MEETING SUMMARY*
BISHOP CREEK HYDROELECTRIC PROJECT
FERC PROJECT NO. 1394

DATE: September 3, 2021
LOCATION: Webinar
Topics: Bishop Creek Operations Model Workshop

**These meeting notes are documentation of general discussions from the meeting held on the above-noted date. These notes are not a verbatim account of proceedings, are not meeting minutes, and do not represent any final decisions or official documentation for the project or participating agencies.*

1.0 Attendees

Sheila Irons, USFS	Seth Carr, Southern California Edison
Tristan Leong, USFS	Bret Hoffman, Kleinschmidt Group
Alyssa Marquez, CDFW	Finlay Anderson, Kleinschmidt Group
Lawrence Primosch, BLM	Brandon Kulik, Kleinschmidt Group
Chase Hildeburn, SWRCB	Shannon Luoma, Kleinschmidt Group
Martin Ostendorf, Southern California Edison	Mike Harty, Kearns & West, Inc.
Matthew Woodhall, Southern California Edison	Terra Alpaugh, Kearns & West, Inc.
Lyle Laven, Southern California Edison	Lindsay Tryba, Kearns & West, Inc

2.0 Introductions & Agenda Review

Mike Harty, Kearns & West, shared the **meeting objectives**, which included:

- Explaining the model and how to interpret its outputs.
- Using the model to illustrate constraints in the BC system.
- Building agreement around the model's functionality, accuracy, and limitations.

Mike Harty reminded participants that this meeting is intended to build an understanding of the Operations Model as a tool. It is not intended to discuss proposed flows or Protection, Mitigation, and Enhancement measures (PM&Es). Those discussions will begin later in the fall.

3.0 Review of Operations Model Study Goals & Objectives

Finlay Anderson, Kleinschmidt, provided an overview of the report entitled *Bishop Creek Operations Model Final Technical Report (AQ2)* (Report), which summarizes the Operations Model (Model) description, application and results, and development and application of the Model. The Report was

distributed to the group in advance of the meeting on August 16th, 2021. Members were asked to review the report and provide written comments by Friday, October 15th; this feedback will be used to inform SCE's draft license application (DLA).

Finlay explained that the Model is designed to assist SCE and stakeholders in understanding how Project operations interact with Bishop Creek hydrology. The Model is intended to support the needs of other relicensing studies, e.g., the Model can simulate the Project's operations relative to different water year types and allocation decisions, as well as allowing SCE and stakeholders to test alternative operational scenarios and document the results.

The model reflects SCE's determination of operating limits for all units, representing installed and dependable capacity. System inflows in the Model are based on hydrologic data – a calculation of the increases in storage plus flow releases from reservoirs. The gauged areas help predict the flows in the ungauged areas. While changes in the flow release requirements impact allocations, these changes do not affect inflow calculations. The Model's rules are set according to current requirements.

Questions/Comments

- Question (Q) (USFS): Do you want modeling feedback by October? Is there a process where we can let our hydrologists work through the Model with SCE's folks?
    - Response (R) (Relicensing Team): Eventually, SCE will distribute the Model and give agencies a chance to use it. The idea behind this meeting is to explain the mechanisms of the Model and establish consensus around the Model's objectives and functionality (i.e., the Model does what it was intended to do) before releasing the Model to the agencies. At that point, hydrologists can test it.
    - R (USFS): We are comfortable with the Model as it is now, but our hydrologists will have a better understanding of the performance and calibration of the Model. We will defer to our modeling experts to weigh in with feedback. Typically, in relicensing processes, there is a subforum where modeling experts can run through the model together. I suggest that we bring experts together to test it out in another meeting.
    - R (Relicensing Team): Yes, SCE can set that up with Bret Hoffman if this group agrees with the Model's basic assumptions and objectives. The Relicensing Team wants to begin using the Model as soon as possible to inform discussions with scenario planning.

4. 0 Demonstration of Operations Model

Bret Hoffman, Kleinschmidt Group, provided a technical and structural overview of the Model. Bret prefaced the discussion by saying that the Model is not meant to be an exact planning tool, because SCE can change plans to accommodate adequate flows. For example, during dry years, there may be times when Bishop Creek lacks the adequate resources to meet the projected allocation for the upcoming months. In these instances, SCE will make necessary adjustments. That said, it is very rare that SCE cannot meet the flow requirements due to low water levels.

The Model will allow SCE to:

- Measure the ability of the Bishop Creek system to meet flow targets.
- Enter flows that enhance reaches to test alternative scenarios to baseline conditions.
- Calculate the percentage of days when the target flow is missed.

- Calculate the impacts to all other reaches' target flows.
- Display missed target flows due to dry years.
- Check for success in meeting the "or inflow" alternative minimum flow requirement.

The Model uses water data from 1990-2019, including gage flow and storage data, snow course measurements, and synthesized inflows. The model uses average record data to synthesize flows, and because daily inflow and daily outflow do not correlate well, the model uses a 5-day running average to improve the correlation. The USGS gauge is within roughly two percent accuracy, which helps decrease uncertainty within the model. The Model includes constraints surrounding physical limitations, Chandler Decree, and minimum flows.

Bret provided examples of scenarios using the Model and monthly comparisons and explained the Model's structure and nodes (see slides 15-17).

Questions/Comments

- Q (BLM): Is this tool like the Mill Creek Accounting and Planning Tool (MCAPT) for the Lundy project? What is the difference between them?
    - R (Relicensing Team): It is similar in its ability to show allocations based on predicted hydrology, but the Lundy tool is built around multiple tiers of water and storage rights that significantly constrain how water can be allocated. The Bishop Creek Operations model has certain constraints built in it is designed to meet the Chandler Decree and to try to deliver instream flows as long as inflows remain at a certain level.
- Q (USFS): When you say, "flows that enhance reaches can be added in the model to test alternative scenarios," is the opposite also true that we can remove water? Or is it only for adding water?
    - R (Relicensing Team): Yes, the Model can change the volume (in cfs) of any target flow.
- Q (USFS): The Report describes the model as calculating the percentage of successful days when the flow is missed. What is the output, and how is that represented?
    - R (Relicensing Team): There are many ways to look at metrics of success. At this point, our metric refers to the percentage of days that a target flow is not met. We break down the upper, middle, and lower third of hydrologic availability from a percentage of flow versus the average.
    - R (USFS) So, it simulates twenty years of output, but it does not tell you the specific days or years that the target was met, correct?
    - R (Relicensing Team): Yes, that is correct.
    - Q (USFS): Can you offer examples of specific flows?
        - R (Relicensing Team): Walking through the South Fork Creek box in detail: there is a higher low flow target at this spot, so the Model makes sure that there is enough flow in each location to meet the specific flow requirement(s). The Model can show how many days a year the target flow is not met due to a lack of resources. In addition, the Model can show the percent of time that we miss the target during the dry years versus the normal or wet years.
    - Q (Water Board): Is the dry years box the percentage of the overall number of days that you wouldn't be able to meet that requirement? Or is it a percentage of the box next to it?

    - R (Relicensing Team): We're accounting for the percentage of "misses" that happen in a dry year as a subset of the overall misses. This is shown in the column that records dry years. So for example, an output of (10% / 9%) would show that a target gets missed 10% of the time, and of that 10%, 9% are accounted for in dry years while the remaining 1 % would be in normal or wet years,
- Q (USFS): Can the Model graphically represent the type of years by wet, normal, or dry year? In other words, where can I see the type of water year (i.e., wet, normal, dry) by year?
    - R (Relicensing Team): That is coded in the storage tab, which is based on the snowpack tab.
    - R (USFS): It can be helpful to make a graph that shows how the years on record were distributed across dry, normal, and wet years based on the classification you used. I recommend adding this to the Model.
    - R (Relicensing Team): It is possible to color code this information in the Model and tease out the water type. We just need to determine where to present this information. Specifically, what are you trying to see?
    - R (USFS): I'm interested in seeing how often we have dry years and what that looks like from an operations standpoint. Can we pull data for those specific scenarios?
    - R (Relicensing Team): That information can be found in the snowpack tab.
- Q (USFS): How many normal years are in this period of data? What are the trends showing? Are years trending toward dry years? What effect will this Model have on operations?
    - R (Relicensing Team): Need to caution that the Model is not designed to be a climate model. Climate change could have an impact on the Bishop Creek system but predicting those impacts is not what the model is designed to do.
    - R (USFS): Not asking the model to predict climate changes. Rather, interested in the systems' ability to meet the targets in dry years generally. If dry years do increase this is important, because if there is not water to meet releases, what is the point of discussing targets that high?
- Comment (C) (Kearns & West): It sounds like the focus is on the dry year category. What qualifies as a dry year?
    - R (SCE): A dry year is characterized as <75% of the average Apil 1st snow water equivalent.
    - Q (Kearns & West): If someone set a flow target that is unachievable given the resources, what would happen?
    - R (SCE): This is extremely rare. If the flow target became unachievable, then SCE would formally ask for a deviation from the license. This has only ever happened due to construction constraints, not water constraints. The condition today is written to allow it to adjust to what nature provides.
- Q (USFS): Will the Model be able to tell us if SCE can or cannot meet the targeted flow rates?
    - R (Relicensing Team): Yes, the Model can represent changing the cfs.
- Q (USFS): Will the Model go back and adjust flow rates to meet the targets?
    - R (Relicensing Team): The Model can adjust or increase flow releases to meet the targets. The Model is designed to meet (1) the Chandler Decree, (2) FERC requirements, and (3) to flow and storage requirements. It will force releases to

increase as needed and tell you how many days it can successfully do so to meet the targets.
    - Q (USFS: Are the impacts of increased releases to meet targets felt in subsequent years?
    - R (Relicensing Team): No, the lakes are drained to minimum pool every winter, so multiple dry years does not have an impact on cumulative storage. Every year, the reservoirs are filled with spring storage, so every year the targets are responsive to whatever nature provided that year.

Mike asked if the group was comfortable moving forward in using the model as a tool to discuss project impacts and PM&Es, and if SCE was comfortable distributing the Model. The group agreed that they understood and supported the Model's objectives but wanted their hydrologists to review and ground truth the Model for its ability to accurately represent the Bishop Creek system. SCE agreed to distribute the Model soon and set up a separate Model workshop where hydrologists can ask questions and test scenarios. Mike and Finlay thanked the group for their participation and adjourned the meeting.

Next Steps

- Release Model to Stakeholders (next week)
- Review comments on Technical Report
    - Comments due October 15th
- Upcoming Meetings:
    - Late October: Effects Meeting (all resource areas)
        - Discuss potential effects as identified from study plan implementation
    - November 4: Ops Model follow up
        - Arrive at consensus for final changes to be made to the Operations Model for use during the PM&E discussions
    - November 18: USR Meeting
    - December 7 and December 9: PM&E Meetings