Report (Exhibit 1 at pp. 4-6), this statement fails to take into account that increasing summer water demands along the entire Eel River and tributaries has led to serious concerns about the direct and cumulative impacts of summer diversions, especially to listed salmonids. Moreover, blockwater releases in late summer 2014, intended to help keep temperatures down for juvenile steelhead in the upper river, actually reconnected surface flows at the mouth of the Eel. Thus, Project operations clearly do affect river conditions as far down as the mouth during the summer dry period. Consequently, the Conservation Groups request that the EIS expand the geographic scope of Project analysis to include the Eel River from the Project area to the Pacific Ocean.

The scope of analysis on the Russian River should also be expanded. SD1 currently limits the scope for the assessment of water quality and fishery resources to the East Fork Russian River from the PVP powerhouse to the Lake Mendocino. SD1 at p. 17. However, given the dependence on Lake Mendocino water in meeting Russian River minimum instream flow thresholds and associated aquatic habitats, it seems logical that any potential changes to PVP operations would potentially have an impact on the Russian River down to the confluence with Dry Creek. Below Dry Creek, Lake Sonoma also supplies flows necessary to meet Russian River minimum flow needs. Thus, the Conservation Groups ask that the geographic scope on the Russian River be expanded to at least Dry Creek, and that all relevant information be considered.

IV. The EIS Must Undertake an Adequate Evaluation of the Project's Impacts Over the Expected Life of the Project.

The EIS must undertake a comprehensive and detailed evaluation of the Project's potential environmental impacts, identification of mitigation measures for those impacts, and formulation of alternatives to the Project that would involve fewer and less severe environmental impacts. The purpose of NEPA is to "promote efforts which will prevent or eliminate damage to the environment and biosphere." 42 U.S.C. § 4321. NEPA's fundamental purposes are to guarantee that: (1) agencies take a "hard look" at the environmental consequences of their actions before these actions occur by ensuring that the agency carefully considers "detailed information concerning significant environmental impacts," *Robertson v.*

Methow Valley Citizens Council, 490 U.S. 332, 349 (1989); and (2) agencies make the relevant information available to the public so that it "may also play a role in both the decision-making process and the implementation of the decision." *Id*.

NEPA emphasizes "coherent and comprehensive up-front environmental analysis" to ensure an agency "will not act on incomplete information, only to regret its decision after it is too late to correct." *Blue Mountains Biodiverisity Project v. Blackwood*, 161 F.3d 1208, 1216 (9th Cir. 1998), cert. denied, 527 U.S. 1003 (1999) quoting *Marsha v. Oregon Natural Resources Council*, 490 U.S. 360, 371 (1989); *see also Foundation on Economic Trends v. Heckler*, 756 F.2d 143, 157 (D.C. Cir. 1985) ("The NEPA duty is more than a technicality; it is an extremely important statutory requirement to serve the public and the agency *before* major federal actions occur.") (emphasis in original).

Critically, the EIS may not assume, as currently stated in SD1, that because the proposed Project is the same as the "no-action alternative," that there would be no change to the environment and that "[n]o new environmental protection, mitigation, or enhancement measures would be implemented." SD1 at p. 6. Even though the EIS plans to utilize the existing conditions under the license to establish a baseline, it must still evaluate the environmental impacts of continued Project operations *over the expected life of the Project* (e.g., another 50 years).

The Project involves a host of potentially significant impacts, which will likely progressively increase over the life of the Project as dam safety issues and climate change worsen. As set forth below, in addition to the issues listed in SD1, the EIS should evaluate the Project's impacts to public safety, geology, and soils; the Project's useful lifespan; how climate change may alter the Project's environment and operations; and how the Project itself may contribute to climate change. The EIS must disclose and analyze these impacts fully and minimize or eliminate them to the extent feasible.

A. Public Safety, Geology and Soils

SD1 addresses dam safety entirely as a constraint on mitigation or modification of existing structures:

"As the proposal and alternatives are developed, the applicants must evaluate the effects and ensure that the project would meet the Commission's dam safety criteria found in Part 12 of the Commission's regulations and the engineering guidelines."

However, because of the significant structural, geotechnical, and seismic issues presented especially by Scott Dam and its setting, FERC must consider dam safety issues directly as a central issue in this relicensing process.[5] FERC must consider, analyze, and disclose information bearing on the capacity of Scott Dam to withstand any or all of the combination of structural, geotechnical, and seismic events which might reasonably be expected to occur. FERC must consider whether Scott Dam can be retrofitted, reconstructed, reinforced, or safely dismantled (in whole or in part) to compensate for potential hazards which can be identified by such a careful analysis.

FERC must also consider and update the Dam Failure Inundation Study for both Scott Dam and Cape Horn Dam. In the event of dam failure, Scott Dam would release a wall of water downstream, causing immeasurable harm and damages. PG&E's Dec. 1, 1993 *Civil-Hydrologic Engineering Inundation Study* indicates a Peak Maximum Flood at dam-break conditions of 875,000 cfs just below Scott Dam.[6] At Fortuna, the front-of-wave arrival is 8 hours 36 minutes after dam break, with a maximum discharge of 1,220,600 cfs, at a maximum stage of 64.4 ft. arriving approximately 13 hours after dam break.

FERC comes to the question of relicensing the Eel River dams in the immediate aftermath of a near-disaster at Oroville Dam and a series of revelations that raise significant questions about the adequacy of dam safety review by both FERC and the California Division of Safety of Dams (DSOD). What is apparent to the public and policy makers is that dam safety at FERC-jurisdictional dams is not assured by current licensing and inspection procedures.

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[5] See, e.g., Melosh, G., *Geologic Risks at the Potter Valley Project* **(**July 20, 2017), available at https://drive.google.com/file/d/0B8LzWutg0vukcWpsbEJycFlLbTg/view?usp=sharing

[6] PG&E 1993 Civil-Hydrologic Engineering Inundation Study available at https://drive.google.com/file/d/0B0CHJ_mE5vWeY3JMWkl1TmEwM1U/view?usp=sharing

In the aftermath of the Oroville crisis, catastrophic risk assessment expert Robert Bea called the near-disaster "a regulated failure."[7] Bea told KQED that the Division of Water Resources "and other oversight bodies, such as the Federal Energy Regulatory Commission, are using standards that don't account for the deterioration of infrastructure over time or outdated technology." Prof. Bea wrote "it is likely that the wrong standards and guidelines are being used to re- qualify many critical infrastructure systems for continued service. The majority of these standards and guidelines were originally intended for design, not re-qualification or re-assessment of existing aged infrastructure systems that have experienced 'aging,' 'technological obsolesce,' and increased risk (likelihoods and consequences of major failures) effects. Inappropriate standards and guidelines are being used to re-qualify these infrastructure systems for continued service."[8]

The Oroville events and Prof. Bea's assessment of the adequacy of regulatory standards and guidelines used to determine and assure dam safety demonstrate that it is incumbent on FERC to reassess those standards and to assure that it is applying the appropriate level of scrutiny to the questions surrounding the safety of the present Project. FERC can and must consider dam safety as a distinct question in each dam relicensing process. It is not enough to suggest that routine safety inspections and reviews are adequate to assure dam safety when it is evident that such reviews and inspections have failed to reveal critical underlying weaknesses in design, engineering, and construction of significant structures.

Indeed, if the broad purpose of relicensing is to determine whether a hydropower dam produces societal benefits in excess of its net burdens – whether the power it produces is worth the costs to things we care about in addition to electricity – then questions around the safety of dams, the liabilities which might result from their failure, and the costs of correcting those issues

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[7] See https://ww2.kqed.org/news/2017/04/18/report-design-building-and-upkeep-flaws-led-to-oroville-spillway-failure/.

[8] See *Preliminary Root Causes Analysis of Failures of the Oroville Dam Gated Spillway* R. G. Bea Center for Catastrophic Risk Management University of California Berkeley April 17, 2017.

are precisely the sort of information we should be considering. It is clear that dam safety issues, which could result in failures that harm the entire ecosystem, constitute potentially significant environmental impacts that must be evaluated in an EIS.

And safety issues are hardly theoretical for the Eel River dams. When the Eel River dams were built, the theory of plate tectonics was as yet unaccepted. It was only in later generations that we came to understand that many of the places that seem like excellent places to build dams are where river canyons cross faults. As the two sides of the fault slip against one another, the canyon narrows at the fault. The Scott Dam is one of the dams that, we have come to understand, were built dangerously close to such unstable areas.[9] Scott Dam's design was altered mid-construction to accommodate the collapse of rock structures on its left embankment. The area remains under close scrutiny today for its uncertain geologic stability. Given that Scott Dam is almost 96 years old, and that Cape Horn Dam is 109 years old, it would be folly to assume that there will be no required changes to Project structures or operations to address current conditions.[10]

Further, there are reasons to be concerned about potential hazards presented by the Project's infrastructure itself. For example, at present only one of the slide gates controlling releases over the top of the dam is automated. The other gates must be opened manually. Because operators are normally not present at the dam, there are a number of contingencies that could prevent operators reaching the gates to open them manually. Additionally, there is no backup power source available to operate the radial gate in the event of power failure to Scott

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[9] *See* Engineering Report and PVP Earthquake Reports, submitted as Exhibits 2 and 7 in FOER's comments on the Fish Flows DEIR, and available at https://eelriver.org/2017/03/10/comments-on-draft-eir-for-fish-habitat-flows-and-water-rights-project/.

[10] *See, e.g.*, the photographic documentation of Scott Dam's construction, submitted as Exhibit 5 in FOER's comments on the Fish Flows DEIR, and available at https://eelriver.org/2017/03/10/comments-on-draft-eir-for-fish-habitat-flows-and-water-rights-project/

Dam. There is also no remote operational capability for any of the radial or slide gates. If the gates are closed and the automatic gate does not work for any reason during a high flow event, there is potential for a hazardous overtopping spill event.

Whether the mechanism is earthquake, storm, or failure of the dam itself, the EIS should analyze what the impacts of full or partial failure of Scott Dam would be on the Eel and its fisheries.[11] For example, if a complete failure were to happen while adult salmon were spawning, or redds were in the river, it could negatively impact a whole year's run of fish. Further, if the sediment backed up in the Lake Pillsbury and Van Arsdale reservoirs were to be unevenly distributed in the wrong parts of the mainstem, that would release sediment that could harm spawning or egg incubation.

1. Significant Information and Data Gaps Exist.

In the era after the Oroville Dam spillway incident, the Scoping Document 1 (SD1) as well as PG&E's Pre-Application Document (PAD), fail to consider and address critically important aspects and concerns about Scott Dam and Cape Horn Dam. The PAD identifies *no* "Potential Information Gaps" nor "Potential Studies to Address Identified Significant Information Gaps" related to dam safety, stability, reliability or liability.

The EIS for the Project must address the following data gaps (which run through the PAD and the Scoping Document 1):

- **Safety** of the dams and Project to residents, businesses, recreational and commercial users and water craft on the Eel River and Lake Pillsbury, tourists and visitors, as well as public and private property losses and damages.
- **Reliability** of PVP as a power generating source for PG&E and its customers; water

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[11] The substantial impacts and scope of dam failure to people, businesses, roads, bridges, and other infrastructure located downstream are addressed in the failure analysis of PG&E's Emergency Action Plans. *See* Scott Dam Geotechnical Instrumentation Additions, Emergency Action Plans, and "Downstream Flooding Due to the Hypothetical Failure of Scott Dam," PG&E, available at PVP Inundation Study 1981-1994 - https://drive.google.com/file/d/0B0CHJ_mE5vWeY3JMWkl1TmEwM1U/view?usp=sharing.

supply for downstream Eel River water diverters as well as for East Branch Russian River diverters (municipal, agricultural and residential); and flows for fish, wildlife, botanic and aquatic habitat in both the Eel and Russian Rivers.

- **Liabilities** that would accrue to PG&E, FERC and others as a result of dam failures, with consequent potential loss of life, property, access and business interruptions.
- **Additional problems and issues:** There are other missing pieces of data and reliable, valid information necessary for an informed decision-making process for relicensing the dams for another 50 years. These include:
- complete data and modeling for the potential maximum flood event;
- engineering and corrections to erosion at the left and right abutments due to splashing and overtopping of the retaining walls;[12]
- without a spillway, there is no designed structure to ensure dam safety in the event of flood flows in excess of the capacity of the gates, or in the event that the gates become inoperable;
- design and construction corrections to address water releases or overtopping during periods of gate failure, potentially from debris, loss of power (with no or failed backup power generation onsite);
- inability of PG&E operators to reach the dam and manually operated gates due to road blockage or washout in both directions or during severe weather (*see* Exhibit 2);
- clogging or blocking of the needle valve or "grizzly" inlet structure by debris or

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[12] See, e.g. Hinton, Hughes, Zapel 2015, *"Scott Dam Spillway – Comparing physical model study results"* Northwest Hydraulic Consultants, available at http://www.nhcweb.com/upload/news/Scott_Dam_Spillway_-_HydroVision_2015_-_R1.pdf The study "evaluates the performance of the training walls and describes the balancing act between achieving the necessary discharge capacity of the spillway crest and preventing overtopping of the training walls." The authors note that "(p)otential concerns regarding spillway capacity and structural stability of the spillway chute training walls under high flow and potential overtopping conditions have been identified." Additional studies, and reinforcing protection to guard against erosion, are recommended.

reservoir sediments. PG&E does not have any means or plan for clearing blockages and getting water past Scott Dam if the needle valve fails to function properly. This could be devastating to fish migration during critical periods, particularly dry season flows where interruption of releases from Scott Dam could easily result in fish kills in the reach between Scott Dam and Cape Horn Dam, and below Cape Horn Dam in the mainstem Eel River. To assess needle valve performance, the EIS must analyze and disclose what minimum water storage elevations behind Scott Dam are required to maintain Project operations;

- Sediment loading on the upstream face of Scott Dam has not been evaluated for potential sliding analysis and lateral displacements (*see* Exhibit 2 at p. 1); and
- PG&E organizational structure and culture have been noted as factors of concern by the California Division of Safety of Dams.[13] The California Public Utilities Commission Safety and Enforcement Division reports:

> "To get a better understanding of PG&E's dam safety issues, Staff met with the California Division of Safety of Dams (DSOD) in January 2016. DSOD explained some of the challenges it encounters with dam operators in California. Specifically with respect PG&E's dam risk management program, DSOD expressed concerns with delays in dam mitigation work, and with PG&E's Energy Supply's organizational structure that organizes the mitigation work.
>
> DSOD based this, in part, upon its assessment of two aspects of PG&E's dam risk management program:
>
> 1. PG&E appeared to lack a structured risk portfolio management program to assess, rank, and effectively mitigate risks at its dams in a timely manner. DSOD considers development of a comprehensive risk portfolio an

[13] *See* Safety and Enforcement Division Risk Assessment Section Staff Report, Pacific Gas and Electric Company (PG&E), 2017-2019 General Rate Case Application A.15-09-001, March 7, 2016. p 63. Available at www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=10180

> emerging best practice, and a more effective approach for ensuring mitigation of dam risks.
>
> 2. Although PG&E has hired additional staff, its current organizational structure generally impeded expedient and accountable mitigations of issues pertaining to inspections, dam-related assessments, and design/construction projects. PG&E assigns licensing coordinators to interface with regulators and inspectors. Since these Licensing Coordinators generally do not have a dam engineering background, they must arrange for the necessary engineering support to respond to issues raised by DSOD's engineers. DSOD found the current structure generally leads to a reactive culture rather than a proactive one. DSOD considers permanent assignment of an engineer responsible for specific dams to be a more effective and accountable best practice. DSOD has found operators that engage in that practice are more proactive in addressing and mitigating risks."

There are no references to any public or proprietary data, studies, conclusions or warnings from FERC's Potential Failure Mode Analysis (PFMA), nor to any reports from PG&E or from FERC's Dam Safety Performance Monitoring Program. The EIS must disclose whether PG&E or its agents have received any public funding, grants, loans technical assistance or other support to address safety, failures, reliability, repairs, maintenance, research or other related costs for the Potter Valley Project. If so, we request that the EIS identify when, for what purposes, related costs, results, and whether the work was completed.

By omitting any references or data at SD1 §3.3, and stating that there are no 'Geologic or Soils Resources' issues, despite what information is already known to the public, SD1 is inadequate and misinforms the public. It is critical that FERC and PG&E address the risks of continued operation of Scott and Cape Horn Dams and their related reservoirs and infrastructure

of the PVP.[14]

2. FERC Should Re-Designate Relevant Safety Information Currently Hidden from Public Review as CEII.

Unfortunately, the classification of certain documents as Critical Energy Infrastructure Information (CEII), which prevents their ordinary dissemination to the public, prevents adequate disclosure and analysis of relevant information, data, analyses, and documents related to dam safety, without providing any real benefit to public safety. The public, including scientists and engineers, stakeholders, downstream and upstream residents, businesses, public and private property owners, and those pursuing continued water transfers from the Eel River to the Russian River, are left in the dark, to no one's benefit.

In investigating the causes of the failure of the Oroville dam spillway, Prof. Bea found his analysis cut short by the refusal of DWR staff to provide documents essential to a complete assessment. "As (the Oroville Dam spillway) near-catastrophe unfolded, Bea said in interviews, he began assembling materials to try to explain it. He says the Department of Water Resources

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[14] PG&E's San Bruno pipeline disaster may also be informative here. PG&E has issued a public response, stating:

"On September 9, 2010, PG&E learned a tragic lesson we can never forget.

This gas pipeline ruptured in San Bruno.

The explosion and fire killed eight people.

PG&E was convicted of six felony charges including five violations of the U.S. Pipeline Safety Act and obstructing an NTSB investigation.

PG&E was fined, placed under an outside monitor, given five years of probation,

and required to perform 10,000 hours of community service.

We are deeply sorry.

We failed our customers in San Bruno.

While an apology alone will never be enough, actions can make PG&E safer.

And that's why we've replaced hundreds of miles of gas pipeline, adopted new leak detection technology that is one-thousand times more sensitive, and built a state-of-the-art gas operations center.

We can never forget what happened in San Bruno.

That's why we're working every day to make PG&E the safest energy company in the nation."

rebuffed a request for original design documents of the spillway and adjacent emergency weir. DWR representatives told him that agency guidelines barred the release of information on critical infrastructure systems — data protected by a post-9/11 law designed to prevent such resources from falling into the hands of potential attackers. "They looked at me and smiled and said, 'You might be a terrorist,' " Bea recalls."[15]

Although some information may be obtained if the requesting party signs a non-disclosure agreement ("NDA"), this process is largely useless in the scoping process as the NDA prevents that party from discussing their findings in a public setting.

As with Oroville Dam's complex problems, which were ignored, FERC and other agencies and PG&E cannot afford to repeat the kind of errors and omissions of data and information critical to peer review, scrutiny, analysis and recommendations.

CEII is defined as:

Information concerning proposed or existing critical infrastructure (physical or virtual) that:

1. Relates to the production, generation, transmission or distribution of energy;

2. Could be useful to a person planning an attack on critical infrastructure;

3. Is exempt from mandatory disclosure under the Freedom of Information Act; and,

4. Gives strategic information beyond the location of the critical infrastructure.

https://www.ferc.gov/legal/ceii-foia/ceii/guidance-dam.pdf Jan. 12, 2005

The current Designation of Incoming Dam Safety Documents (see, https://www.ferc.gov/legal/ceii-foia/ceii/designation.asp) allows the following items to be hidden behind CEII classifications:

Dam Safety: Design Report; Engineering Analysis [excepting Exemption from P12d Request Letter]; Engineering Evaluation; Part 12.10(a) Incident Report; Part 12D Consultant Inspection Report; Board of Consultants Report; Instrumentation Report; Potential Failure Mode

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[15] https://ww2.kqed.org/news/2017/04/18/report-design-building-and-upkeep-flaws-led-to-oroville-spillway-failure/.

Analysis; Supporting Technical Information; Part 12D Consultant Resume for Approval

Emergency Action Plans: Annual EAP Update; 5-Year EAP Submittal [excepting Annual review of conditions for EAP exemption]; EAP Submittal; EAP Func. Exercise Critique Report

Hazard Classification: EAP Dambreak Report.

Construction: Design Report; Plans and Specifications; Cofferdam Report; As-Built Drawings [excepting Decommissioning Study/Report]; Foundation Report; Blasting Plan.

The Federal Power Act states that FERC, or the Secretary of Energy "shall remove the designation of [CEII], in whole or in part, . . . if [FERC] . . . determines that the unauthorized disclosure of such information could no longer be used to impair the security or reliability of the bulk-power system or distribution facilities," or "any other form of energy infrastructure." 16 U.S.C. § 824o-1(d)(10); 18 C.F.R. § 388.113(e)(2). FERC can "make determinations with regard to any claim of CEII status at any time . . .." 18 C.F.R. § 388.113 (d)(1)(v). Thus, the Commission can and should remove the CEII designation for information relevant to the EIS analysis so that the public may fully be able to participate in the environmental review process. Indeed, the Conservation Groups believe there is a far greater safety risk from *not* releasing this information than there is from revealing it to the public.

At a bare minimum, though, FERC must make it clear how it will incorporate dam safety, partial and full failure analyses, disaster planning, potential mitigations and corrections, liabilities and desires for reliability into a public process. This process must occur early in the relicensing and NEPA review process, while the potential decisions are still flexible enough for changes, so as not to impair FERC from properly and responsibly doing its job.

3. Bartlett Springs Fault Zone includes Scott Dam and Lake Pillsbury, and must be considered in assessing the stability and safety of the Potter Valley Project.

While the PAD (§ 5.6) does note the presence at the Project site of the nearby Bartlett Springs Fault (§ 5.6.5.1) as the northward continuation of the Calaveras-Green Valley fault system, neither the PAD nor SD1 discuss any impacts of the fault's potential movement on the stability and safety of the PVP's dams, particularly Scott Dam and Lake Pillsbury. However,

FERC did issue a June 15, 2017 request to PG&E to "complete the investigation and associated analyses necessary to characterize the Bartlett Springs Fault…"[16] This is information should be included within the EIS. There is also no discussion of flooding or other impacts that might result from dam failure. This information should likewise be included in the EIS.

On August 10, 2016, an earthquake M5.1 magnitude occurred 10 miles south east of Scott Dam, with some 93+ aftershocks M3.0 or greater, and offsets measured at 5-10mm. PG&E's report on the incident indicates that the fault is capable of M6.0-7.4 earthquakes.

Given the age and construction of Scott Dam, this information is critical for the public and engineering understanding for its future.

4. SD1 Omits Consideration of the Hayward Fault.

According to recent work by the US Geological Survey, Rodgers Creek Fault may be a northern extension of the Hayward Fault. *See* Exhibit 2 (Miller Pacific Report) at p. 2. No information about this discovery is provided in the PAD or SD1. With a potential doubling of its length, the fault would be capable of larger earthquakes than previously assessed. Thus, expected ground motions must be re-analyzed for lateral deformations and potential failure of Scott Dam.

The EIS should fully explain how PG&E and FERC have carefully considered the potential for earthquakes to cause partial or complete failure of Project infrastructure, including the potential for seismic triggering of known and suspect areas of geologic instability.

5. Design and construction problems are known to exist at PVP, yet neither the PAD nor SD1 acknowledge any issues to be considered within the relicensing process.

Scott Dam is a textbook example of construction of a vulnerable structure's foundation on "bimrock": block-in-matrix geology, mixtures of stronger blocks of rock surrounded by weaker bonded matrix rocks of finer texture. Scott Dam was intended in 1921 to go straight across the Eel River valley to impound the waters of Lake Pillsbury. However, during the

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[16] See http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20170628-0278

construction interval in the winter of 1921-22, the large outcropping of greenstone (the "knocker"), believed to be bedrock and intended to become the south or left abutment of the dam, moved in winter Eel River flood flows, dropping some 60' in elevation.[17]

Rather than relocate the dam to a more stable location, builders simply built an angle in the dam's foundation and face, in order to bypass the "knocker" and connecting to the bank downstream of the moving boulder. This long hillside at the left abutment continues to slide and creep today, as it no doubt did, undetected, for many years prior to dam construction. The SD1 and PAD fail to mention continued movement of this landslide, or of the associated foundation instability concerns at the left abutment. *See* Exhibit 2 (Miller Pacific Report) at pp. 2-3. The EIS must analyze the potential for damage to Project infrastructure and operations from this unstable area.

It is unknown to the public, geotechnical and engineering communities whether this moving material is putting lateral pressure on the dam beyond its design and construction capabilities, where it essentially acts as a strut across the valley. It is also not known if the foundation of the dam actually rests solidly on bedrock, and if the moving slides could uplift the dam by flowing or moving underneath the dam's foundation under adverse conditions, such as earthquakes or saturated slopes, leading to partial or total failure. Further, several modifications have been made to Scott Dam over the years, adding another element of uncertainty as to the structural integrity of the dam. An assessment must be made as to the overall current safety of the dam.

In sum, dam safety issues are highly relevant—indeed, critical—to FERC's consideration of a Project license. FERC must consider all relevant safety data, provide an adequate safety evaluation in the EIS, and consider feasible mitigation measures and alternatives that could

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[17] See the photographic documentation of Scott Dam's construction, submitted as Exhibit 5 in FOER's comments on the Fish Flows DEIR, and available at https://eelriver.org/2017/03/10/comments-on-draft-eir-for-fish-habitat-flows-and-water-rights-project/

minimize the dam safety risks that currently exist at the Project site. FERC must explain the risks and hazards associated with the Project in easily understood language.

B. Climate Change

Pursuant to CEQ guidance[18], FERC must consider the effects of climate change as they relate to the proposed relicensing. These will include potential and probable changes in precipitation, hydrology, stream flows, and potential water yield, as well as potential effects on energy production and fisheries. FERC cannot adequately consider the potential effects, including cumulative effects, of the proposed fifty-year license renewal without carefully reviewing projected changes in environmental conditions in the project region which are certain to affect project operations and public trust resources.[19]

Furthermore, a new study in BioScience Volume 66 Number 11 brings new information to light about greenhouse gas emissions from reservoir water surfaces, concluding that methane accounts for 79 percent of carbon dioxide equivalent emissions from reservoirs, and those reservoir emissions may have been underestimated.[20] Hydropower is considered a low-carbon technology, however this new study suggests that some reservoirs in certain conditions can release quantities of methane, a greenhouse gas, and/or act as carbon sinks. FERC should therefore also consider whether the Eel River dam reservoirs should be evaluated as a source of elevated methane emissions.

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[18] Council on Environmental Quality, *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*. August 1, 2016.

[19] See, e.g. Palmer, M.A., Lettenmaier, D.P., Poff, N.L., Postel, S., Richter, B., and R. Warner. 2009. Climate Change and River Ecosystems: Protection and Adaptation Options. Environmental Management 44:1053-168.

[20] *Greenhouse Gas Emissions from Reservoir Water Surfaces: A New Global Synthesis Bridget R.* Deemer, John A. Harrison, Siyue Li, Jake J. Beaulieu, Tonya DelSontro, Nathan Barros, José F. Bezerra-Neto, Stephen M. Powers, Marco A. dos Santos, and J. Arie Vonk.