

KRB STUDY REQUEST 5: *Flow Travel Times*

RESPONSE TO COMMENTS

EDISON: *WR-2 Hydrology has been modified to include an analysis of flow travel times between Fairview Dam and the KR3 Powerhouse. Travel times will be estimated utilizing existing gage data and incorporated as part of the final Technical Memo. (PSP at 21.)*

KRB: Edison does not clearly state it will be determining flow travel times between Fairview Dam and the powerhouse for both (1) flows in its conveyance and (2) flows in the dewatered reach. Both of these times are needed to fully understand project effects and evaluate potential opportunities and constraints for PMEs, such as alignment with expected times of renewable curtailment and/or low and negative market pricing for electricity.²⁰² There is no reason to “estimate” travel times for these important uses; travel times can be conclusively determined with the use of two or three gauges: a gauge just past the diversion point and a gauge at the forebay (for conveyance times), and a gauge just upriver of the tailrace along with use of the existing gauge in the riverbed just below Fairview Dam (for riverbed times). Alternatively, a logging of energy output could directly correlate timing at the forebay, removing the need for a gauge there. For these reasons, and those others described in the request, we ask that the Commission direct Edison to implement our updated flow timing study.

KRB SR-5: FLOW TRAVEL TIMES UPDATED STUDY PROPOSAL

Criterion (1) – Describe the goals and objectives of each study proposal and the information to be obtained.

The goal of this study is to evaluate the amounts of time certain flows take to travel from the project’s diversion point to its powerhouse, both through its conveyance and through the dewatered reach, the results of which may constrain or afford opportunities for plausible environmental or recreational mitigation measures.

Criterion (2) – If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.

Not applicable.

Criterion (3) – if the requester is not a resource agency, explain any relevant public interest considerations in regards to the proposed study.

²⁰² See KRB SD1 at 11-22

The Commission is charged by the Federal Power Act to balance developmental values with nondevelopment values, including recreational and environmental values, in its formation of hydropower licenses in a manner best adapted for the affected resource, its user groups, and the goals of existing management plans. The United States Forest Service is charged with establishing conditions in hydropower licenses that are necessary for the public's utilization and enjoyment of the affected resource, including recreation. The results of this study may further the managing agencies' goals by providing solid data about constraints and opportunities the project's configuration affords for environmental and recreational mitigation. For instance, recreational flow releases, which lower the ability of the project to generate power, may be able to be coordinated in substantial respect with predictable times of day, days of the week, or months in the year when energy markets are likely to signal low or negative needs for marginal power.²⁰³ Such coordination will require information about how long it takes for the water to travel the conveyance (to evaluate at what time changes in the diversion affect the timing of the project's power production) and the dewatered reach (to evaluate the recreational opportunities afforded by changes in the diversion).

The dewatered reach of the Wild and Scenic North Fork Kern River attracts vast members of the public throughout the year. It is the closest major perennial river to Southern California, and attracts significant numbers of visitors for camping, hiking, fishing, whitewater, and other forms of recreation throughout the year. It also has inherently outstanding recreational values that are to be conserved and enhanced under governing management plans.²⁰⁴ The amount of time flows take to reach the powerhouse through the project's conveyance and through the dewatered reach may constrain or afford opportunities for conservation and enhancement mitigation in the public interest. Since the managing agencies are charged with mitigating the project's effects in balance with society's need for power, it is important to know if and when there are opportunities for the mitigation of those effects that coincide with times society has a relatively low need for power. A controlled-flow timing study would accordingly serve the public interest in designing a license that best serves this public resource.

Criterion (4) – Describe existing information concerning the subject of the study proposal, and the need for additional information.

The PAD does not describe the amount of time flows or flow changes at the diversion take to arrive at the project powerhouse by either its relatively direct concrete conveyance or the relatively meandering natural riverbed it affects.

²⁰³ See KRB SD1 at 11-22

²⁰⁴ 1994 USFS N&SFKR W&SR ROD&CMP at CMP 46-47

Criterion (5) – Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.

The project presently takes the first 40-45 cfs of incoming flows at the Fairview diversion dam for minimum power generation, and then, after the seasonally varying minimum instream flow requirement is satisfied, takes the next 600 cfs. These conditions leave only 40-130 cfs, or less, in the dewatered reach when incoming flows are below 640 and 770 cfs, and decreases all incoming flows above 640 and 770 cfs by 600 cfs. The project accordingly has a major effects on recreation in the dewatered reach throughout the year. The proposed controlled-flow timing study would be used to develop timing requirements of recreational or ecological releases to as part of the license requirements.

Criterion (6) – Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.

The study would involve flow gauges at the diversion point and timed releases of several different quantities of water. Two different sets of timings need to be collected: 1) time required for water to move through its conveyance until it reaches the powerhouse, and 2) time required for water to move through the dewatered reach of the NF Kern. This can be accomplished with the use of a gauge at the diversion point, at the forebay, and just upriver of the tailrace, along with the existing gauge in the riverbed just below Fairview Dam. Alternatively, a simple logging of energy output could directly correlate timing at the forebay. Edison, moreover, retains the capacity to significantly shape flows in the riverbed and its conveyance to obtain this data.²⁰⁵

Part 1: Time required in conveyance

Sensors do already exist at “the penstocks [which] are equipped with electronic flowmeters for the determination of the amount of waterflow” (SCE, 1991). Where not already present, flow gauges should be placed at the diversion point at Fairview dam, at the generators or penstock valves. Using these sensors, change the diversion from 0 cfs to each flow volume as specified (and according to ramping maximum constraints), and record the time required for the specified flow to reach the point of power generation. Optionally, also record the power generated itself (MW) and measure time required to corresponding power generation if there are any further time delays or requirements.

²⁰⁵ See *post*, KRB STUDY REQUEST 8: Whitewater Flows, at “Comments and Response”

Flow volume (cfs)	Time required for water passage through conveyance from diversion point to power generation point (minutes)	Time required from water diversion to power generation (minutes)
100		
200		
300		
400		
500		
600		

Part 2: Time required in river channel

Where not already present, flow gauges should be placed at the diversion point at Fairview dam, and in NF Kern River at the Powerhouse above the powerhouse discharge to capture the flows in the river at that point. Using these sensors, change the diversion to release each flow volume specified into the river channel, and record the time required for the specified flow to reach the Powerhouse via the river channel. Since these times will differ based on how much water is in the river, evaluate the speed at various incoming flow levels.

Flow volume released (cfs)	Time required for water passage through river channel from diversion point to Powerhouse (minutes)			
	Incoming flow above Fairview is 100 cfs	Incoming flow above Fairview is 500 cfs	Incoming flow above Fairview is 1000 cfs	Incoming flow above Fairview is 1500 cfs
100				
200				
300				
400				
500				
600				

Where data is already recorded and available, it could be provided in lieu of re-measurement. Report and share all results with stakeholders.

Criterion (7) – Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

The cost for this internal study should be an estimated \$15,000 based on the use and recording of three gauges, less if energy correlation is used at the endpoint. The controlled flow portion of the study would not amount to an out-of-pocket cost to Edison; it would be lost generation opportunity in service of designing a license for vastly more generation (40

years of such) that is best adapted to the affected resource and its users. Edison's proposed alternative is inadequate in that it does not plainly state (1) that it will measure flow travel times in both the river and its conveyance, (2) that it will measure flow travel times at different changes in flow level, and (3) that it will identify these times according to the best science available rather than estimate them.

References

- NPS. (2012) Historic American Engineering Record Kern River 3 Hydroelectric System: Written Historical and Descriptive Data. HAER No. CA-2309.
- SCE. (1991) Kern River No. 3 Water Power Project (FERC Project No. 2290) Application for New License for Major Project – Existing Dam. Volume 1 of 5: Initial Statement; Exhibits A, B, C, D, F, G, H; and Appendices. United States of America Before the Federal Energy Regulatory Commission. December 1991.
- SCE. (2021) Southern California Edison Kern River No. 3 Hydroelectric Project (FERC Project No. 2290), Pre- Application Document. Volume 1. September 2021.