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December 21, 2017

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C., 20426

RE: Project No. P–14227
Lake Elsinore Advanced Pumped Storage Project
18 C.F.R. § 4.32(b)(7) Response to Study Requests

Dear Secretary Bose,

In its "Notice of Application Tendered for Filing with the Commission and Soliciting Additional Study Requests" ("Tendering Notice"), issued on October 11, 2017, the Commission solicited additional study requests pursuant to 18 C.F.R. § 4.32(b)(7) of its regulations. Specifically, the Commission announced that if any resource agency, Indian Tribe, or person believes that an additional scientific study should be conducted to form an adequate factual basis for a complete analysis of the application on its merit, they must file a request for a study with the Commission not later than 60 days from the date of filing of the application, and serve a copy of the request on the applicant. Because Nevada Hydro filed its Final License Application on October 2, 2017, the deadline for filing additional study requests was December 1, 2017.

Pursuant to 18 C.F.R. § 4.32(b)(8), the Company is herein filing with the Commission its response to study requests that satisfies the criteria of 18 C.F.R. § 4.32(b)(7) and serving the study request response on the applicable requester.

1.0. Introduction to this Letter

The Company received study requests from the U.S. Department of Agriculture, Forest Service, Cleveland National Forest ("Forest Service"), the U.S. Fish and Wildlife Service ("USFWS"), the State Water Resources Control Board ("State Board"), the Santa Ana Regional Water Quality Control Board ("RWQCB"), the State of California Department of Fish and Wildlife ("CDFW") and the Temecula Band of the Luiseño Mission Indians ("Pechanga Tribe" or the "Tribe"). Because of its intimate relationship to the scope of the project, the Company also is addressing here the request of the City of Lake Elsinore ("City").

Table 1: Study Requests Accepted, summarizes those requests to which the Company generally agrees (with modifications) with the requesting agency. Due to the quantity of

information already made available in the FLA, the Company believes that all studies can be completed prior to construction, and that none are required for the application to be deemed complete now by the Commission.

Table 1: Study Requests Accepted

Study Number	Requesting Agency	Section of this Filing	Request	Agree with modifications
1	RWQCB	2.2.2.2	Study of Total Nitrogen, Phosphorus and Cyanotoxins the Project Will Contribute to Lake Elsinore	✓
2	RWQCB	2.2.2.3	Study of How the Project Will be Incorporated into Lake Elsinore's "TMDLs"	✓
3	USFWS	2.3.1.2	Request for Updated Biological Surveys	✓
4	CDFW	2.3.2.1	Request for Updated Biological Surveys	✓
5	CDFW	2.3.2.2	Bald Eagle and Peregrine Falcon Studies	✓
6	CDFW	2.3.2.3	Golden Eagle and General Raptor Studies	✓
7	CDFW	2.3.2.4	Special Status Riparian Bird and Nest Monitoring Study	✓
8	CDFW	2.3.2.6	Special Status Plant Study	✓
9	CDFW	2.3.2.7	Vegetation Mapping Study	✓
10	CDFW	2.3.2.9	Special Status Fish, Amphibian and Aquatic Reptile Study	✓
11	CDFW	2.3.2.12	Special Status Butterfly Study	✓
12	Pechanga	2.4.1	Update Inventory Report	✓
13	City	3.3	Updated Biological Resource Study	✓
14	City	3.7	Development of Additional Visual Simulations	✓
15	City	3.8	Updated Cultural Resources Assessment Study	✓
16	City	3.9	Construction Traffic Analysis Study	✓

2.0. Introduction to Agency and Tribe Requests

Although not all study requests satisfied the Commission's rules at 18 CFR 4.32 (b)(7), the Company is herein treating all agency letters as valid study requests.

To best respond to the range of these requests, the Company retained the services of the following recognized experts:

- GENTERRA Consultants, Inc. ("Genterra") for geotechnical and hydrological issues.
- TRC Solutions, Inc., ("TRC") for issues related to biological resource issues.
- Chambers Group, Inc. ("Chambers") for issues pertaining to cultural resources.
- Dr. Michael Anderson, Professor of Environmental Chemistry, University of California, Riverside ("Dr. Anderson") for issues pertaining to Lake Elsinore water, its quality and chemistry and recreation resources. Dr. Anderson frequently advises local water agencies.
- ZGlobal Inc. ("ZGlobal") for electric grid economic issues.
- Fred Depenbrock for transmission and substation electrical engineering.

The Company anticipates that these experts (and others as may be required) will work closely with the resource agencies and Tribes to address their requests and concerns, where necessary to develop appropriate study plans, and perform agreed-to studies.

As the FLA includes a library of reports focusing on the major issues raised: water in Lake Elsinore, geotechnical issues, and biological resources, the Company presents a listing of these reports in the following tables. For ease of access, the tables are organized according to the report's location in the FLA.

Table 2: Lake Elsinore Water Report Library

FLA Volume	Tab	Content
4	2.	Lake Elsinore Restoration and San Jacinto River Watershed Protection Program Proposal
4	3.	Restoration of Canyon Lake and Benefits to Lake Elsinore
4	4	Alum Application of Lake Elsinore Report and Questionnaire Responses
4	5.	Review of Water Quality Data on Lake Elsinore
4	6.	Proposed Lake Elsinore Aeration and Bio-manipulation Study
4	7.	Lake Elsinore Replenishment Level Study Alternatives Analysis
4	8.	Lake Elsinore Technical Memoranda – Nutrient Removal

FLA Volume	Tab	Content
4	9.	Lake Elsinore Draft Fisheries Management Plan
4	10.	Lake Elsinore Stabilization and Enhancement Project
5	E-1	Conceptual-Level Hydrology Study
5	E-2	Lake Elsinore Recycling Water Project Draft Fifth Quarter Monitoring Report
5	E-3	Preliminary Guidelines for a Monitoring and Surveillance Program
5	E-4	Hydrology Study for FERC Project No. 11504
5	E-5	Biological Resource Assessment
7	1.	San Jacinto Nutrient Management Plan – Draft Report
7	2.	Lake Elsinore/Canyon Lake Nutrient TMDL Monitoring Program Report for Year 2000/2001
7	3.	Lake Elsinore Nutrient TMDL Monitoring Program Report for Year 2001/2002
7	4.	Internal Loading and Nutrient Cycle in Lake Elsinore
7	5.	Lake Elsinore Nutrient Removal Study – Draft Report
7	6.	Lake Elsinore Toxins TMDL Monitoring Program Report
7	6a.	Representative Sampling Data
7	7.	Engineering Feasibility Study for NPDES Permit for Discharge to Lake Elsinore – Final Report
7	8.	Lake Elsinore User Survey Results
7	9.	Elsinore Basin Groundwater Monitoring Plan
7	10.	Elsinore Basin Groundwater Management Plan
7	11.	Grant Proposal No. 564 “Canyon Lake and Lake Elsinore Lake Monitoring and Modeling” rejection letter from SWRCB
6	7.8	Water Quality Control Plan, Santa Ana River Basin (8) (SARWQCB)
6	7.9	Water Quality Control Plan, San Diego Basin (9) (SDRWQCB, September 8, 1994)
8	1–11	Augmenting Lake Elsinore Flows
8	1–12	Wastewater Discharge Monitoring
8	1–13	Oxygenation
9	(3)	Status of Water Rights, Purchase Agreements and Water Reuse
9	(6)	Level of Effect of Cycling
9	E.	Final Aeration Monitoring Report (Additional Project Information)

FLA Volume	Tab	Content
11	1.	Elsinore Valley Municipal Water District Urban Water Management Plan, July 2011
11	2.	Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use, February 2011
11	3.	Elsinore Valley Municipal Water District, Elsinore Basin Groundwater Management Plan, Final Report, March 2005
11	4.	Developing a Baseline of Natural Lake-Level/Hydrologic Variability and Understanding Past Versus Present Lake Productivity over the Late-Holocene: A Paleo-Perspective for Management of Modern Lake Elsinore, March 2005
11	5.	Technical Analysis of the Potential Water Quality Impacts of the LEAPS Project on Lake Elsinore, Michael Anderson, January 31, 2006
11	6.	Technical Memorandum, June 12, 2015
11	7.	Effects of LEAPS Operation on Lake Elsinore: Predictions from 3-D Hydrodynamic Modeling, DRAFT FINAL REPORT, April 23, 2007
11	8.	Report on Water Quality Sampling Events 2004-05
11	9.	Lake Elsinore/Canyon Lake TMDL Compliance Program San Jacinto River Watershed Storm Water Sampling and Analysis Plan (SAP), December, 2008
11	10.	In-Lake Sediment Nutrient Reduction Plan for Lake Elsinore, October 31, 2007
11	11.	Three Species Studies on Nitrogen Offsets in Semi-Desert Lake Elsinore in 2006-08 as part of the Nutrient TMDL for Reclaimed Water Added to Stabilize Lake Levels, June 30, 2009
11	12.	San Jacinto Watershed Model Update (2010) – Final, October 7, 2010
11	13.	Lake Elsinore & Canyon Lake TMDL Comprehensive Phase 2 Compliance Monitoring Program Framework Lake Elsinore & San Jacinto Watersheds Authority Riverside, California, July 6, 2014
11	14.	Lake Elsinore Phase 2 Water Quality Monitoring Plan to Evaluate the Efficacy of the In-Lake Nutrient Reduction Facilities (Aeration and Mixing) for Lake Elsinore, December, 2010
11	15.	Lake Elsinore/Canyon Lake TMDL Compliance Program San Jacinto River Watershed Storm Water Sampling and Analysis Plan (SAP), December, 2008
11	16.	In-Lake Sediment Nutrient Reduction Plan for Lake Elsinore, October 31, 2007
11	17.	Three Species Studies on Nitrogen Offsets in Semi-Desert Lake Elsinore in 2006-08 as part of the Nutrient TMDL for Reclaimed Water Added to Stabilize Lake Levels, June 30, 2009
11	18.	San Jacinto Watershed Model Update (2010) – Final, October 7, 2010
12	H1.	Elsinore Valley Municipal Water District Urban Water Management Plan, Final, June, 2016
12	H2.	Lake Elsinore and Canyon Lake Nutrient TMDL Annual Water Quality Report, Final Report, August, 2015

FLA Volume	Tab	Content
12	H3.	Lake Heating, Cooling and Stratification During LEAPS Operation, August, 2006
12	H4.	Lake Elsinore and Canyon Lake Preliminary Aeration System Report, June, 2004
12	H5.	Memorandum, March, 2015
12	H6.	Effects of LEAPS Operation on Lake Elsinore: 3-D Hydrodynamic Modeling
12	H7.	Lake Elsinore Water Supply
12	H8.	Lake Elsinore Recycled Water Project – Draft 4th Quarterly Report, September, 2017
12	H9.	Lake Elsinore Recycled Water Project – Draft Final Report, November,2004
12	H10.	Results from the Lake Elsinore Recycled Water Monitoring Project
12	H11.	Draft Technical Memorandum, Michael Anderson, April, 2015
12	H12.	Draft Technical Memorandum, Michael Anderson, June, 2015
12	H13.	Lake Elsinore Water Level Sustainability

Source: FLA

Table 3: Biological Resources Report Library

FLA Volume	Tab	Content
8	1–14	Botanical and Zoological Surveys
8	II–1	Terrestrial Biological Resources Study, Lake Elsinore Advanced Pumped Storage, Talega-Escondido/Valley Serrano Interconnect Project
8	II–2	Draft Fisheries Management Plan for Lake Elsinore
9	(7)	Quantitative Information on Impacts to Terrestrial Resources
9	(8)	Existing Shoreline Vegetation and Proposed Mitigation Measures
9	(9)	Invasive Plants
9	a.	Existing Aquatic Vegetation in Lake Elsinore and Potential Project Effects
9	b.	Upland, Wetland, and Riparian Weeds and Non-Native Invasive Plants and Proposed Control Measures
9	(10)	Special Status Wildlife Species
9	a.	USFS Management Indicator Species (MIS) and USFS Sensitive Species
9	b.	Bald Eagle Surveys and Potential Project Effects
9	c.	Proposed Measures to Mitigate Impacts to Special Status Species

FLA Volume	Tab	Content
9	(11)	Additional Information about Bird use of Lake Elsinore
9	A.	Proposed Designation of Critical Habitat for Allium Munzil (Munz's Onion)
10	1.	Terrestrial Biological Resources Study LEAPS Project and Talega Escondido/Valley Serrano 500-kV Interconnection Project, Riverside County, California, November, 2004
10	2.	Summary of 2005 Focused Survey Results for the LEAPS and Talega/Escondido – Valley Serrano Interconnect Projects Riverside County and San Diego, September 29, 2005
10	3.	Impact Assessment Letter Report for LEAPS and Talega-Escondido/Valley Serrano 500-kV Interconnection Project, June 21, 2007
10	4.	Delineation of Jurisdictional Waters and Wetlands Proposed LEAPS Unincorporated Riverside and San Diego Counties, California, November 14, 2007
10	5.	Fisheries Management Plan for Lake Elsinore, September 20, 2005
10	6.	White and Leatherman Bioservices, Munz's Onion, December, 1992

Source: FLA

Table 4: Geotechnical Report Library

b	Tab	Title
5	E-10	Geotechnical Feasibility Report
5	E-11	Second Stage Geotechnical Evaluation
5	E-12	Conceptual-Level Inundation Studies
5	E-13	Construction Traffic Analysis
12	G1.	Technical Memorandum No. 3, Preliminary Evaluation of Faulting and Seismicity, LEAPS, July 18, 2008
12	G2.	Technical Memorandum No. 2, Geologic Mapping, LEAPS, July 17, 2008
12	G3.	Technical Memorandum No. 1, Summary Report of Existing Information, Geology, Seismicity and Geotechnical Issues, LEAPS, January 25, 2008
12	G4.	Memorandum to U.S. Army Corps of Engineers, Input for United States Army Corps of Engineers Section 404 Permit, LEAPS, November 22, 2006
12	G5.	Technical Memorandum, Comments on Issues Relating to Hydrology as Identified in the DEIS, LEAPS, March 31, 2006
12	G6.	Technical Memorandum, Comments on Geotechnical Issues as Identified in the DEIS, LEAPS, March 30, 2006

12	G7.	Technical Memorandum, Comparative Review of Geotechnical Conditions at Three Candidate Powerhouse Sites: Ortega Oaks, Santa Rosa and Evergreen, LEAPS, March 24, 2006
12	G8.	Phase I Work Plan, Preliminary Geotechnical Investigation, LEAPS, June 10, 2005
12	G9.	Report on Water-Quality Sampling Events 2004-05 Wet Season, LEAPS, May 31, 2005
12	G10.	Geotechnical Feasibility Report, LEAPS, August 28, 2003
12	G11.	Supplemental Report, Conceptual-Level Dike Breach Inundation Study, LEAPS, December 12, 2003
12	G12.	Supplement No. 1 to Geotechnical Feasibility Report, October 16, 2003
12	G13.	Conceptual-Level Hydrology Study, LEAPS, August 28, 2003
12	G14.	Conceptual-Level Inundation Study, LEAPS, August 28, 2003

Source: FLA

A summary of the Company's responses to the specific requests of each agency follows.

2.1. Study Requests of the US Forest Service

In its November 30, 2017 letter, the Forest Service made of number of comments that the Company proposes to address in direct discussion with appropriate Forest Service personnel. The Company intends to provide clarification to the Forest Service on the issues it raised.

2.1.1. Project Fire Risk, Impacts to Fire Suppression Efforts & Hazardous Fuels Reduction Assessment

The first study requested is to address "the extent of hazardous fuel loading, fire risk, and potential impacts to firefighters that could be affected by the proposed project."

The Company understands that it cannot take any unilateral action related to fuel loading without express approval from the Forest Service and that the Forest Service is ultimately responsible for fuel management in the CNF. As a result, the Company can only address fuel loading issues to the extent so directed by the CNF. As a result, the Company disagrees with this request.

Regarding fire risk and impacts to firefighters that could be affected by the Project, the Company notes that water in the Decker Canyon reservoir will always be available for firefighting, and that it is a non–recreational water body roughly 1,600 feet above Lake Elsinore. Further, associated with the presence of the Decker Canyon reservoir, at the option of the Forest Service, fire hydrants could be located in the area. This resource had previously been viewed by the Forest Service as a major benefit the Project provides to the CNF and should be included in any overall assessment of fire risks the Project may bring to the CNF.

The Company understands that the Forest Service has conditioning authority and can file Section 4(e) conditions relative to fire. For example, the FEIS noted that one of the Forest Service's standard conditions filed in its June 22, 2006 letter in the Project No. 11858 proceeding and discussed in the FEIS involves "fire prevention measures that would conform to water quality protection practices consistent with the USFS' best management practices for water quality management for National Forest System lands in California." Condition 33, of the previously-filed 4(e) conditions, required the creation of a vegetation and invasive weed management plan. Condition 9 of the previously-filed 4(e) conditions, explicitly addressed "fire prevention, response and investigation". In addition, this issue was addressed in Volume 2, Section 5.16 of the FLA, and also discussed in the FEIS in response to comments 201, 202, and 203 in Appendix E, and as the Company has supplemented this analysis as described in Section 4.2, Fire Risk and Impact on Fire Suppression of this Volume 14. Therefore, the Company disagrees that additional studies on fire risks brought about by the presence of the Project are needed.

The Company notes that the FEIS prepared with the cooperation of the Forest Service in the Project No. 11858 proceeding, noted that the "staff alternative" adopted in full for the Project, "includes an alternative facility location for the upper reservoir as well as a revised transmission alignment developed by the USFS and Commission staff" that in part was developed to minimize fire suppression–related risks.[1] The June 22, 2006 letter from the Forest Service in which it transmitted its preliminary 4(e) conditions concludes:

> *The staff alternative, which avoids impacts to unique riparian habitat, and provides transmission line locations that would not hinder fire suppression actions necessary to protect watershed values, would be consistent with the reservation.*[2]

As the FEIS pointed out in response to a comment, the scope of responsibility is relatively clear:

> *The co-applicants do not propose to clear vegetation under the transmission line, but fuel management in the future may require manipulation to reduce the risk of fire. Methods selected for fuel management would be developed* ***in consultation with the USFS*** *and would depend on site-specific factors (e.g., vegetation type, slope, aspect, access), and could include grazing, prescribed fire, or mechanical means to create and maintain firebreaks. Existing firebreaks that intersect the proposed alignment would also be maintained, as needed* ***and as specified by the USFS****. The increased risk of fire that would be associated*

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[1]/ FEIS at page 5–1, 5–18. See also Table 55 of the FEIS.

[2]/ FEIS at page C–2.

> *with uncontrolled public access and weed invasion highlights the importance of effective road and weed management. The objective is to eliminate all man caused fires within the project area and to take prompt, aggressive action on all fires in the vicinity. Our recommended hazardous vegetative fuel treatment plan* ***as specified by the USFS*** *would set forth protocols for the treatment of vegetation in the vicinity of the transmission lines.*[3]

The Company's proposed transmission line route in the FLA is substantially similar to the staff alternative alignment described in the FEIS. The Company looks forward to working with the Forest Service to develop any plans required by the Forest Service with respect to the construction and operation of the Project to further protect the CNF and its neighbors from fire risks.

2.1.2. Project Site Specific Seismic Hazard and Geotechnical Study

The Forest Service's second study request is that the Company conduct a seismic and geotechnical study to conduct a deterministic and probabilistic seismic hazard evaluations to estimate earthquake ground motion parameters at the Project site, assess the potential loads the proposed Project facilities would be subject to during seismic events, and develop appropriate design and safety criteria for Project facilities and operation.

The Company addressed this issue in Exhibit E–6 in Volume 1 of its FLA and in Section 4.8 and 5.6 of Volume 2 of the FLA. The Company requested a response to this request from its geotechnical consultant. Their response may be found in Attachments

[3]/ FEIS response to comment 124 at page E–38. Emphasis added.

Attachment 1: Site-Specific Seismic Hazard and Geotechnical Study Plan IssuesAttachment 1: Site-Specific Seismic Hazard and Geotechnical Study Plan Issues The studies requested by the Forest Service present a level of effort and cost which would be overly burdensome relative to the need for the information at this time. As the FEIS addressed these issues in responding to comments 68 and 69 in Appendix E, Genterra believes that the preliminary reports it prepared remain sufficient to inform the Commission of these geotechnical issues at this stage, particularly as the Commission relied on these same studies in reaching its conclusions described in the FEIS. More invasive investigations are planned to develop design level engineering criteria.

2.2. Study Requests from Water Agencies

The Company received a range of requests for studies from the State and regional water agencies, the State Board and the and the RWQCB. As discussed below, the Company has been invited to participate in the Lake Elsinore and Canyon Lake TMDL (Total Maximum Daily Load) Task Force ("Task Force"). The Task Force is comprised of local stakeholders interested in improving water quality and attaining water quality standards at both Lake Elsinore and the neighboring Canyon Lake. The Task Force includes representatives from local cities, Riverside County, agriculture and dairy, environmental groups, and the regulatory community.

In 1994 the Regional Water Quality Control Board (RWQCB) placed Lake Elsinore on the Clean Water Act Section 303(d) list of impaired waterbodies due to the lake's ongoing problem with hypereutrophication, or an excessive amount of nutrients, namely phosphorous and nitrogen, in the water. This in turn caused high algal productivity and fish kills. In 1998 and 2002, Lake Elsinore was listed for unknown toxicity, nutrients, organic enrichment/low dissolved oxygen, and sedimentation/siltation.

The TMDL Task Force works with the RWQCB to monitor lake water quality, provide nutrient source assessment models, and produce studies periodically to further understand the impairment processes affecting Lake Elsinore and publish ongoing reports periodically. All of the topics for studies requested by these two agencies will be addressed by the Task Force through the course of its work. As all of these topics had been addressed in reports described in the FLA (see for example, the reports listed in Table 2: Lake Elsinore Water Report Library) and FEIS, the Task Force will be providing periodic updated information that can be used to fine tune the design and operation of the Project prior to construction. The Company believes that both these agencies currently have sufficient information for the Commission to now accept the FLA as complete and not wait for completion of the ongoing work by the Task Force.

2.2.1. Study Requests of the State Water Resources Control Board[4]

[4]/ Much of the information relied upon in this section references reports prepared by Dr. Anderson. For ease of reference, the major reports referenced in this section may be found in Attachment 3: Copies of Select Reports from Dr. Anderson. These

The State Water Resources Control Board ("State Board") submitted study requests in its June 30, 2014 letter to the Commission. The Company herein responds to those requests.

2.2.1.1. Daily Water-Level Fluctuation at Lake Elsinore

Comment #2 in the State Board's letter requests a study of the extent of the expanding shoreline due to project operations at various foreseeable lake levels including a series of drought years. The Company does not believe an additional study is necessary, as described below.

As noted in this letter and described in the Commission's FEIS, fluctuations in lake surface elevation and lake area will result from operation of the Project. The bathymetry of the lake, lake surface elevation during operation, and pumping (withdrawal) and generation (return flow) volumes will dictate the changes in lake surface elevation and surface area. An assessment was conducted in connection with the license application submitted for Project No. 11858, which can be found in Volume 7 of the pending FLA, and further analysis was part of a study commissioned by the RWQCB.[5] Lake elevation was predicted to change 1.0 foot during weekday operation and 1.7 feet during the weekend when extended pumping could occur. Using bathymetry reported by Black & Veatch, a 1.0-foot elevation change corresponds to 49 acres of exposed (or rewetted) sediment, while 1.7 feet resulted in an 83-acre change. Using bathymetry developed from point sampling across the lake (Anderson, 2004), somewhat larger areas were predicted (79 and 134 acres exposed for 1.0 and 1.7-foot drawdown, respectively). A further analysis of water level fluctuations was conducted for the RWQCB using bathymetric data developed from 270 km of hydroacoustic measurements in 2010 (Anderson, 2010). This analysis is provided in Section 4.5, Dr. Anderson's Analysis of Daily Water Level Fluctuation at Lake Elsinore, and yielded exposed sediment areas of 72 and 122 acres for 1.0 and 1.7-foot elevation change at 1247 feet, which is in good agreement with earlier estimates from Dr. Anderson.

This compares with the range of surface elevation of Lake Elsinore of >20 feet since 2000 and variation in surface area of >1400 acres (Appendix). The loss of recreational access and use, as well as habitat loss, over the past several years has been dramatic. With annual variations in lake elevation commonly 3-4 feet and surface area reductions of 200-300 acres per year, a key advantage of the Project is the longer-term stabilization of lake level within an operational range of 1240 – 1247 feet and about 2800-3300 surface acres; although daily oscillations will be much larger than present at the lake, the longer-term stabilization will provide greater recreational and habitat value especially during periods of protracted drought.

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reports document the analyses and modeling he conducted on behalf of the RWQCB a decade or so ago to assess possible water quality impacts from operation of the Project. They have been numbered to indicate the order in which they were developed, and are best read in that order.

[5]/ See Professor Anderson's 2006 report, "Technical Analysis of the Potential Water Quality Impacts of the LEAPS Project on Lake Elsinore, Final Report submitted to the Santa Ana Regional Water Quality Control Board" ("Anderson 2006").

Lastly, further discussion of this issue may be found in:

- Comments 76, 77, 78 91, 120 and 191 in Appendix E of the FEIS, in which the Commission addressed these issues in responding to specific questions on this topic.
- Section E-2 in Volume 1 of the FLA.
- Section 4.16 in Volume 2.
- Memoranda in Volume 12 of the FLA.

2.2.1.2. Water Quality in Lake Elsinore

Comment #9 in the State Board's letter requests a study of how the cycling of the water used by the Project will affect water quality in the lake. The Company does not believe an additional study is necessary, as described below.

Resuspension of bottom sediments and sediment-associated nutrients and other contaminants resulting from operation of the Project was previously identified as a possible concern. In studies commissioned by the RWCB, an analytical wind-wave model and 3-D hydrodynamic model evaluated resuspension derived from operation of the Project. Hourly wind data were used with the model of Carper and Bachmann[6] to calculate wave period and wind-mixed depth; these calculations demonstrated that natural wind-wave action resuspends fine bottom materials in Lake Elsinore at a depth of 1 foot about 70% of the time, transporting that material into deeper regions of the lake, and thus yielding correspondingly low organic C content present in these shallow sediments.[7] Application of a 3-D hydrodynamic model further evaluated bottom shear and sediment resuspension.[8] Simulations for the proposed 150 m wide intake structure at 1247 feet elevation yielded average bottom shear values near the intake of only about 0.02 N m^{-2}; bottom shear increased at 1240 feet but the Santa Rosa site remained below the assumed critical value of 0.1 N m^{-2}.[9] As a result, resuspension was not predicted to be a significant concern for the full shoreline-mounted intake structure. Moreover, as previously noted, sediment near the margins of Lake Elsinore are coarse-textured (70-90% sand) with very little organic C that results from wind-wave action and seasonal lake surface elevation changes that focus organic matter and associated nutrients into the deeper regions of the lake.

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[6]/ Carper, G.L. & R.W. Bachmann, 1984. Wind resuspension of sediments in a prairie lake. Canadian Journal of Fisheries and Aquatic Sciences 41: 1763-1767.

[7]/ Anderson, 2006.

[8]/ Please see Dr. Anderson's 2007 report, "Ecological Impacts from LEAPS Operation: Predictions Using a Simple Linear Food Chain Model. Final Report submitted to the Santa Ana Regional Water Quality Control Board". ("Anderson, 2007").

[9]/ Id.

Although not proposed for implementation, additional simulations also evaluated 1-m vertical gates with 150, 40 and 10 m intake widths; these scenarios yielded predicted bottom shear values of 0.24, 0.54 and 1.61 N m^{-2} that could resuspend bottom sediment and result in elevated local concentrations of suspended sediment.[10] The resuspension process itself would be relatively short-lived however, as the bottom sediment would quickly equilibrate to the local shear stress.

A useful example of sediment equilibrating to the local shear stress is with the axial flow pumps installed at the lake. Horizontal velocities > 40 cm s-1 have been measured directly above soft organic sediments adjacent to the pumps11 that eroded sediment immediately beneath them. See Figure 4-2: Map Showing Basin Elevation as a Function of Latitude and Longitude with 3–D Representation and note circular depressions in inset. These velocities are an order of magnitude greater than average velocities above sediments near the Project's intake (generally <4 cm s-1).12 Measurements of acoustic backscatter (a measure of turbidity) adjacent to operational axial flow pumps did not indicate any differences with values recorded elsewhere in the lake.13 Moreover, the type-I coarse-textured sediment near the lake margins require high shear stress to mobilize and are low in total N, total P and with low pore-water nutrient concentrations that release very little nutrients (Anderson, 2001).14 Rip-rap placed near the intake will also armor the bottom. As a result, chronic resuspension of bottom sediment and sediment-borne nutrients is not expected from the operation of the Project, with its large shore-mounted intake structure.

Lastly, the Commission addressed these issues in responding to comments 85, 89 and 95 in Appendix E of the FEIS.

2.2.1.3. Aquatic Resources.

Comment # 10 in the State Board's letter requests a study of the consequences of lake fluctuation and the exposure of near shore littoral habitats to support the Lake Elsinore Fishery Management Plan. The Company does not believe an additional study is necessary, as described below.

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[10] /Id.

[11] /Lawson, R. and M.A. Anderson. 2007. Stratification and mixing in Lake Elsinore, California: An assessment of axial flow pumps for improving water quality in a shallow eutrophic lake. Water Res. 41:4457-4467.

[12] /Anderson, 2007.

[13] /Anderson's 2006.

[14] /Anderson, M.A. 2001. Internal Loading and Nutrient Cycling in Lake Elsinore. Final Report to the Santa Ana Regional Water Quality Control Board.

The fluctuation in lake level and exposure of near shore littoral habitats is not anticipated to substantially affect spawning of sport fish. Largemouth bass and bluegill typically spawn in water that is 1-3 m (3-10 feet) deep (Stuber et al., 1982); variation on the order of 1 foot due to the Project is below this range, and within the guidelines in the habitat suitability index model of Stuber et al. (1982). Moreover, maintenance of higher lake levels for operation of the Project with additional supplemental water will also avoid extreme salinity concentrations that are present at low lake levels. High salinities have been previously identified as interfering with sport fish and beneficial zooplankton reproduction in Lake Elsinore.[15]

Further discussion of this issue can be found in Sections 3.3.3 and 5.2.5 in the FEIS and Exhibit E–3 of Volume 1 of the FLA.

2.2.2. Study Requests of the Santa Ana Regional Water Quality Control Board[16]

In its December 1, 2017 letter, the RWQCB requested the studies described in the following subsections:

2.2.2.1. Water Supply Study

Study request #1 involves identifying an adequate water supply for the Project's use in the lake.

The Company understands this has been an ongoing issue for the lake for decades, and that many agencies that have been involved in resolving this issue, including the RWQCB. The Company anticipates that its involvement in the process, and its willingness to provide funds for any needed supplementary water, will allow this issue to be finally resolved to everyone's satisfaction.

Additional information on this issue can be found at comment 75 in Appendix E of the FEIS, in which the Commission addressed this issue in responding to a specific question on this topic. Also, please see Sections 3.3.2 of the FEIS, Section E–2 of Volume 1 of the FLA, Section 3.6.2.6.1 and 4.18 of Volume 2 of the FLA.

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[15]/Veiga-Nascimento, R.A. 2004. Water Quality and Zooplankton Community in a Southern California Lake Receiving Recycled Water Discharge. M.S. Thesis, University of California, Riverside, CA. 87 pp.

[16]/Much of the information relied upon in this section references reports prepared by Dr. Anderson. For ease of reference, the major reports referenced in this section may be found in Attachment 3: Copies of Select Reports from Dr. Anderson. These reports document the analyses and modeling he conducted on behalf of the RWQCB a decade or so ago to assess possible water quality impacts from operation of the Project. They have been numbered to indicate the order in which they were developed, and are best read in that order.

The Company disagrees that a new study needs to be undertaken by it since the operation of the Project is a non-consumptive use. Rather than embarking on another study of the issue, the Company anticipates working closely with the Lake Elsinore stakeholders to secure adequate, long term water for the lake to serve its water quality and recreation needs.

2.2.2.2. Study of Total Nitrogen, Phosphorus and Cyanotoxins the Project Will Contribute to Lake Elsinore

Study request #2 notes that evaporation and biogeochemical processes occurring in the upper reservoir may increase concentrations of nutrients and cyanotoxins in water during storage there. The Company agrees that additional study of processes occurring in the upper reservoir is warranted, as modified from the request below.

Preliminary consideration suggests that evapoconcentration will not be a dominant factor, but biogeochemical and physical processes may change concentrations and forms of some water quality constituents. Analytical or numerical modeling should help ascertain whether water quality is improved, degraded or unchanged during transient storage in the upper reservoir.

The Company agrees that a supplemental study could be needed on this issue and looks forward to working with the RWQCB on this issue. The Company suggests that this issue be included within the scope of the Task Force undertaking. As discussed above, due to the scope of analysis already completed, primarily by Dr. Anderson, and documented in the FLA, the Company proposes that this study be completed in due course by the Task Force, and implemented prior to the Company engaging in any ground-disturbing activities associated with Project construction.

2.2.2.3. Study of How the Project Will be Incorporated into Lake Elsinore's "TMDLs"

Study request #3 involves development of relevant information to incorporate the Project in Lake Elsinore's TMDLs. The Company agrees that additional work is needed to address this issue, as described below.

The TMDL revision presently underway by the TMDL Task Force, as described in Section 2.2, Study Requests from Water Agencies, includes a placeholder for the Project, and the Company is now working with the Task Force to develop this element. The Company will suggest to the Task Force that the development of a waste load allocation should be included in their studies, based on the differential load between that in water withdrawn from the lake during pumping and that returned to the lake during generation. While additional work is warranted to understand any changes in water quality within the upper reservoir and assess the need for and implications of a waste load allocation for the upper reservoir, based upon the schedule for the Task Force to complete their work, the Company proposes that this element of their study be completed in due course by the Task Force, and implemented prior to the Company engaging in any ground-disturbing activities associated with Project construction.

Information on this topic can be found in comments 89 and 95 in Appendix E of the FEIS, in which the Commission addressed this issue in responding to specific questions on this topic.

2.2.2.4. Study of any Increase in Nutrients in the Water Column from the Project

Study request #4 notes that bottom sediments represent a primary source of nutrients released to the water column, and that resuspension of sediments and nutrients through operation of the Project needs to be assessed.

The Company agrees that sediment resuspension and enhanced nutrient release is a very important issue, but believes that the issue of sediment resuspension and potential for enhanced nutrient release was adequately addressed in previously commissioned studies by the RWQCB as reported in Anderson (2006), Anderson (2007), and discussed in Sections 2.2.1.1, Daily Water-Level Fluctuation at Lake Elsinore and 2.2.1.2, Water Quality in Lake Elsinore.

Moreover, because further analysis will likely be undertaken by the Task Force, and due to the scope and timing for the proposed completion of the Task Force's work, the Company does not believe any additional information is necessary for the Commission to assess this issue.

2.2.2.5. Study on the Impacts to Water Contact Recreation

Study request #5 addresses the impacts of the Project on recreation and safety. The Company agrees that safety measures (likely implemented as best management practices) will be needed to exclude contact with facilities at the lake and prevent injury to recreators and proposes a modified version of the study to develop a safety plan as part of the project. The Company proposes to develop a safety plan to be implemented prior to construction or operation of the Project.

The drawdown of shoreline, and variation of lake elevation with pumping/generation was previously addressed in Anderson (2006), Anderson (2007) and considered further in response to comments in Sections 2.2.1.1, Daily Water-Level Fluctuation at Lake Elsinore and 2.2.1.2, Water Quality in Lake Elsinore. As noted in Section 2.2.1.1, Daily Water-Level Fluctuation at Lake Elsinore, stabilization of the lake at nominal operating levels of 1,240 – 1,247 feet is thought to provide enhanced long-term recreational opportunities compared with recent conditions in which lake levels have dropped as low as 1,233 feet which limited use of boat launches, created navigational hazards, yielded extremely poor water quality, and generated public health concerns and recreational restrictions due to algal toxins. Moreover, as is illustrated in 4.5, Dr. Anderson's Analysis of Daily Water Level Fluctuation at Lake Elsinore, bathymetric data indicates that shallow regions in the southern part of the lake away from beach and boat launch areas are most sensitive to lake level changes.

Information on this topic can be found in Sections 3.3.6, 5.2.8 and comments commencing with number 168 of Appendix E of the FEIS, in which the Commission addressed this issue in

responding to a specific question on this topic. Additional information can also be found in Exhibit E–7 of Volume 1 of the FLA and Sections 4.16 and 5.14 of Volume 2 of the FLA.

2.2.2.6. Study of the Impacts of Impingement and Entrainment on Aquatic Organisms

Study request #6 concerns how Project operation will potentially impact aquatic organisms in Lake Elsinore. The Company does not believe an additional study is needed based upon the previous studies commissioned by the RWQCB. Impacts were specifically evaluated for phytoplankton, zooplankton, and larval and adult fish in Anderson (2006). The impacts were minimal for phytoplankton due to their rapid rate of reproduction compared with the rate of lake volume exchange, while greater loss was predicted for zooplankton (7-25% reduction due to Project operation) and most significant for larval fish (40-100% loss). A Gunderboom system proposed for the Project reduced entrainment and lowered larval fish mortality to 8-29% and zooplankton loss to approximately 3-12% in these studies.[17] A linear food-web model was subsequently developed to project possible trophic cascades resulting from Project operation.[18]

Information on this issue can be found in Sections 3.3.3 and 5.2.5 of the FEIS.

2.2.2.7. Study of the Lake Level Impact of Project Operation

Study request #7 notes that lake level governs water quality and ecosystem health. It is agreed that a critical surface elevation exists below which the Project would not be operated. The FLA explicitly assumes a nominal operating elevation of 1240-1247 feet above MSL. Detailed hydrodynamic modeling was conducted to assess water velocities and bottom shear at 1240 and 1247 feet elevations.[19] The intent is that water will be supplied to the lake to maintain the nominal elevation above 1240 feet, a target minimum elevation for the lake that is recognized in the initial TMDL as well as the TMDL revision process as conferring generally favorable water quality conditions for recreational and ecological beneficial uses. The Company will engage with the TMDL Task force as appropriate, but does not believe additional studies apart from those underway by the TMDL Task force are necessary at this time for the Commission to assess the impacts of the proposed Project. Thus, the Company disagrees that this study is required.

Additional information on this topic can be found at comments 76, 77, 78, 91, 130 and 191 in Appendix E of the FEIS, in which the Commission addressed this issue in responding to specific questions on this topic.

2.2.2.8. Study of Impacts of Project Chemicals (if any) on the Lake

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[17] /Anderson 2006.

[18] /Anderson 2007.

[19] /Anderson 2007.

Study request #8 concerns impacts of any chemical additions to the water that would represent a discharge to the lake. The Company does not believe a study is necessary since chemical addition for algal or nutrient control is not presently planned as part of the Project.

2.3. Studies Requested by Biological Resource Agencies

Both the USFWS and the CDFW submitted comments and study requests in their December 1, 2017 letters.

We agree with some requests, would agree to others with modifications as explained below, and disagree with others for the reasons given below. The Company has prepared a proposed Biological Resources Study Program which sets forth in more detail the study plans we propose and modifications from agency-requested studies. This Study Program will serve as a basis for consultation with agencies on study modifications and final study plans and protocols. A copy may be found in Attachment 2: Proposed Biological Resources Study Program. For all studies in this Section 2.3 that the Company agrees may be needed, each can be implemented prior to the Company engaging in any ground-disturbing activities associated with Project construction.

Additional information on these topics can be found in:

- Sections 3.3.3, 3.3.4 and 3.3.5 of the FEIS.
- From the FLA, Exhibit E–3 in Volume 1, and in Volume 2, Sections 4.6 and 5.0 as well as Attachments 5 and 11. Also see Tab E–5 in Volume 5 and in Volume 8, Tab 2, part 2–1.

The following subsections provides detailed responses to each request.

2.3.1. Study Requests of the US Fish and Wildlife Service

In its December 1, 2017 letter, the USFWS requested the studies described in the following subsections:

2.3.1.1. Study of Project Effects on Nearby Critical Habitat Designated after 2007

First, the USFWS is requesting an analysis of the project effects to designated critical habitats for the federally endangered Munz's onion (*Allium munzii*), Quino checkerspot butterfly (*Euphydryas editha quino*), arroyo toad (*Anaxyrus californicus*), and southwestern willow flycatcher (*Empidonax traillii extimus*) and the federally threatened thread-leaved brodiaea (*Brodiaea filifolia*), California redlegged frog (*Rana draytonii*), and coastal California gnatcatcher (*Polioptila californica californica*), which have changed since the preparation of the existing 2007 FEIS.

The Company updated changes to designated critical habitat for these species in its October 1, 2017 Final License Application and proposes to address each of these species and their critical

habitats in its proposed study program, found in Attachment 2: Proposed Biological Resources Study Program, as described for each individual species described below.

Sections 3.3.5 and 5.2.7 of the FEIS also addresses this issue.

2.3.1.2. Request for Updated Biological Surveys

USFWS request number 2 recommends completing updated protocol surveys and habitat assessments for federally listed species and other sensitive biological resources and updating the description of potential impacts to habitats. USFWS especially recommends updated surveys for Quino checkerspot butterfly and for any areas affected by wildfires since the 2006 surveys. As noted in our response above, the Company intends to address each of these species, including the butterfly, in special-status species surveys as also requested by CDFW (below).

The Company notes, however, that just because an area may have burned would not necessarily indicate a need to conduct new surveys of the burned area if the project will not have significant effects there. The Company is proposing to conduct surveys in areas where significant effects may occur, and if those areas have burned, these surveys will also reflect any changes due to wildfire at those locations.

FEIS Sections 3.3.3 through 3.3.5 and 5.2.5 through 5.2.7 and Appendix G all provide additional information. Please also see Sections 4.6 and 5.4 of Volume 2 of the FLA.

We note that the Forest Service and City also have requested updated biological surveys, and our response to those requests would be the same as that given here for the USFWS and for CDFW, below.

2.3.2. Study Requests of the California Department of Fish and Wildlife

As noted above, the USFWS, in its letter dated December 1, 2017, recommends completing updated protocol surveys and habitat assessments for federally listed species and other sensitive biological resources and updating the description of potential impacts to habitats. USFWS especially recommends updated surveys for Quino checkerspot butterfly and for any areas affected by wildfires since the 2006 surveys. As noted in our response above, the Company intends to address each of these species, including the butterfly, in special-status species surveys requested by CDFW (below).

The fact that an area may have burned would not indicate a need to conduct new surveys of the burned area if the project will not have significant effects there. The Company is proposing to conduct surveys in areas where significant effects may occur, and if those areas have burned, these surveys will also reflect any changes due to wildfire at those locations.

We note that the Forest Service and City also request updated biological surveys, and our response to those requests would be the same as that given here for the USFWS.

Because those requests pertain to the area of interest of USFW and CDFW, the Company will work to develop protocols with these agencies and advise the Forest Service and the City of progress.

2.3.2.1. Request for Updated Biological Surveys

CDFW requests that the Company complete updated general biological surveys over the entirety of the proposed Project footprint, including the perimeter of Lake Elsinore.

A broad biological field survey of the entire Project is not considered necessary to evaluate probable significant effects. Although CDFW did not define what a "General Biological Survey" would entail, the Company believes that the comprehensive desktop site assessment that it proposes to conduct for biological resources potentially affected by the project (see Attachment 2: Proposed Biological Resources Study Program), in combination with the focused special-status species studies, as described below will be adequate. The desktop assessment will consider a 0.5-mile transmission corridor and the immediate vicinity of the hydro facilities. For other populations that are not likely to be significantly affected by the project, existing information is expected to be adequate.

The Company addresses each of the individual study requests in the following subsections. For those studies the Company agrees to undertake, with modifications noted, the Company believes that all will be developed in consultation with the USFWS and the CDFW, and implemented prior to the Company engaging in any ground-disturbing activities associated with Project construction

The FEIS Sections 3.3.3 through 3.3.5 and 5.2.5 through 5.2.7 and Appendix G all provide additional information. Please also see Sections 4.6 and 5.4 of Volume 2 of the FLA.

2.3.2.2. Bald Eagle and Peregrine Falcon Studies

CDFW requests that the Company develop a Bald Eagle and Peregrine Falcon Study Plan in order to obtain information about how bald eagles and peregrine falcons may be affected by Project construction, operation, and maintenance. Section 3.4 of Exhibit E in Volume I of the FLA and Sections 4.6 and 5.4 of Volume 2 of the FLA address the potential occurrences of bald eagles and peregrine falcons in the vicinity of the Project. In addition, the Company submitted information related to bald eagles and peregrine falcons that was analyzed by the Commission in Sections 3.3.5 and 5.2.7, and Appendix G of the 2007 FEIS. The Company agrees that the license should require that a Bald Eagle and Peregrine Falcon Protection Plan be developed in consultation with the USFWS and the CDFW, and implemented prior to the Company engaging in any ground-disturbing activities associated with Project construction.

2.3.2.3. Golden Eagle and General Raptor Studies

CDFW requests #3-4 provide an extensively detailed study request for golden eagles and raptor surveys. We agree with modifications.

The Company believes that alternative studies at a lesser cost or level of effort would be sufficient to meet the stated information needs and that such studies be implemented prior to the Company engaging in any ground-disturbing activities associated with Project construction.

Because of the heavily wooded terrain, lack of road access, and the required survey buffers (0.5 mi for golden eagles and 500 feet for other raptors), the Company proposes to locate and monitor nests from the air using a drone or helicopter. For efficiency, when possible golden eagle surveys would be paired with general raptor surveys and with bald eagle nesting and roost surveys to complete multiple species surveys during each field mobilization. The Company proposes to consult with CDFW and USFWS to discuss potential modifications to study protocols that could be more time- and cost-effective, and meet or improve data quality (e.g., the ability to determine number of eggs, accurate documentation and ease of locating nests in the terrain adjacent to the Project).

FEIS Sections 3.3.5 and 5.2.7 and Appendix G provide additional information. Exhibit E, Section 3.4 of Volume 1 and Sections 4.6 and 5.4 of Volume 2 of the FLA also discuss this topic.

2.3.2.4. Special Status Riparian Bird and Nest Monitoring Study

CDFW study #5 requests special-status riparian bird surveys and nest monitoring, including surveys for Southwestern willow flycatcher, least Bell's vireo, and coastal CA gnatcatcher. The Company believes that alternative studies at a lesser cost or level of effort would be sufficient to meet the stated information needs and that such studies be implemented prior to the Company engaging in any ground-disturbing activities associated with Project construction.

Since yellow-breasted chat, yellow warblers, and other non-federally listed riparian avian species may have a moderate to high potential to occur within the Project Area and a 500-foot buffer in riparian habitats, the Company proposes to modify this study plan to include point count surveys in suitable habitats to determine their presence during the nesting season, but to exclude nest searches. Nest searches have the potential to disturb nesting pairs, and point count surveys should be sufficient to inform the agencies as to which riparian species may occur (and are likely to breed) within the survey area. Further, if construction or vegetation clearing occurs within the nesting season, nest searches for birds would be conducted at that time to avoid impacting active nesting pairs. As the clear majority of passerine species do not reuse nests in subsequent years, locating nests prior to the proposed construction season is not sufficiently informative to justify costs and potential disturbance to the birds that may occur during non-clearance surveys. Rather, birds recorded during point count surveys would be assumed to be breeding in the area if they are observed during the appropriate season and are known to breed in the vicinity.

Lastly, information on the habitat of coastal gnatcatcher can be found at comment 161 in Appendix E of the FEIS, in which the Commission addressed this issue in responding to a specific question on this topic.

As noted above, the Company agrees to analyze potential project affects to federally designated critical habitats for Southwestern willow flycatcher and California coastal gnatcatcher, and to conduct updated field studies for those two species plus the least Bell's vireo. Surveys would be focused on identified suitable habitats for the species targeted, and final study protocols would be agreed in consultation. Again, the Company believes that such studies can be implemented prior to the Company engaging in any ground-disturbing activities associated with Project construction.

FEIS Sections 3.3.5 and 5.2.7 and Appendix G provide additional information. Exhibit E, Section 3.4 of Volume 1 and Sections 4.6 and 5.4 of Volume 2 of the FLA also address this issue.

2.3.2.5. Special Status Bat Study

CDFW study #6 requests special status bat surveys. We do not agree with the need for this study. Initial desktop review did not identify bat species of concern likely to be affected.

2.3.2.6. Special Status Plant Study

CDFW study #7 requests special-status plant surveys.

The Company generally agrees to the study plan, excluding federally-listed Munz's onion which has been addressed in the Commission's response to comment 158 in Appendix E of the FEIS. Final study protocols for other species would be developed in consultation with the agencies. As sufficient information is already in the record, the Company believes that such studies can be implemented prior to the Company engaging in any ground-disturbing activities associated with Project construction.

Additional information may be found in FEIS Sections 3.3.5 and 5.2.7 and Appendix G, as well as Exhibit E, Section 3.4 of Volume 1 and Sections 4.6 and 5.4 of Volume 2 of the FLA.

2.3.2.7. Vegetation Mapping Study

CDFW study #8 requests vegetation mapping. We agree with the need for this study, with modifications.

The Company agrees to conduct vegetation mapping. However, the level of effort and cost to conduct the VegCAMP method as proposed is overly burdensome relative to the need for the information; therefore, the Company proposes to use existing digital vegetation/habitat information, including CalFIRE to update vegetation communities potentially affected within the footprint of the proposed project components. This information will be used to identify the areas of suitable habitat for the species-specific surveys. As so much information on this topic is presently in the record, the Company believes that such studies can be implemented prior to the Company engaging in any ground-disturbing activities associated with Project construction.

Section 5.4 of Volume 2 includes additional information on this issue.

2.3.2.8. Terrestrial Wildlife Movement Study

CDFW study #9 requests a study of terrestrial wildlife movements. We do not agree with the need for this study.

The Company believes that the requested Regional Connectivity/Wildlife Movement Corridor Assessment is not necessary to evaluate the probable significant effects of the Project. Existing information is considered adequate to evaluate effects, as wildlife movements are unlikely to be significantly affected by the project.

Section 5.4 of Volume 2 provides additional information.

2.3.2.9. Special Status Fish, Amphibian and Aquatic Reptile Study

CDFW requests that the Company develop a Special-Status Fish, Amphibian, and Aquatic Reptile Study Plan in order to obtain information regarding special-status fish, amphibian, and aquatic reptile species in the Project vicinity, to perform an analysis of how the species may be affected by Project construction and long-term operations and maintenance activities, and to develop appropriate buffers and avoidance and minimization measures for Project construction, operations, and maintenance activities. Section 5.4 of Volume 2 of the FLA discusses these species. The Company agrees that a study plan should be developed in consultation with CDFW and USFWS, and implemented prior to the Company engaging in any ground-disturbing activities associated with Project construction. Such plan would identify all aquatic habitats during field wetland delineations conducted prior to Project construction and certain Project components may be located to avoid identified habitats for special-status fish and amphibians. The plan also would include a focused field survey in suitable and critical arroyo toad habitat, as outlined in the study plan found in Attachment 2: Proposed Biological Resources Study Program. Finally, this plan may propose adequate buffer zones and avoidance and protection measures, if necessary.

2.3.2.10. Vernal Pool Study

CDFW study #11 requests surveys of vernal pools. The Company does not agree to conduct this study as it has worked with the Forest Service to ensure that project facilities avoid these areas. Attachment 11 of Volume 2 includes detailed information on facility placement within the CNF.

2.3.2.11. Coastal Cactus Wren Study

CDFW #12 requests surveys of coastal California cactus wren. We do not agree that this study is needed.

As San Diego cactus wren has a low potential to occur within the Project Area and a 500-foot buffer, based on geographic range, the Company does not propose to conduct the requested study.

2.3.2.12. Special Status Butterfly Study

CDFW study #13 requests studies of special-status butterflies, including the federally-listed Quino checkerspot butterfly. We agree with modifications to the study proposal to conduct a survey in advance of construction of the Project. This approach is consistent with the Commission's response to comment 159 in Appendix E of the FEIS in which the Commission acknowledged that the construction of the project could adversely affect Quino checkerspot butterfly.

Our proposed study approach is provided in the Biological Resources Study Program found in Attachment 2: Proposed Biological Resources Study Program.

2.3.2.13. Pacific Pocket Mouse Study

CDFW study #14 requests surveys of the Pacific Pocket mouse. We do not agree that this study is needed.

CDFW cites several papers regarding the recommended methodology for the requested survey, including live trapping and the use of canine scent-dogs, which would require permitting from the USFWS, an MOU from the CDFW and potentially approval from the CNF. The level of effort and cost for both methods is overly burdensome relative to the need for the information. Live trapping is considered suboptimal for this species as evaluated in the 2010 5-Year Species Review. This species lives in the immediate vicinity of the coast and has not been found further than 2.5 miles inland. CDFW did not state that the species was likely found within the Project area, but only in the general vicinity. There is no nexus between project operations and potential effects (whether direct, indirect, or cumulative). There is a low likelihood of species occurrence, and low probability of significant impact.

2.3.2.14. Water Balance/Operations Model Study

CDFW study #15 requests a water balance/operations model study for Lake Elsinore. The Company understands that CDFW may look to a water operations models to determine effects on resources under its control. However, the Company believes that alternative studies at a lesser cost or level of effort would be sufficient to meet the stated information needs. Specifically, the Company suggests that the scope of this type of study (if required) can best be determined in consultation with the RWCQB. Further, this type of study is likely included in the ongoing work of the TMDL Task Force. Thus, the Company suggests that CDFW may wish to participate in the Task Force to obtain current information on this topic.

2.4. Studies Requested by the Temecula Band of Luiseño Mission Indians

In their December 1, 2017 letter, the Pechanga Tribe has requested numerous studies regarding impacts on Traditional Cultural Property and updates to Tribal Cultural Resources to augment traditional scientific archeology from its elders and community members. The letter from the Tribe is greatly appreciated and provides valuable information regarding their knowledge and concerns for the project area. Nevada Hydro is seeking to actively engage with

the Pechanga Tribe regarding the issues raised. Please also see the cultural resources assessment in Tab E–6 of Volume 5 and the SHPO and Tribes Correspondence and Distribution List in Section B of "Additional Project Information" of Volume 9 of the FLA.

The Company has retained the services of the Chambers Group to assist with issues relating to historic properties and cultural resources. Chambers had previously been involved in the Project, and authored the Historic Properties Management Plan for the Project. On behalf of the Company, Chambers has reached out to the Pechanga Tribe to coordinate with them, and has requested a meeting.

Nevada Hydro President Rex Wait has written a formal response to the Pechanga Tribe's December 1, 2017 submission, thanking the Tribe for its participation in the Study Request period of the licensing process. Mr. Wait expressed his respect for the Tribe and the issues raised in their submission and requested a meeting to discuss a close collaboration in preparation and updating of studies regarding the Tribe's Traditional Cultural Property. A copy of this letter may be found in Attachment 4: Letter from the Company to the Temecula Band of Luiseño Mission Indians.

Nevada Hydro respects the historical perspective of the Tribe, and looks forward to the senior-level meeting in early 2018, which the Company hopes and expects will lead to engagement and insights from the Tribe, its leadership, and its Elders.

While largely agreeing with the Tribe's recommendations, the Company believes some refinement and clarification to the specifics with regards to the updates and additional studies that may be required. While the Company agrees that while the Historic Properties Management Plan ("HPMP") created for Project No. 11858 is now aged, it still contains quite a bit of useful information that remains largely unchanged today. Below is an overview of the updates the Company believes are necessary to achieve the results the Tribe requested so that all parties are informed. The Company intends to discuss this approach with the Tribe, as soon as a meeting has been scheduled with them.

2.4.1. Update Inventory Report

Prior to implementing any ground disturbing activities, and in consultation with the Tribe, the Company proposes that an updated study define the Area of Potential Effect (APE) in the original HPMP including the direct and indirect areas. The Company proposes to update the technical inventory report to include an updated record search, archival research, prehistoric and historic context (as-needed), ethnographic context (with Tribal input), field survey data, summary of findings, and eligibility and management recommendations. The Tribal outreach will include an updated Native American Heritage Commission (NAHC) Sacred Lands File (SLF) search and contacting the Tribes listed on the NAHC response letter. The additional field work will entail revisiting all sites previously inventoried and updating the report as needed, and surveying areas that are publicly accessible but were not surveyed previously within the APE. The revised report

will include updated figures, maps, and site forms. As part of the inventory process the following documents will also be prepared to assess potential impacts to previously unknown resources and/or traditional cultural properties (TCP) to avoid and/or resolve adverse impacts to historic properties and TCPs.

2.4.2. Geoarchaeological Study

A geoarchaeological study will address the Tribe's concern regarding the potential for buried sites within the APE. The study will use concepts and methods of earth sciences (especially geology, geomorphology, hydrology, sedimentology, and pedology) to understand the changes that have occurred over time in the area that would make certain areas likely to contain cultural resources, including the potential for submerged sites. This study will be conducted by a qualified geoarchaeologist with support from senior cultural resources experts.

2.4.3. Landscape Study

The landscape study will include a thorough review and reporting of ethnographic information about the region and will weigh heavily on the Tribal knowledge obtained through interviews and references reviewed and approved by the Tribe. This task will also include documentation of Lake Elsinore as a Traditional Cultural Property. Additionally, a visual assessment will be conducted to include evaluating the overall viewshed changes from Indirect APE vantage points to evaluated potential viewshed-related impacts to eligible cultural resources. This study will be conducted by a qualified ethnographer (where applicable) with support from senior cultural resources experts.

2.4.4. Draft Programmatic Agreement ("PA")

Upon the review and approval of the above documents, a Project Programmatic Agreement ("PA") is anticipated. A Project PA would be appropriate because the project involves multiple agencies, and the effects to historic properties may not be fully determined in advance due to private property and/or the potential for submerged (or buried) sites. The PA will serve as the overarching agreement document or guide that sets out the measures that will be implemented to resolve any adverse effects through avoidance, minimization, or mitigation.

The Company anticipates developing an Historic Properties Management Plan ("HPMP") to be based on the updated Inventory Report and the results of additional studies. The HPMP will be updated to include the current findings and approved measures for the Project. The updated HPMP will also follow the *Guidelines of the Development of Historic Property Management Plans for FERC Hydroelectric Projects* (2002). The HPMP will also include a plan for the treatment of human remains (NAGPRA Plan) and unanticipated discoveries (Inadvertent Discovery Plan) in the event such is identified during construction activities.

3.0. Studies Requested by the City of Lake Elsinore

Although the City of Lake Elsinore is not a resource agency under Commission rules, because of the important role it holds regarding the status and management of the lake, the Company is herein responding to its requests as if it were a resource agency. The Company was gratified to note that the City appeared to be one of the few commenters to have reviewed the entire FLA.

In its December 1, 2017 letter, the City requested the studies described in the following subsections.

3.1. Additional Geotechnical Studies

The City's first study request is that the "preliminary" reports prepared by Genterra be updated. Conceptual-level statements and descriptions presented by the Company and its geotechnical consultant in their reports were prepared as required by Commission rules, and so are considered as provisional and subject to revision by the Commission. Refinements to the conceptual design are to be made during preliminary and final design of the Project facilities, as required by Commission rules. Additional discussion on this issue can and on the geotechnical reporting requirements the Commission imposes on license applicant can be found in Section 4.3, Potential Impacts on Local Groundwater Resources.

Thus, the Company disagrees that additional geotechnical studies are required at this stage of the Commission's licensing process.

3.2. Study on Potential for Breach of the Lake's Clay Liner

The City's second request involves a study of whether and how construction of the powerhouse could breach the clay liner of the lake. The Company believes that the discussion in Section 4.3, Potential Impacts on Local Groundwater Resources sufficiently addresses the issue, describing the design and construction techniques to be utilized to protect aquifers from contamination. Consequently, the Company does not agree that additional studies on this issue are required.

3.3. Updated Biological Resource Study

The City's third request was that the Company conduct updated biological surveys. Please see the discussions in 2.3, Studies Requested by Biological Resource Agencies, where the Company addresses this issue in detail. Because this request pertains to the area of interest of USFW and CDFW, the Company will work to develop protocols with these agencies and advise the City of progress.

3.4. Shoreline Erosion and Turbidity Study.

The fourth request of the City focused upon the potential for sediment erosion and generation of turbidity because of Project operation. This is an issue that has been identified in earlier reviews, as well as part of this current application review. The issue was considered in an

initial technical analysis of potential water quality impacts of the Project[20], and evaluated more rigorously in the subsequent 3-D hydrodynamic modeling analysis.[21] While the statement indicating "persistence of turbidity induced by sediment resuspension from regular Project operation is not clear" on p.7 in Anderson (2006) identified in this letter, subsequent empirical evidence in that report supported the notion that chronic resuspension would not be expected. This evidence included acoustic backscatter measurements near the axial flow pumps that, despite continued input of a large amount of bottom shear, did not generate suspended sediments from soft organic sediments there. Additional evidence was provided from 3-D hydrodynamic simulations that yielded average bottom shear values below critical values required to resuspend sediments near the 150-m long shore-mounted intake.[22]

Additional information can be found in the following locations:

- Section 2.2.1.2, Water Quality in Lake Elsinore.
- The Commission's response to comments 19, 76, 77, 78, 85, 91 and 130 in Appendix E of the FEIS in which the Commission addressed and resolved this issue in responding to specific questions on this topic.
- From the FEIS, Sections 3.3.1.2, 3.3.2.1 and 3.3.2.2.
- From Volume 1 of the FLA, Exhibit E–3.
- From Volume 2 of the FLA, Sections 3.1.1, 4.10.1.3 and 5.8.2.

As a result, the Company does not believe additional studies are called for on this topic.

3.5. Study on Recreation Needs

The City's fifth request is to evaluate recreational use information to identify current and future needs.

The Company proposes to consult with the City and other interested parties to evaluate the present state of understanding to determine what further studies may be required to update the information already available. As a result, the Company is willing to participate in a recreation study with other interested parties, but the outcome of this study should not cause a delay in Commission acceptance of the FLA. As a result, the Company does not believe an additional study is required at this time. However, the Company expects that the cooperative effort of all

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[20] / Anderson 2006.

[21] / Anderson 2007.

[22] / Anderson 2007 at pages 22–25.

interested parties during the licensing process will form recreation–related mitigation proposals for the Commission.

Recreation is addressed extensively in Sections 3.3.6 and 5.2.8 in the FEIS. Additional information can be found in Exhibit E–7 of Volume 1 of the FLA and Sections 4.16 and 5.14 of Volume 2 of the FLA.

3.6. Effect of Daily Lake Elevation Fluctuations on Existing Recreational Activities.

The sixth study request by the City is to study the effect of daily lake elevation fluctuations on existing recreational activities. In consultation with Dr. Anderson, the Company believes that the general issue of lake elevation fluctuations was considered in some detail in earlier studies and has been updated in Section 2.2.1.1, Daily Water-Level Fluctuation at Lake Elsinore. As noted in that section, with annual variations in lake elevation now commonly 3-4 feet and surface area reductions of 200-300 acres per year, a key advantage of the Project's presence is the longer-term stabilization of lake level within an operational range of 1240 – 1247 feet and about 2800-3300 surface acres; although daily oscillations will be larger than present at the lake, the longer-term stabilization will provide greater recreational and habitat value especially during periods of protracted drought.

Additional information on the topic may be found at comment 168 in Appendix E of the FEIS in which the Commission addressed and resolved this issue in responding to specific questions on this topic.

The Company therefore does not believe additional studies on this topic are needed at this time. As noted in the previous section, the Company expects that the cooperative effort of all interested parties during the licensing process will form recreation–related mitigation proposals for the Commission.

3.7. Development of Additional Visual Simulations

The City's seventh study request is to update and expand the visual simulations present in the FLA. The Company agrees that many of the simulations presented in the FLA are dated and should be updated during the Commission's licensing process. The Company will consult with the City to determine appropriate images.

3.8. Updated Cultural Resources Assessment Study

Regarding the City's eighth request for an updated cultural resources assessment, the Company believes that this issue is best addressed with the Pechanga Tribe as described in Section 2.4, Studies Requested by the Temecula Band of Luiseño Mission Indians, and so does not believe studies on this topic should be undertaken relating to this request.

3.9. Construction Traffic Analysis Study

The City's ninth request asks the Company to undertake and updated analysis of construction traffic. The Company presented an extensive traffic analysis in section 5.15 of Volume 2 of its FLA. The Commission addressed this issue extensively in response to comments 67, 159, 221, 222, 223, 224, 225 and 226 in Appendix E of the FEIS. Nonetheless, the Company agrees that an updated traffic analysis is appropriate, and is willing to undertake an updated traffic analysis prior to construction.

3.10. Construction Noise and Vibration Assessment Study

In its tenth request, the City asks for a noise and vibration assessment related to construction of the Project. The Commission addressed this issue in response to comment 258 and 259 in Appendix E of the FEIS. As a result, the Company does not believe additional studies are required.

Additional information on noise is scattered throughout the FEIS. Please also see Sections 4.13 and 5.18 of Volume 2 of the FLA.

3.11. Property Value Assessment Study

In its final study request, the City asks for a study of the short and long-term effects of the project on residential property values.

Socio–economic impacts were addressed in the FEIS in Section 3.3.8.2 and updated in Section 5.12 of Volume 2 of the FLA. See the Commission's response to comments 195, 198, 218 and 227 in Appendix E of the FEIS in which the Commission addressed this issue in responding to specific questions on this topic. The Company, therefore, disagrees that any update to these conclusions is needed at this stage of the Commission's licensing process.

4.0. Detailed Responses to major Issues Raised

4.1. Introduction

In the study requests discussed in this letter, the issues of fire risk, groundwater and lake water quality were raised by more than one party. Those issues are addressed in more detail in this section.

4.2. Fire Risk and Impact on Fire Suppression

Many stakeholders are concerned that the Project's proposed primary transmission lines could present a fire risk. The Company has addressed this issue herein in Sections 2.1.1, Project Fire Risk, Impacts to Fire Suppression Efforts & Hazardous Fuels Reduction Assessment. As noted there, the Commission addressed this issue extensively in its response to comments 201, 202 and 203 in Appendix E of the FEIS. The Forest Service also addressed the issue in its Sec. 4(e) condition #9 in the FEIS.

As described below, the Company is of the view that these concerns are not well founded. 500 kV lines like the primary transmission lines that are part of the Project have essentially never caused fires. In addition, these lines are operated to not impair firefighting efforts.

On November 8, 2017, the California Public Utilities Commission published a proposed decision in its Docket Rulemaking 15–05–006 titled, "Decision Adopting Regulations to Enhance Fire Safety in the High Fire-Threat District."[23] As both CalFire and the Forest Service participated in the development of this decision, the Company views it as the "state of the art" in California, and will design and operate its facilities according to the parameters set out in the proposed and final decision, when made available.

Finally, the Company has worked with CNF personnel to assure them that water in the Decker Canyon head lake will be available for firefighting use.

4.2.1. 500 kV Lines do not Cause Fires

Several letters asked about the transmission lines that ignited the devastating Butte fire in 2015. Nevada Hydro retained Fred Depenbrock as a transmission planning consultant to the Project. Mr. Depenbrock has significant credentials in electric utility planning and operations, engineering analysis, economic and regulatory studies, and human dynamics. He has extensive experience in system load flow, dynamics and short circuit analysis using both Siemens PTI's PSS®E and GE's PSLF software and has used Siemens PTI's PSS®MUST software to analyze outlet capabilities of new generation projects. He represented Siemens PTI to the WECC Modeling and Validation Work Group and the WECC Modeling and Validation Work Group.

Fires such as in Butte in 2015 were caused by smaller, lower voltage lines that generally are designed for local distribution from a substation or tap off a line between two substations to supply homes and businesses. The high voltage 500 kV primary transmission lines that will connect the Project to the grid are different from the lower voltage residential and business connections that have been associated with wildfires. Mr. Depenbrock has researched the available data and found only a single fire caused by 500 kV transmission line anywhere in the country. According to a 2005 report from the National Electric Reliability Council, this fire occurred when a Lombardi Poplar tree fell across the transmission line, and subsequent arcing set fire to a nearby house. The fire was a result of inadequate vegetation management.

The Project includes about 33.2 miles of 500 kV primary transmission lines, including approximately 2.7 miles underground[24]. This is a small fraction of the approximately 15,000 miles

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[23]/The Proposed Decision is available at http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M198/K355/198355203.PDF

[24]/This consists of approximately 31.2-mile length from the San Diego Gas and Electric and Southern California Edison systems, plus two, one-mile lines to connect the powerhouse. These two circuits are run in a single one-mile long tunnel running up the hill from the powerhouse.

of 500 kV lines that make up the arterial system of the US electric system in the Western Electricity Coordinating Council ("WECC"). The WECC system provides fast-acting performance that is overseen by government agencies such as the Commission and local experts in utilities and their regional councils. Reliability and safety are paramount at all levels of the oversight process.

All 500 kV lines have protective relays at both ends of the line that communicate to each other constantly. If this doesn't result in a zero-net flow difference or if there is any loss of communication, the relays initiate a line trip using circuit breakers at both ends of the line. This de-energizes the line in less than one tenth of a second, **so the probability of a fire igniting is very low**.

In addition to the extremely fast de-energization ensured by the differential protection relays and constant communication on the transmission line, there are numerous protections provided for the 500 kV lines in WECC. Wide transmission rights-of-way (ROW) for this voltage level of line ensure that line behavior such as conductor swings in high winds will not impact the nearby area. As well, vegetation management (tree and brush trimming and monitoring) along the ROW keeps debris from hitting the line and reduces potentially flammable patches of grass, bush or trees. California's electricity industry maintains active vegetation management programs to keep existing transmission and distribution powerlines clear of potentially hazardous vegetation.

4.2.2. High Voltage Lines are Operated in a Manner that does not Impair Fire Fighting

Transmission lines located in areas with high fire risk and high occurrence of lightning strikes creates a reliability risk to the grid system. Dense smoke from wildfires can "trip" a circuit, causing it to go out of service, or outages can result from emergency line de-rating or shut-downs during a nearby fire to prevent thermal damage to the line, to prevent a smoke-caused trip, or to meet the safety needs of firefighters.

The U.S. Forest Service and municipal fire-fighting organizations have set protocols and rigorous training procedures for line operations and for fire suppression, including the use of helicopters near high voltage power lines and how to fight fires on the ground near such facilities. The transmission array proposed by Nevada Hydro is not new or unique, and in fact a similar line traverses the valley and crosses the I-15 near Temescal Valley.

Nevada Hydro is committed to abiding by industry-leading fire prevention and operation protocols in conjunction with Federal, CNF, State and local officials. To the extent allowed by the CNF, the Company will maintain a rigorous vegetation management program on the ROW, reducing fuel sources and limiting the opportunity for fire near transmission towers and lines. The ROW will be monitored by camera, drones and physical inspection.

4.2.3. Water in the Decker Canyon Reservoir will be Available for Fighting Fires.

The creation of a new reservoir in Decker Canyon will provide a new, convenient source of water for fire suppression high on the mountain in the Cleveland National Forest. This will allow for easier access to water and shorter trip times for firefighters.

4.3. Potential Impacts on Local Groundwater Resources

In response to concerns raised by a variety of parties relative to potential impacts the Project may have on groundwater resources, the Company called on its Geotechnical Consultant, Genterra Consultants, Inc. ("Genterra") to formulate a response. Genterra has been responsible for the geotechnical analysis for the Project as documented in the FLA. Genterra is a California corporation, headquartered in Irvine, California, specializing in geotechnical engineering, hydrology, and hydraulics for dams, reservoirs, and other water facilities. The firm has provided consulting engineering services on more than 160 dams and reservoirs, most of them located in California.

4.3.1. Introduction

During 2003, in support of the Company's prior proposal to license the Project, Genterra had prepared a feasibility-level report on geotechnical issues, a conceptual-level hydrology report, and a conceptual-level inundation study report. See Volumes 11 and 12 of the FLA for copies of these reports.

The major components of the Project include the dam and reservoir located in Decker Canyon (upper reservoir), near the upstream end of the watershed adjacent to South Main Divide Road, a single approximately 21-foot diameter shaft and pressure tunnel descending from the upper reservoir to an underground powerhouse located near Grand Avenue and Santa Rosa Avenue on the west side of Lake Elsinore, a probable second smaller utility tunnel (non-pressure) from the upper reservoir area to the powerhouse, an access tunnel to the powerhouse, single or double tailrace tunnels leading from the powerhouse to Lake Elsinore (lower reservoir), and an inlet/outlet structure located in Lake Elsinore. Water will cycle between the existing lower reservoir (Lake Elsinore) and the man-made upper reservoir located roughly 2,792 feet above MSL.

The Company recognizes that the construction and subsequent operation of the Project has the potential to impact groundwater resources in the immediate vicinity of the facilities, and in areas located hydraulically down-gradient from the facilities. Conceptual-level statements and descriptions presented by Genterra in its reports were prepared as required by Commission rules, and so are considered as provisional and subject to revision by the Commission. It is understood that refinements to the conceptual design may be made during preliminary and final design of the Project facilities, as required by Commission rules.

4.3.2. Groundwater Issues

The Commission responded to questions on this issue in its response to comments 82, 83, 112 and 117 in Appendix E in the FEIS. As noted in Genterra's Geotechnical Feasibility Report dated August 28, 2003, evidence of groundwater near the surface was not observed in Decker Canyon during site reconnaissance visits. However, it is likely that groundwater does exist in fractures in the bedrock underlying the proposed Decker Canyon reservoir. Invasive groundwater studies were not performed as part of the conceptual-level studies done by Genterra, but are scheduled before commencement of construction can commence. Therefore, as part of anticipated preliminary design activities as required by Commission rules, potential groundwater issues and concerns will be further addressed by the Company. Research and field investigations are planned to address the issues of concern related to potential adverse impacts to groundwater near Project facilities. Three to four deep (approximately 1,000 feet) borings are planned along each selected penstock alignment to obtain cores of the granitic rock that will be tunneled through, as well as to assess existing groundwater conditions.

It is anticipated that the subsurface investigations may include the following activities:

- Assessment of any aquifers, springs, and local groundwater;
- Assessment of information on domestic water wells near the Project;
- Research into potential Project impacts to nearby domestic water wells;
- Exploratory drilling and sampling to assess current groundwater conditions as well as to determine level of fractures in the bedrock materials;
- Installation of piezometers with automated data acquisition system for long-term collection of groundwater monitoring data;
- In-situ permeability testing (Packer testing) in selected borings by measuring water loss within the weathered granite and granitic bedrock (which will be used to determine appropriate grouting to minimize groundwater loss during tunneling); and,
- Additional in-situ testing, such as Downhole P- and S-wave Logging, 3-Arm Caliper Logging, Acoustic and/or Optical Televiewer, Heat Pulse Flowmeter Testing, and Gamma Ray Neutron Logging, will be performed to better understand the characteristics of bedrock materials, and for engineering evaluation.

4.3.3. Mitigation of Groundwater Issues

The Decker Canyon reservoir will be impounded by a dam to be constructed on its downstream (west) side. At the Decker Canyon site, the Project design is anticipated to include construction of storm water diversion structures to prevent runoff of rainfall from flowing into the reservoir from upstream areas, diverting it instead to is natural streamflow. Therefore, the only reservoir inflow would be from direct rainfall within the perimeter drainage boundary of the reservoir.

It is recognized that tunneling through the subsurface and other Project construction activities may cause impacts to the local groundwater system. It is anticipated that tunneling conditions across existing fault zones will quickly transition from competent granitic rock to soft, saturated lake sediments. Tunneling through the soft lake sediments will require ground stabilization methods to allow tunneling, and measures to control any significant groundwater inflow that may occur. Ground improvement of the sediments may be necessary to allow for efficient tunneling. The selection of methods to be used for construction of the tunnel will be based on consideration of how to minimize adverse impacts to the groundwater. For example, during the tunneling process groundwater will tend to drain out of any open fractures in the rock that contain free water. Any significantly large amount of drainage into the tunnel could cause some lowering of local groundwater levels. By grouting the fractures before advancing the tunneling process, the potential adverse effects of the construction activities on the groundwater system in the area can be minimized. Therefore, prior to and/or during tunneling activities, it is anticipated that pressure grouting will be used to seal-off the open fractures as needed to minimize the flow of groundwater into the tunnel and to reduce impacts to existing wells in the vicinity of the Project site. All wells and piezometers will be carefully monitored during construction to implement necessary mitigation measures that are needed to reduce the impacts to existing wells.

The mitigation of potential impacts due to construction of Project facilities is anticipated to include the following:

- Implementation of an effective erosion control plan during construction in accordance with local and state requirements. The erosion control plan will include Best Management Practices;
- Provide for watering of the construction sites to minimize the generation of any dust;
- Provide and maintain vegetation for disturbed areas; and,
- Minimization of the size and extent of disturbed areas by designating appropriate construction traffic areas, worker areas, and off-limits areas.

These mitigation measures are commonly performed for many projects and will be used successfully for the Project to limit potential impacts to the environment at the site.

The Decker Canyon reservoir design is anticipated to include installation of a double-liner system, which will function to minimize impacts to the groundwater beneath the reservoir. This liner system will include seepage collection facilities to direct seepage flows into the drainage system. Water that accumulates at the drainage system collection points will then be removed by pumping the water back into the reservoir. Water will not be released to the downstream area because the objective is to prevent lake water from getting into the local groundwater system. During the preliminary design phase of the Project, it is anticipated that a double liner system

alternative will be selected as the design alternative for the reservoir liner. The liner system would consist of two impermeable layers, and the secondary liner would serve as a barrier for any leakage that might pass through the primary liner. The drainage layer would be sandwiched between the liners. Sensors will be designed and installed at key locations to act as a detection system, and to assist in finding locations where any repairs may be needed to minimize possible leakage. An additional subdrain below the lower liner may be required to collect water from existing seeps, if any, in the subgrade. The reservoir liner will be designed to minimize the potential for any mixing of reservoir water with the local groundwater. All Project features will be waterproofed to prevent existing groundwater from getting into the Project systems, as well as to prevent any lake water from getting into the local groundwater system.

Domestic water wells are currently being used by communities located along South Main Divide Road, and in other nearby areas. Much of the flow of groundwater towards these wells is assumed to occur through fractures in the subsurface bedrock materials. By keeping the groundwater resources largely intact with proper design and construction techniques, the residents of the local communities can continue to rely on the groundwater to supply water to their wells. The Project design is anticipated to include a mitigation plan with strategies to minimize adverse Project impacts so that the wells can continue to provide the same quality of water to the owners.

In addition, Genterra's Technical Memorandum dated December 1, 2017 not only discussed the groundwater issues and concerns about the dam and reservoir to be constructed in the Decker Canyon area, it also addressed potential groundwater impacts and mitigation measures related to the construction of the shaft and tunnel from the upper reservoir to the underground powerhouse, the vertical access to the underground powerhouse, and the single (or double) tailrace from the powerhouse to the Lake Elsinore inlet/outlet structure. During construction of the tailrace and inlet/outlet structure at Lake Elsinore, it is anticipated that soft lake sediments will be encountered. Mitigation measures will need to be implemented to deal appropriately with soft soils encountered in the subsurface.

Also, in the Technical Memorandum of December 1, 2017, Genterra noted that tunnel construction activities could impact the local groundwater resources in the Decker Canyon area because groundwater would tend to flow into the tunnel during construction. The inflow of water from intersected fractures in the rock could potentially lead to a lowering of groundwater levels in the overlying Decker Canyon area. Genterra engineers and scientists have the requisite skills and experience needed to develop features that can be designed to appropriately deal with these issues. Grouting and other cost-effective mitigation measures are important for implementation to reduce the risk of water loss from the groundwater system. The groundwater issues can be handled in an effective manner by development of sound design and construction plans, monitoring during construction, and the implementation of appropriate mitigation measures, all of which are to occur upon issuance of the Commission's license.

4.4. Non–Technical Description of Lake Elsinore Water Level Fluctuation

4.4.1. Introduction

Throughout the study request process, many respondents requested a variety of water and aquatic habitat studies to update those contained in the FLA. As discussed throughout this document, these requests are being evaluated through further meetings with agencies, municipality administrations and the Pechanga Band of Luiseño Indians. Specifically, Nevada Hydro is working closely with LESJWA, the TMDL Task Force, and such notable experts as Dr. Michael Anderson of University of California – Riverside who is assisting Nevada Hydro's Project team. These agencies, administrations, and subject experts will inform studies on water quality and shoreline impacts as part of a larger water management program. Although the Company believes this review meets any Commission's requirements, it will, of course abide by future Commission orders on the issue.

4.4.2. Water Levels

Note that Commission addressed this issue in response to comments 76, 77, 78, 85, 91, 130 and 191 in Appendix E in the FEIS.

Lake Elsinore is a relatively shallow lake with a large surface area that is a naturally occurring sink for the San Jacinto River watershed. The lake has a surface area of 3,412 acres at a maximum water level of 1,247 feet above mean sea level (AMSL) between December and March, and a minimum surface elevation of 1,240 AMSL. The normal operating level is 1,245 feet AMSL with an average depth of about 25 feet. Normal evaporation causes the lake level to drop about 4.5 feet every year. This, combined with excessive nutrient input, causes algae blooms that lead to depressed lake oxygen levels and related fish die-offs.

Over the past eighty years, Lake Elsinore has flooded seven times and gone dry twice. Various State and local agencies have significantly modified the lake for water control and have invested to improve both the quality and quantity of water. Millions of dollars have been invested in projects to reduce the size of the lake, the Lake Management Project, the Wetlands Enhancement Project, and mixing systems to help destratify the lake's water column. Water stratification occurs when water masses with different properties such as salinity, oxygenation, density, and temperature form layers that prevent mixing.

To prevent large fluctuations in water levels, SAWPA undertook a major management project with the U.S. Army Corps of Engineers beginning in 1988. The project included a 17,800-foot rolled-earth levee to separate the main basin from the floodplain, a 1,600-foot overflow weir across the San Jacinto River channel, and an outlet channel with a sill elevation of 1,255 feet AMSL. During normal conditions, water is stored in the main basin, with the 356-acre wetland/flood control facility (the back basin) providing additional storage capacity in the event of major storms.

The proposed Project could be viewed as the final of a series of projects implemented to benefit water management of Lake Elsinore. A recent UC Riverside study suggests that the proposed water transfer will increase water circulation in the lake, increasing aeration and potentially improving fish habitat and reducing algal overgrowth. The Project will be able to support regional watershed agency initiatives by selling electricity and contributing a portion of the revenue to projects that directly benefit the lake, providing a source of non–governmental funds to implement projects and helping to fund experts and needed studies to improve water quality. These funds also could be used to augment water from the Elsinore Valley Municipal Water District to maintain water levels.

4.4.3. Shoreline Rise and Run

The Project will essentially create a regular but minor "tide" effect where the water will raise and fall regularly plus or minus six inches throughout the 24-hour cycle. This vertical rise will create a lateral run where portions of the lake with a steeper shoreline may not even notice the change, but other areas could see the water moving up and down the shore. Because of the current 4.5 to 7-foot variance in lake levels, it is difficult to state a definitive shoreline movement even without Project impact. Additional study may be required to determine where mitigation efforts can be undertaken to lessen the impact in those areas where the shoreline is less steep, in conjunction with the agencies and subject experts mentioned above.

4.5. Dr. Anderson's Analysis of Daily Water Level Fluctuation at Lake Elsinore

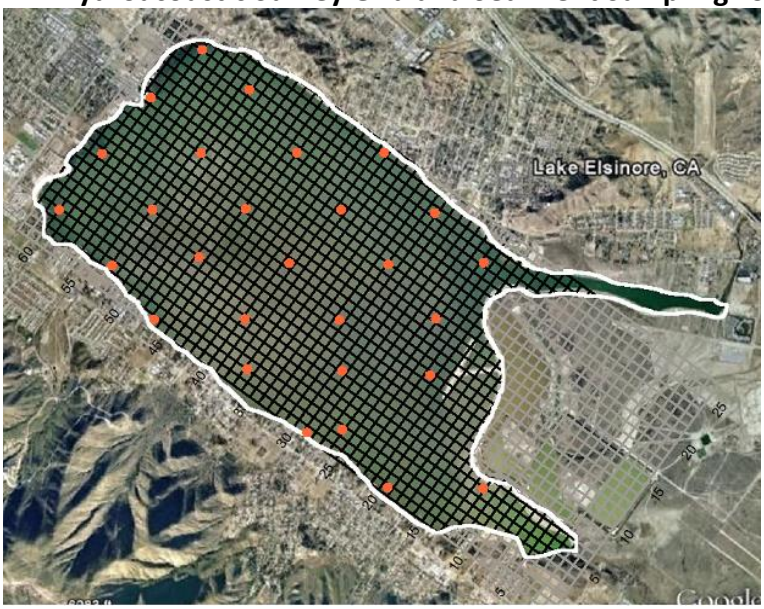
As noted in this filing and described in the 2007 FEIS, fluctuations in lake surface elevation and lake area will result from operation of the Project. The bathymetry of the lake, lake surface elevation during operation, and pumping (withdrawal) and generation (return flow) volumes will dictate the changes in lake surface elevation and surface area. An assessment was conducted in the original 2005 license application and further analysis was part of a study commissioned by the SARWQCB (Anderson, 2006). Lake elevation was predicted to change 1.0 foot during weekday operation and 1.7 feet during the weekend when extended pumping is planned. Using bathymetry reported by Black & Veatch, a 1.0-foot elevation change corresponds to 49 acres of exposed (or rewetted) sediment, while 1.7 feet resulted in an 83-acre change. Using bathymetry developed from point sampling across the lake (Anderson, 2004), somewhat larger areas were predicted (79 and 134 acres exposed for 1.0 and 1.7-foot drawdown, respectively). Given the limited number of soundings and discrepancy between these two datasets, it is useful to reevaluate using the hydroacoustic survey of the lake conducted on June 27-30 and July 12-14, 2010 that involved hundreds of thousands of points along 270 km of orthogonal transects (Anderson, 2010; Fig. 1). The hydroacoustic survey was conducted with the lake surface elevation at 379.0 m (1243.4 feet) above MSL.

This survey allowed development of a revised bathymetric map shown in Figure 4-2: Map Showing Basin Elevation as a Function of Latitude and Longitude, depicting the elevation of the

lake bottom at 2-foot contours. The minimum bottom elevation was 1216 feet beneath the axial flow pump located in the deepest part of the lake that resulted from scouring of the soft organic sediments there. Excluding this small area, the nominal minimum bottom elevation is 1218 feet. This bathymetric map indicates that the variation in lake surface elevation will have most pronounced effect in the southern end of the lake, followed by the northwest shoreline at nominal values near 1240 as shown in the above referenced figure. The tight contour lines on the northeast and southwest parts of the lake shore indicate that shoreline will recede comparatively little with changes in lake level at surface elevations greater than roughly 1232 feet.

The change in lake surface area as a function of lake surface elevation was assessed more quantitatively as shown in Figure 4-3: Hypsographic Data of Lake Elsinore. As shown in the figure, a 4th-order polynomial fit to the data (r2=0.99) displays the lake surface area as a function of lake surface elevation, while the slope of the hypsographic curve represents the change in lake area associated with a 1-foot decline in lake surface elevation (Figure 4–3b).

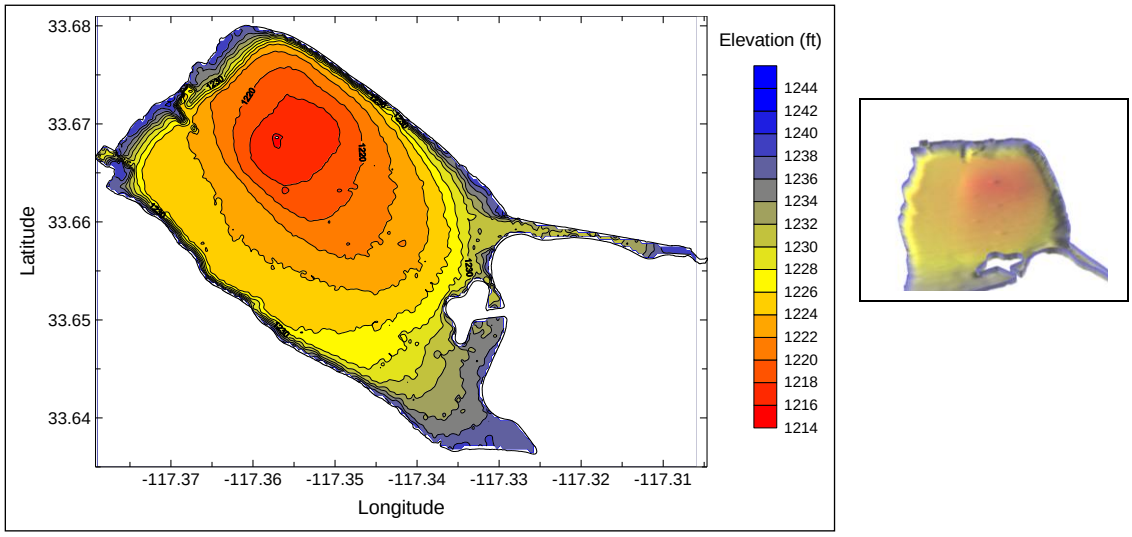
Figure 4-1: Hydroacoustic Survey Grid and Sediment Sampling Locations



Source: Dr. Michael Anderson[25]

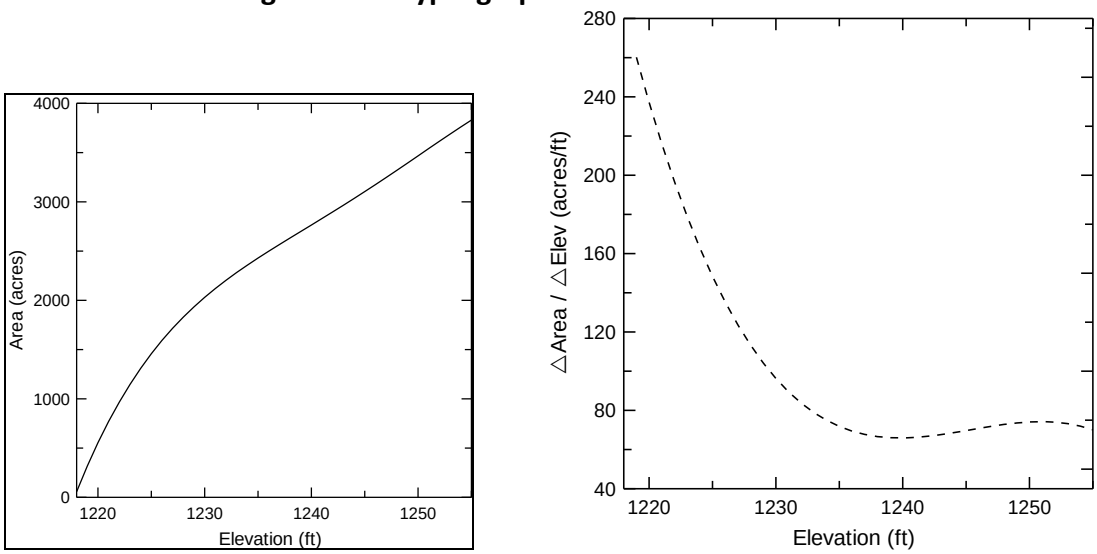
[25] /See Dr. Anderson's 2010 report, Bathymetric, Sedimentological and Retrospective Water Quality Analysis to Evaluate Effectiveness of the Lake Elsinore Recycled Water Pipeline Project. Final Report submitted to Lake Elsinore & San Jacinto Watersheds Authority. This report may be found in Attachment 3: Copies of Select Reports from Dr. Anderson..

Figure 4-2: Map Showing Basin Elevation as a Function of Latitude and Longitude with 3–D Representation



Source: Dr. Michael Anderson[26]
Note: Lake surface elevation of 1243.4 feet above MSL with basin also shown in 3-D.

Figure 4-3: Hypsographic Data of Lake Elsinore



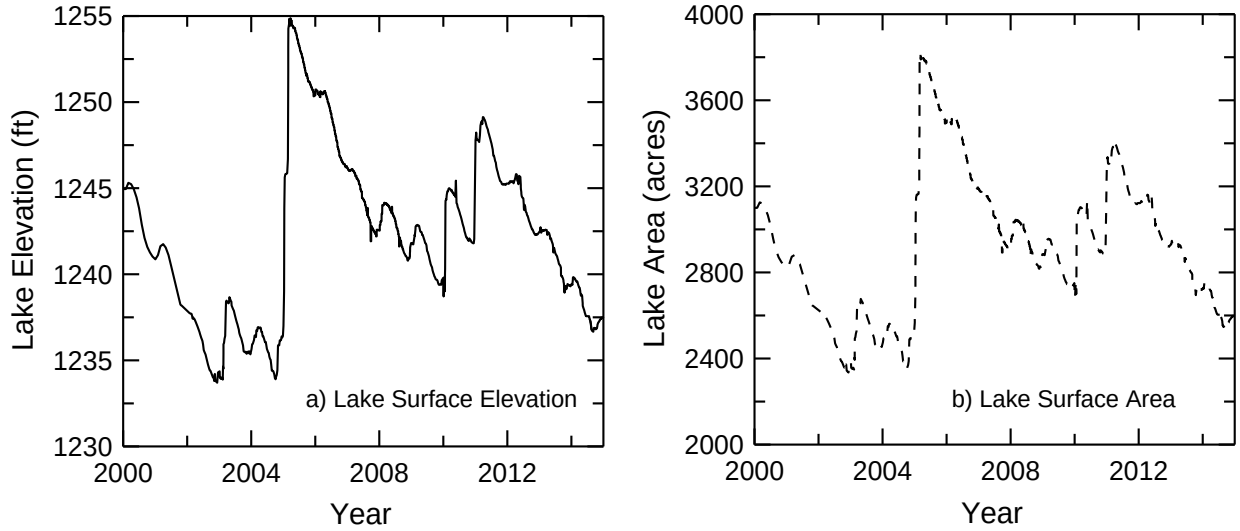
Source: Dr. Michael Anderson
Hypsographic data: a) lake area vs. lake surface elevation, and b) change of area associated with a 1-foot decline in surface elevation. (Values above 1243.4 feet from earlier engineering reports.)

[26] /Id.

Thus, one sees that about 70 acres of lake shore will be exposed with a 1-foot decline in lake surface elevation (or about 6 acres per inch change in elevation), and about 120 acres exposed for a 1.7-foot change depending upon specific elevation within the range of 1233 and 1255 feet, in general agreement with earlier estimated values.[27]

It is helpful to consider these variations resulting from operation of the Project with the natural seasonal and annual variations in lake elevation and surface area. The region has experienced intervals of extreme drought as well as near record rainfall over that has dramatically altered elevation and surface area as shown in Figure 4-4: Reported lake surface elevation and derived lake surface area for Lake Elsinore (2000-2014).

Figure 4-4: Reported lake surface elevation and derived lake surface area for Lake Elsinore (2000-2014)



Source: Dr. Michael Anderson[28]

The lake surface elevation and surface area have both varied greatly over this period, with a range in elevation as much as 20 feet and 1400 acres (this does not include 2015-16 in which lake elevation declined to about 1233 feet). The loss of recreational access and use, as well as habitat loss, over the past several years has been dramatic. With annual variations in lake

[27] / Anderson 2006.

[28] / Please see Dr. Anderson's 2016 Report, Technical Memorandum Task 1.2: Water Quality in Lake Elsinore Under Selected Scenarios: Model Predictions for 1916-2014 with Current (Post-LEMP) Basin. Draft Technical Memorandum to LESJWA. This report may be found in Attachment 3: Copies of Select Reports from Dr. Anderson.

elevation commonly 3-4 feet and surface area reductions of 200-300 acres per year, a key advantage of the Project's presence is the longer-term stabilization of lake level within an operational range of 1240 – 1247 feet and about 2800-3300 surface acres; although daily oscillations will be much larger than present at the lake, the longer-term stabilization is thought to provide greater recreational and habitat value especially during periods of protracted drought.

Please let me know if you have any questions on this filing.

Sincerely,

/s/ David Kates
David Kates
For The Nevada Hydro Company

Attachments

Cc: Darrell Vance, Cleveland National Forest, w/attach.
Kennon A. Corey, U.S. Fish and Wildlife Service, w/attach.
Gary Dubois, Pechanga Cultural Resources Department, w/attach.
Joanna Gibson, California Department of Fish and Wildlife, w/attach.
Mark Smythe, Santa Ana Regional Water Quality Control Board, w/attach.
Barbara Leibold, City of Lake Elsinore, w/attach.

Attachments

Attachment 1: Site-Specific Seismic Hazard and Geotechnical Study Plan Issues