COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM

April 30, 2018
Facilitator's Summary
Facilitator: Donna Silverberg; Notes: Nancy Pionk, DS Consulting

The following Facilitator's Summary is intended to capture basic discussion, decisions and actions, as well as point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members. Official minutes can be found on the TMT website: http://www.nwd-wc.usace.army.mil/tmt/agendas/2018/

Lower Granite Transmission Line Outage

Doug Baus, Corps, explained that the purpose of this unscheduled TMT meeting was to coordinate an emergency equipment repair at a BPA substation on Wednesday, May 2, 2018, that will require a transmission line outage at Lower Granite Dam (LWG) for approximately 5 hours (9:30 am to 2:30 pm). He noted that the current plan for the operation, while the six turbine units are out of service, would be to pass all outflow via the spillway which could potentially increase total dissolved gas (TDG) in the LWG tailrace to approximately 131% TDG. This meeting was called to discuss alternative LWG operations that could reduce the percentage of TDG that fish would experience in the LWG tailrace during the transmission line outage. One alternative was to maintain spill at 80 kcfs during the outage (which could reduce TDG levels to approximately 127% TDG) and store the remainder of inflow in the LWG reservoir. Dan Turner, Corps, proposed a second alternative: to maintain spill at 50 kcfs during the outage to achieve 120% TDG and store the remaining inflows in the reservoir up to 737.7 feet. After the operation is concluded, the objective would be to resume spill to the gas cap and draft the stored water back to the appropriate Variable MOP elevation (MOP +1 - 734.0 – 735.0 feet) from the forebay as soon as possible

Tony Norris, BPA, explained that the line outage was needed to isolate a switchyard disconnect. He expects that another outage will be needed in June to repair the connection. Aaron Marshall, Corps, reported that LWG was currently operating at Variable MOP+1; the elevation for the LWG forebay was 734.4 feet and the elevations at the Lewiston gauge was 735.55 feet. The LWG minimum forebay elevation level, to maintain safe navigation, is 734 ft, and the maximum forebay elevation is 737.7 ft. The inflow forecast at LWG was expected to be in the range of 95-100 kcfs for May 2.

Paul Wagner, NOAA, noted that the Salmon Managers' main concerns regarding this operation were to limit TDG levels and to maintain spill throughout the outage to aid smolt migration. Smolts generally migrate in the late evening or morning. Salmon managers were concerned that a reduction in flow would cause a reduction in fish travel time. As such, they request that the Corps consider this impact while managing the operation and, if possible, draft the forebay after the operation's conclusion: as close as possible to the smolt's migration timing (i.e. increasing flow between 4 PM and 9 AM).

Fish managers also were concerned that this operation not impact spill and TDG levels at other projects downriver. They asked that the Corps not be overly reactive in managing spill levels down river as a result of this operation. Dan noted that flows in the lower Snake River are unpredictable and it would be difficult to adjust spill caps at Little Goose to anticipate changes in TDG from LWG as a result of this operation.

Summary: TMT members supported the following alternative operation at LWG:

- During the transmission line outage on May 2 from 9:30 AM – 2:30 PM, spill will be maintained at approximately 50 kcfs; excess flow will be stored in the forebay up to the maximum elevation of 737.7 feet. The spill level may be increased if there is more inflow than predicted.
- After the outage, the Corps will t draft the forebay back to the appropriate Variable MOP elevation based on inflows (MOP +1 at this time) and resume the 'spill to gas cap' operation.
- The Corps and BPA will inform operators of the Salmon Managers' preference to move the water out in the afternoon/evening hours, if possible; however, this language will not be included in the teletype.
- The Corps will do its best not to be overly reactive in managing spill caps at other projects downstream of this work.

The next regular TMT meeting will be a Face-to-Face Meeting on May 2, 2018, at 9:00 am.

This summary was prepared by the impartial facilitation team of DS Consulting. Please send questions, comments or revisions to nancy@dsconsult.co

Columbia River Regional Forum
TECHNICAL MANAGEMENT TEAM OFFICIAL MINUTES

April 30, 2018
Minutes: Pat Vivian

1. Introduction

Representatives of BPA, the COE, Nez Perce Tribe, Colville Tribe, Washington, Montana, USFWS, Warm Springs Tribe, Idaho, NOAA, Oregon, Yakama Tribe and others participated in today's TMT conference call chaired by Doug Baus, COE, and facilitated by Donna Silverberg, DS Consulting.

2. Lower Granite Dam Operation

On April 27, Doug Baus, COE, sent an email notifying TMT of the need to coordinate operations of Lower Granite Dam (LWG) for emergency BPA substation equipment repairs that will take a transmission line and all 6 turbine units out of service on May 2 from 9:30 am to 2:30 pm.

A disconnect failed in an upstream switchyard, Tony Norris, BPA, explained. Phase 1 of the repair requires an outage to isolate and bypass the only transmission line connecting LWG to the power grid. Loss of powerhouse generation will result in spilling total inflows for 5 hours, currently forecasted to be in the range of 95-100 kcfs, which would result in an estimated TDG production of 131% saturation in the LWG tailrace. Phase 2 of the repairs will be completed in June and will require a second outage.

One way to reduce spill and control TDG production during the 5-hour outage on May 2 is ponding, or storing water, in the LWG reservoir, Baus said. Inflows on May 2 are forecasted to be around 100 kcfs. The Corps estimates that maintaining spill at 80 kcfs would produce approximately 125-127% TDG saturation in the tailrace and the remainder of inflow could be stored in the forebay up to the maximum of 737.7 feet elevation for flood control at Lewiston. When the transmission line is returned to service, the stored water would be drafted out of the project and the forebay would return to the minimum 1-foot operating range of 734.0 to 735.0 feet (MOP+1).

The goal of today's conversation was to determine if there was consensus on operating the LWG forebay up to 737.7 feet in an effort to reduce TDG production in the LWG tailrace during the line outage. Aaron Marshall, COE, gave an update on forecasted inflows and forebay elevations. As previously coordinated, the Corps is operating the Lower Granite forebay

in the minimum 1-foot operating range that maintains the required depth in the navigation channel, dependent on inflows (also referred to as Variable MOP). Currently, inflows are in the range of 80-120 kcfs, which triggers a forebay operating range of 734-735 feet (MOP+1). The current forebay elevation is 734.4 feet and the Lewiston gauge is at elevation 735.5 feet, maintaining critical navigation depth at the confluence of the Snake and Clearwater rivers. Inflows are forecasted to stay in this range over the week, which would keep the project operating at MOP+1, then increase to over 120 kcfs this weekend of May 5-6. On the day of the outage, May 2, the forebay could be operated in the range of 734-737.7 feet, with the bottom limit providing navigation safety at the confluence and the upper limit providing flood control at the Lewiston levees.

Erick Van Dyke, Oregon, asked what would be the volume of water associated with storing water in the LWG forebay between elevations 735.0 to 737.7 feet. If inflows were approximately 100 kcfs and outflows were approximately 80 kcfs, storing the remaining 20 kcfs over 5 hours would represent approximately 60 kaf of water storage volume, Marshall replied.

Paul Wagner, NOAA, said the Salmon Managers discussed this situation and agreed to focus on achieving two objectives:

1. Spill a constant rate during the 5-hour outage to limit TDG and avoid 130% saturation in the LWG tailrace.

2. If spill exceeds 120% TDG in the LWG tailrace, do not make any significant reductions in the spill caps at projects downstream because this outage will be short in duration.

Wagner asked how the COE would manage spill caps at downstream projects if TDG production associated with this short duration spill operation exceeded 120% TDG in the LWG tailrace. Turner said it would be very difficult to track the effects of this short duration spill adjustment downstream. If Lower Granite is producing 120-125% TDG for a few hours, the effects on TDG at Little Goose and successive projects will be hard to follow, so it wouldn't impact how they set spill caps.

Scott Bettin, BPA, asked for an estimate of the spill cap to maintain the 120% TDG limit in the Lower Granite tailrace. Turner anticipated 50-52 kcfs would produce 120% TDG in the tailrace.

Wagner added that, ideally, the stored water would be drafted out during the early evening and morning hours when smolts tend to migrate. Flows could be increased after the outage that evening until 9 am the next morning, drafting the project back down to the appropriate 1-foot minimum operating range.

Bettin said there might not be enough load to run the turbines and draft the pondage out by 9 am the next morning. The objective would be to release the stored water as soon as possible, but it might take two days.

Erick Van Dyke, Oregon, asked about involuntary spill and whether spill could be increased above the gas cap to get the pool back to MOP+1. Julie Ammann, COE, replied that after the outage, the Action Agencies will resume spilling to the gas cap in accordance with the court order and state standards. Spill cannot exceed the gas cap unless forced by involuntary conditions like high flows above turbine capacity or lack of load The turbines may have to operate around the clock to get all the water out. A forecasted sag in inflows over the next couple days might help.

Wagner said the plan to maintain spill at 50 kcfs (120% TDG) and store the rest would be acceptable to NOAA. The Salmon Managers were willing to accept TDG exceedances to return the pool to its MOP+1 elevation by 9 am the next day, May 3. The biological objective is to align water travel time more closely with smolt migration, which usually occurs at night. Ammann emphasized that a voluntary operation outside the gas cap would be out of compliance with the court order and state standards. Realistically, the water will be released by the morning of May 4, sooner if possible.

Charles Morrill, Washington, requested that the water be released between the hours of 6 pm on May 3 and 9 am on May 4 if it can't be released by 9 am on May 3. The goal is to get fish moving again after the outage. Such a detailed request may be too complicated for the COE and BPA to implement, Ammann replied. She asked the Salmon Managers to focus instead on a date for returning the project to MOP+1.

Jay Hesse, Nez Perce Tribe, asked whether the spill cap estimate of 50-52 kcfs at Lower Granite takes into account that no water will be passing through the turbines; Turner said it doesn't. Spilling 100% of the river at inflows of 95-100 kcfs will produce an estimated 130% TDG in the tailrace. At current flow levels, the tailwater gauge measures all spillway flows. Hesse and Turner agreed that a reduction in the spill cap at LWG or other downstream projects would not be appropriate because the spill operation associated with the transmission outage is short in duration.

BPA expects to be able to draft all the pondage out in two days, Bettin said. Morrill's request will be factored in to the extent possible. The wild card in this operation will be Snake River inflows, known for being unpredictable, especially this time of year.

Wagner pointed out this scenario is based on estimated inflows of 100 kcfs, not 120 kcfs. Ammann added that the operation will be adjusted if necessary to maintain the pool below the maximum hard constraint of 737.7 feet if inflows are higher than anticipated. There's a possibility the line will be isolated sooner than 2:30 pm and generation will pick up sooner, Bettin added.

Jay Hesse, Nez Perce, asked the COE to be patient in managing spill caps at the dams downriver and not to overreact to temporary TDG increases generated by 5 hours of spill. Ammann agreed that's the plan. Current travel time is 2.1 days from Lower Granite to Little Goose, the next downstream forebay.

Ammann summarized the operation: on May 2, from 9:30 am to 2:30 pm, Lower Granite will spill 50 kcfs during a transmission line outage that will shut off powerhouse flows. A spill rate of 50 kcfs is expected to produce 120% TDG in the tailrace. Inflows above 50 kcfs will be stored in the forebay up to no higher than 737.7 feet elevation for flood control at Lewiston. Project staff will attempt to draft the pool back down to its MOP+1 elevation by 9 am on May 4, while keeping the operation within the limits of the gas cap. When the outage ends, the project will return to gas cap spill, which is currently 33 kcfs.

Wagner said this plan would be acceptable to the Salmon Managers. The COE and BPA will implement it as described.

3. Next TMT Meeting

TMT will meet next in person on May 2.

Name	***Affiliation***
Tony Norris	BPA
Doug Baus	COE
Jay Hesse	Nez Perce Tribe
Sheri Sears	Colville Tribe
Charles Morrill	Washington
Jim Litchfield	Montana
Dave Swank	USFWS
Jen Graham	Warm Springs
Lance Hebdon	Idaho
Paul Wagner	NOAA

Scott Bettin	BPA
Julie Ammann	COE
Lisa Wright	COE
Erick Van Dyke	Oregon
Dan Turner	COE
Tom Iverson	Yakama
Dave Benner	FPC
Eric Hockersmith	COE Walla Walla
Nancy Pionk	DS Consulting