SCE and SDGE. Correspondingly, operating LEAPS with two "closed" connections to SCE and SDGE does not serve any purpose established by the FPA.
10. All LEAPS power can be delivered to the grid via a 230-kV connection to SDGE; this provides the Commission with a clear path to approve LEAPS without violating the FPA.

These facts and conclusions were all "sourced" directly from documentation prepared by either TNHC or the Commission, and they demonstrate that a LEAPS Project which includes either phase shifters or two "closed" connections to SCE and SDGE cannot be licensed under the FPA. In other words, these facts and conclusions prove that the Commission is statutorily barred from authorizing the LEAPS project as it is currently proposed by TNHC and they raise a larger and more salient point; namely, that it is futile to continue the contemplation of a LEAPS project configuration which exceeds the Commission's licensing authority. Therefore, FRONTLINES respectfully requests that the Commission identify one

or more LEAPS project configurations that fall within the licensing authority granted by the FPA and proceed forward with such FPA-compliant alternative(s) in Docket P-14227. Alternatively, FRONTLINES asks that the Commission direct TNHC to reconfigure its proposed LEAPS project in a manner that assures FPA compliance and forecloses any possibility that non-project power can be carried by any proposed facilities.

Sincerely,

/S/ Jacqueline Ayer
Jacqueline Ayer
On behalf of FRONTLINES

cc: James Fargo, FERC Office of Energy Projects [James.Fargo@ferc.gov]

ATTACHMENT 1

TESTIMONY OFFERED BY TNHC IN THE CPUC'S SUNRISE PROCEEDING (A.06-08-010)

Exhibit No. N-1

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

In the Matter of the Application of) Application No. 06-08-010
San Diego Gas & Electric Company) (Filed August 4, 2006)
(U-902-E) for a Certificate of Public)
Convenience and Necessity for the)
Sunrise Powerlink Transmission Project)

PHASE 1 TESTIMONY OF
REXFORD J. WAIT
ON BEHALF OF
THE NEVADA HYDRO COMPANY

Dated: June 1, 2007

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**PHASE 1 TESTIMONY OF
REXFORD J. WAIT
ON BEHALF OF
THE NEVADA HYDRO COMPANY**

6 Q. Please state your name, position, and business address.

7 A. My name is Rexford J. Wait. I am Vice President of The Hydro Company, Inc., which

8 conducts business under the trade name, The Nevada Hydro Company (TNHC). My

9 business address is 2416 Cades Way, Vista, California 92081.

10 Q. What is the purpose of your testimony in this proceeding?

11 A. I am testifying on behalf of TNHC to provide a description of TNHC's proposed Lake

12 Elsinore Advanced Pumped Storage (LEAPS) Project and the related Talega-

13 Escondido/Valley-Serrano (TE/VS) Transmission Line Project. I also will describe the

14 history of the California Independent System Operator's (CAISO's) review and study of

15 these projects, focusing primarily on the TE/VS project. In my opinion, this history

16 establishes that the CAISO erred by not including TE/VS in its base case for purposes of

17 its evaluations in this case of San Diego Gas & Electric Company's (SDG&E's) proposed

18 Sunrise Powerlink transmission project and alternatives to that proposal.

19 Q. What has been your personal involvement in the development of the LEAPS and TE/VS

20 projects?

21 A. I have been involved in the projects on a daily basis since 1997. My role has included all

22 aspects of the project development effort, including review and approval of

23 permit/licensing applications, project design, public outreach efforts and liaison with

24 federal, state and local governments and agencies, the affected California utilities, the

1 CAISO, Federal Energy Regulatory Commission (FERC), and various electric industry
2 groups in the western United States.

3 Q. Please describe the LEAPS and the TE/VS projects.

4 A. The TE/VS Project is a proposed 500 kV transmission line of approximately 28.5 miles
5 in length and with a design capacity of approximately 1,000 MW. The LEAPS Project is
6 a proposed 500 MW pumped storage hydroelectric generating plant located near the
7 TE/VS Project.

8 The TE/VS transmission line intersects an existing line segment between
9 Southern California Edison Company's (SCE's) Valley and Serrano substations and
10 intersects an existing line segment between SDG&E's Talega and Escondido substations
11 at the northern boundary of the SDG&E transmission system.

12 The TE/VS Project runs past Lake Elsinore, which is the location of the LEAPS
13 pumped storage hydro unit. The LEAPS unit is capable of generating 500 MW for up to
14 12 hours and refilling at a pumping capacity of 600 MW. Storage capacity is 6,000
15 MWh. The cycle efficiency is 83.3 percent.

16 Exhibit No. TNHC-2 superimposes the TE/VS Project and LEAPS Project on a
17 map of high voltage lines and substations in the San Diego and surrounding areas. The
18 major transmission paths into the San Diego area are from the north and east. The
19 northern path is just south of the San Onofre substation (this is referred by the Western
20 Electricity Coordinating Council (WECC) as the South of Path 44 interface). The eastern
21 path is the path connecting the Miguel and Imperial Valley substations and is referred to
22 as the Southwest Power Link, or SWPL. The proposed TE/VS link provides a new
23 transmission path between SCE and SDG&E at the northern boundary of the SDG&E

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1 service area. This new northern link increases SDG&E's access to lower cost power
2 supplies available in the WECC region and provides additional transmission import
3 capability to the SDG&E area to improve system reliability.

4 Q. Please describe the project costs associated with the LEAPS and TE/VS projects.

5 A. Total project costs for both the LEAPS project and the TE/VS transmission line is
6 estimated to be approximately \$1.1 billion (in 2007 dollars). The transmission line
7 represents about \$350 million of this amount and the LEAPS project the remaining \$750
8 million.

9 Q. What is the current status of LEAPS and TE/VS relative to required regulatory permits
10 and approvals?

11 A. In January 2007, the FERC and the U.S. Forest Service issued their joint Final
12 Environmental Impact Statement regarding TNHC's application to FERC (submitted
13 jointly with the Elsinore Valley Municipal Water District) for a license for LEAPS and
14 the associated transmission connections. The project now awaits final FERC action on
15 the license application; we expect FERC to act within the next several months. A
16 favorable decision of the Forest Service and attendant grant of right-of-way across the
17 affected federal lands should follow shortly thereafter. The combined project has
18 completed the interconnection study process under the FERC tariff of the CAISO,
19 pursuant to which TNHC was tendered separate Large Generator Interconnection
20 Agreements with SCE and SDG&E in February, 2007.

21 In short, these and other necessary regulatory approvals are proceeding as needed
22 to permit us to meet our objectives of placing the TE/VS line in service in the fourth

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1 quarter of 2009 and of commencing operation of the LEAPS project in the fourth quarter
2 of 2011.

3 Q. To your knowledge, is the CAISO familiar with the LEAPS and TE/VS projects?

4 A. Yes. I have participated in numerous meetings and other communications for and on
5 behalf of TNHC with the CAISO, particularly its planning staff, relating to essentially all
6 aspects of the LEAPS and TE/VS projects.

7 Q. Please describe the CAISO's reviews and evaluations of the LEAPS and TE/VS projects.

8 A. The CAISO's review of LEAPS and TE/VS began when SDG&E identified impending
9 violations of ISO Grid Planning Criteria due to load growth in its 1999 Annual Grid
10 Planning Assessment. SDG&E began studying alternatives for a new 500 kV
11 transmission link to increase the transmission import capability into the San Diego load
12 area. SDG&E eventually decided upon a new line extending from SCE's Valley
13 substation to a new, proposed "Rainbow" substation in northern San Diego County.
14 SDG&E subsequently applied to the California Public Utilities Commission (CPUC) for
15 a certificate for this proposed "Valley-Rainbow project."

16 In a memorandum to the CAISO Board dated March 23, 2001, a copy of which is
17 included with my testimony as Exhibit No. TNHC-3, the CAISO's staff summarized the
18 Board's previous consideration of Valley-Rainbow in several resolutions enacted in
19 2000. The staff noted that, subsequent to the previous Board actions, system reliability
20 considerations provided a new rationale for a project such as Valley-Rainbow. They went
21 on to explain other pertinent developments:

22 The decision of the former Board to require a competitive
23 solicitation was based to a significant degree on strong community
24 opposition to the Valley-Rainbow Project from the citizens of the

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1 Temecula Valley. Since October 2000, additional information has
2 emerged regarding a potential alternative route for the Valley-
3 Rainbow Project, in association with a pumped storage project at
4 Lake Elsinore. The project includes a transmission line that can be
5 extended to connect Valley substation to the proposed Rainbow
6 substation and would thus be functionally equivalent to the project
7 proposed by SDG&E.
8

9 Exhibit No. TNHC-3 at 4. The pumped storage project at Lake Elsinore mentioned in the
10 memorandum is LEAPS. The alternative transmission route to which the staff referred in
11 this passage is the route of what is now the TE/VS line proposed by TNHC. (I note that,
12 rather than terminating at the new Rainbow substation proposed by SDG&E, TE/VS
13 would terminate at a new substation in Camp Pendleton.)

14 Q. Did the CAISO Board take any action in response to the staff's March 23, 2001
15 memorandum?

16 A. Yes, on March 30, 2001, the Board adopted a resolution stating that it:

17 Finds that a 500 kV Project, such as the Valley-Rainbow project, is
18 needed (without selecting a preferred near-term alternative and
19 without regard to routing) to address the identified reliability
20 concerns of the San Diego and southern Orange county portion of
21 the ISO grid beginning in 2004 . . .

22 A copy of this resolution is attached to my testimony as Exhibit No. TNHC-4. Consistent
23 with the Board resolution finding of a need for a project like Valley-Rainbow, the CAISO
24 on July 12, 2002, filed a brief in the CPUC's certificate proceeding regarding Valley-
25 Rainbow in which it stated (at page 9) that "it is simple to determine whether there is a
26 need for a project such as Valley-Rainbow, in accordance with CA ISO Planning
27 Standards" and (at page 2) that "the need for a project such as Valley-Rainbow has been
28 amply demonstrated." A portion of the CAISO's brief is attached to my testimony as
29 Exhibit No. TNHC-5.

- 1 Q. What happened to the Valley-Rainbow project?
- 2 A. In December 2002, the CPUC denied SDG&E's application for a certificate for the
- 3 project in its Decision No. 02-12-066. Therefore, the project was never built.
- 4 Q. What is the importance of the 2001 CAISO Board resolution with respect to
- 5 consideration of the proposed TE/VS transmission line?
- 6 A. The Board resolution finds a need for "a 500 kV Project, such as the Valley-Rainbow
- 7 project," to address reliability issues in the San Diego load area. There is no question that
- 8 TE/VS is a project "such as Valley-Rainbow." First, note that the CAISO staff itself in
- 9 March 2001 identified the transmission line associated with LEAPS as "functionally
- 10 equivalent" to Valley-Rainbow. SDG&E likewise identified a project similar to TE/VS in
- 11 July 2001 in its "500 kV System Alternatives Study, Lake Elsinore Area," prepared in
- 12 connection with the Valley-Rainbow project. In November 2002, in its "Interim
- 13 Preliminary Report on Alternatives Screening for SDG&E Valley-Rainbow 500 kV
- 14 Interconnect Project," Dudek Associates identified the TE/VS line as Cleveland National
- 15 Forest Trabuco District Alternative 2. At page 3-35 of its report, Dudek stated that this
- 16 alternative "would entail construction of a new 500 kV switching station on or near the
- 17 Valley-Serrano 500 kV right-of-way, located about 15 miles west of the existing Valley
- 18 substation, and the relocation of the [proposed new] Rainbow substation site somewhere
- 19 to the west of Rainbow, along the existing Talega-Escondido right-of-way." This is
- 20 exactly the route of the TE/VS project, i.e., from a new substation on the Valley-Serrano
- 21 500 kV line segment at a location west of the Valley substation, to a new substation on
- 22 the SDG&E 230 kV line segment between Talega and Escondido, west of the intended
- 23 location of the proposed Rainbow substation.

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1 Q. Was the demise of Valley-Rainbow the end of the CAISO's support for a new, 500 kV
2 transmission connection from the north for SDG&E?

3 A. No. The CAISO's Grid Planning Department in May 2004 provided the CAISO
4 Southwest Transmission Expansion Plan (STEP) Study Group with an evaluation of the
5 "relative reliability benefits" of several transmission alternatives in the San Diego area,
6 including LEAPS-TE/VS and a new SDG&E "Imperial Valley-San Diego Expansion
7 Plan" (ISEP). A copy of this study is attached as Exhibit No. TNHC-6. The study began
8 by observing (at page 2) that analyses completed in 2003 had established "the need for an
9 increase in San Diego's import capability, which is currently 2850 MW" and for "a new
10 500 kV line into San Diego . . . to serve future load growth." The 2004 STEP analysis
11 concluded (at pages 2 and 34) that both the LEAPS and ISEP projects "can support a San
12 Diego import level (all lines in service) of 3600 MW" and, together, would increase the
13 import limit to 3800 MW. The CAISO prepared this study both with the LEAPS pumped
14 storage generation capability (see page 24) and with the TE/VS transmission project only
15 (see pages 16 and 29), and under a variety of other combinations of proposed projects and
16 projects using various equipment configurations.

17 Q. Have the circumstances of the CAISO grid that supported the CAISO's findings of need
18 for a project like TE/VS changed since 2004?

19 A. No.

20 Q. What is the import of the CAISO's previous finding of need for TE/VS or a similar, new
21 500 kV transmission link to SDG&E from the north for the evaluation of the Sunrise
22 Powerlink project and alternatives to it that the CAISO has presented in this proceeding?

1 A. The CAISO's long-standing determination of a need for TE/VS or a similar project,
2 combined with its knowledge that TNHC continues to pursue development of TE/VS and
3 plans to complete the line, should have led the CAISO to make TE/VS part of the base
4 case against which it assessed the Sunrise Powerlink project. According to page 27 of the
5 "CAISO South Regional Transmission Plan for 2006 (CSRTP-2006) Findings and
6 Recommendation on the Sun Path Project," Appendix I-1 in Volume 2 of SDG&E's
7 Application 05-12-014, which the CAISO witnesses are sponsoring in this case, the
8 CAISO included in its base cases for the analysis of Sunrise "Future transmission
9 projects that affect the network configuration," among which are "Major 230kV and
10 above voltage transmission projects that have been approved by the CAISO Board."

11 The CAISO's exclusion of TE/VS from its base cases for purposes of evaluating
12 the justification for the Sunrise project is inconsistent with this approach and is
13 unreasonable. The CAISO's own analyses, which I have described above, already have
14 demonstrated that TE/VS will provide much of the reliability and other benefits to
15 SDG&E that the CAISO in its testimony here attributes to the Sunrise project. TE/VS,
16 therefore, should properly be deemed to be part of the base case transmission system to
17 which SDG&E proposes to add the Sunrise project.

18 I have not studied the CAISO's economic assessment of Sunrise in detail.
19 Nevertheless, I know from my long involvement in the LEAPS-TE/VS project that
20 TE/VS would address the same reliability and import capability issues that are claimed to
21 justify Sunrise. Accordingly, it seems only logical that including TE/VS in the base case
22 would have a significant effect on the benefits that could be attributed to Sunrise.

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1 Therefore, the CAISO's exclusion of TE/VS from the base case almost certainly makes
2 its economic analysis of Sunrise inaccurate.

3 Q. Does this conclude your testimony?

4 A. Yes.

ATTACHMENT 2

COMMENTS ON TNHC'S "STUDY PLAN" SUBMITTED BY CAISO AND SDGE.

CAISO'S COMMENTS:

From: Sparks, Robert <RSparks@caiso.com>
Sent: Tuesday, August 28, 2018 9:25 AM
To: David Kates
Cc: Millar, Neil; Strack (Sempra Energy Utilities), Jan; 'Maiga, Habibou A'; Chinn (Southern California Edison), Garry; Ayman Samaan; Chen, Frank
Subject: RE: Request for comments on Study Plan for LEAPS facility

David,

In response to Nevada Hydro's request for comments regarding the Proposed Study Plan for Use of Phase-Shifting Transformers at Case Springs ("Study Plan"), the following comments are provided. The comments focus on the assumptions that could impact the operational performance of the Case Springs phase shifters that are proposed to limit non-project power through the project's interconnection transmission lines.

The ISO understands that the objective of the Study Plan is to meet the study requirement of FERC's Study 34 that focuses on the operation of the proposed transformers. The Study Plan relies too narrowly on nominal power flow base cases (i.e. WECC 2021 Spring Light Load Case and the 2022 Summer Heavy Load Case) to adequately evaluate the performance of the phase shifting transformers. The selection of system conditions in those cases is not consistent with critical system conditions in actual transmission operations and planning assumptions used in recent California ISO transmission planning process cases. The Study Plan falls short in its approach to identifying the study scenarios even though five generation scenarios are identified in the Study Plan to evaluate what the impact would be on the phase shifter operation with LEAPS either pumping or generating. Although it is not easy to identify the most critical study scenarios to examine the impact, it is the ISO viewpoint that the study should be performed for a wide range of operating conditions in terms of the angular difference between the 500 kV bus at Lake Switchyard and the 230 kV bus at Case Springs. Based on the ISO study experience, the angular difference has a close correlation to the power flow loading conditions on the 230 kV path south of the SONGS switchyard. The power flows on this path should be adjusted to achieve 1400 to 1600 MW south-to-north in at least one scenario case and 1000 to 1300 MW north-to-south in other scenario cases. In addition, it appears that the contingencies listed are based on an outdated system configuration assumption. Therefore, the contingencies should be modified to reflect the planned system configuration as shown below.

1. One Case Springs phase shifter and associated 500/230 kV transformer
2. Lee Lake-Alberhill or Serrano 500 kV line (corrected)
3. Lee Lake-Valley 500 kV line (corrected)
4. Case Springs-Talega Tap-Capistrano 230 kV three-terminal line (corrected)

5. Case Springs-Escondido 230 kV line
6. Miguel-ECO 500 kV line with TL23040 IV 500 kV +RAS (corrected)
7. Ocotillo-Suncrest 500 kV line with TL23040 IV 500 kV +RAS (corrected)
8. Imperial Valley-North Gila 500 kV line
9. One of Suncrest-Sycamore 230 kV lines with TL23054/23055 +RAS (added)
10. SONGS-Talega 230 kV line
11. SONGS-Capistrano 230 kV line (added)
12. SONGS-Serrano 230 kV line (added)
13. SONGS-Viejo 230 kV line
14. One SONGS-Santiago 230 kV line

Note: For purposes of this study, the RAS can be assumed to consist of dropping generation connected to Imperial Valley substation as needed to alleviate overloads observed after taking the contingency.

One final comment is that recently completed or future generation interconnection studies of the LEAPS Project are intended to identify reliability impacts caused by the interconnection of the LEAPS Project to the ISO Controlled Grid, and this Study Plan is not intended to be an interconnection study.

Thank you,
Robert Sparks
Manager, Regional Transmission – South
California ISO

SDGE'S COMMENTS

SDG&E Comments on
“Proposed Study Plan for Use of
Phase-Shifting Transformers at Case Springs”
Lake Elsinore Advanced Pumped Storage
FERC Project No. 11427
July 30, 2018 draft

SDG&E understands the focus of the study requested by FERC is to evaluate the operation of the phase-shifting transformers installed at the Case Springs substation. Their purpose is to prevent non-project power to flow between the Case Springs substation (SDG&E system) and the Lake switchyard (SCE system). There are areas of the study plan SDG&E believes deserve additional attention and clarifications. These areas are listed below:

Selection of Power Flow Cases:

As an alternative to WECC cases, SDG&E recommends using the 2023 power flow cases from the CAISO 2018-2019 Transmission Planning process. These cases are more recent and have also been reviewed by the CAISO, SCE, and SDG&E. At a minimum, cases should be selected based on a potential realistic in-service date of the project.

System Conditions to be Used in Study:

It is not clear what is meant by “normal conditions” in the study plan. Although SONGS has retired, the increase of renewable generation is causing flows south-to-north (SDG&E to SCE) to go as high as 1500 MW. Flows north-to-south (SCE to SDG&E) as high as 1000 MW have also been observed. for these reasons, SDG&E believes at least two additional baseline cases with no phase shifters should be modeled to identify the natural flow of MW when either high south-to north or north-to-south flows occur. These cases should be used to benchmark cases where the phase-shifting transformers will be actively controlling the flows. Furthermore, typical stressed system scenarios are already identified in the CAISO 2018-2019 study plan. SDG&E encourages their inclusion in the study plan.

The study plan does not define the “minimum net through-flow” term and the “SDG&E internal generation” term. These terms can have different meanings and impact the results. SDG&E recommends specifying upfront what would be an acceptable range for the “minimum net through-flow” and the “SDG&E internal generation” cut plane.

Contingency Conditions:

The assessment of multiple contingencies is part of NERC, WECC, and CAISO planning criteria. At a minimum, contingencies should include all major contingencies (230 kV and above) the CAISO and SDG&E plan to and operate to. These contingencies include N-1-1, G-1- N-1, and N-2 with their corresponding RAS operations. Also, SDG&E is not aware of any

planning standard that supports the following statement: “[Contingency tests beyond the “N-1” tests would be beyond reasonable design planning for net through-flow on the LEAPS tie lines and may have more serious issues for other reasons.](#)” Finally, the N-1 contingencies listed in the study plan should reflect today’s system configuration and substation names. For example, the “Imperial Valley-Miguel 500 kV line” and the “Imperial Valley-Central South (formerly Sycamore) 500 kV line” N-1 contingencies should be replaced with the “Imperial Valley-East County 500 kV line”, “Imperial Valley-Ocotillo 500 kV line”, “East County-Miguel 500 kV line”, “Ocotillo - Suncrest 500 kV line”.

Timeline:

The study plan does not include a timeline and milestone dates when potential preliminary results could be shared with the CAISO, SDG&E, and SCE. This practice is customary in studies that impact several entities.

Setting of Phase-Shifting Transformers (PST):

Since this is a study focused on the operation of the PSTs, typical technical data for PSTs are essential for proper evaluation. These include angle range, impedance, impedance table, continuous rating, emergency rating (with length of time for the rating specified). To prevent non-project power to flow in the study, operation of the pump storage project will rely heavily on the operation of the PSTs. SDG&E recommends setting the phase shifters in the study the same way they would be operated in the field. Also, additional information should be provided, including but not limiting to:

1. Clarification should be given on whether the PSTs are expected to be operated manually or automatically (automatic angle control or MW flow control modes).
2. how will the PSTs be set pre-contingency (flow control mode, at specified tap position)?
3. How would the PSTs operate post-contingency?
 - a. maintaining the same flow as that pre-contingency?
 - b. If so, how long does it take to move a tap position?
 - c. If not, what are the PSTs designed to do (freeze at the same tap as that in precontingency?)
4. If bypass operation is needed, how will it be implemented, for instance, move to neutral tap position then close bypass switch?

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing FOREST RESIDENTS OPPOSING NEW TRANSMISSION LINES' ("FRONTLINES") Comments on the FEDERAL ENERGY REGULATORY COMMISSION'S "Request for Additional Information and Comments on Study Plans" upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Palmdale, California, this 22nd day of February, 2019.

/s/ Jacqueline Ayer
Jacqueline Ayer
On behalf of FRONTLINES
2010 West Avenue K, #701
Lancaster, CA 93536

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