



MEMORANDUM

EUGENE WATER & ELECTRIC BOARD
General Manager's Office

Rely on us.

January 26, 2010

TO: Commissioners Brown, Cunningham, Cassidy, Ernst and Farmer
FROM: Mike McCann, Carmen-Smith License Implementation Project Manager
Karl Morgenstern, EWEB Drinking Water Source Protection Coordinator
Andy Talabere, Staff Biologist
SUBJECT: Potential for silt and turbidity release during fish passage construction at EWEB's Carmen-Smith Hydroelectric Project.

Issue Statement

A concern has been raised that EWEB's current plan for building fish passage facilities (e.g., fish ladder and fish screen) at the Carmen-Smith Project will result in a release of silt and sediment from behind Trail Bridge Dam to the McKenzie River downstream from the Project. EWEB staff have been asked to identify what steps EWEB will take to prevent the release of sediment to the river during a future drawdown for fish passage construction, and a repeat of the release of silt to the river experienced during the 2002 drawdown of Cougar Reservoir by the Army Corps of Engineers.

Background

The Carmen-Smith Hydroelectric Project, which is located 71 miles east of Eugene on the upper McKenzie River, consists of three dams and reservoirs, two power plants, a substation and 19 miles of transmission line. EWEB began relicensing the Carmen-Smith Project in roughly 2002 and, in October 2008, signed a Settlement Agreement with sixteen other parties (EWEB Board Resolution #0833, October 21, 2008). The Settlement Agreement was filed with the FERC on October 23, 2008 in support of and as a supplement to EWEB's 2006 license application. EWEB is currently awaiting FERC action on the license application and Settlement Agreement.

The Settlement Agreement includes EWEB's commitment to build a volitional fish ladder that will allow fish to migrate from the McKenzie River below the Project into Trail Bridge Reservoir, a fish screen that will separate and transport fish from Trail Bridge Reservoir around the dam and into the McKenzie River, and a tailrace barrier that will prevent fish from accessing the area just below the Trail Bridge Power Plant. The Settlement Agreement requires EWEB to complete construction of the fish ladder, fish screen and tailrace barrier within six years of license issuance. Our current schedule has fish passage construction planned for the years 2013 through 2015.

In 2002, the U.S. Army Corps of Engineers initiated a water temperature control structure construction project at Cougar Reservoir on the South Fork of the McKenzie River. This project required the Corps to draw Cougar Reservoir from full winter pool (roughly 1,699 ft msl) to a construction pool of roughly 1,400 ft msl. The drawdown, initiated in April 2002, resulted in a significant release of silt to the McKenzie River (South Fork and mainstem) downstream of Cougar Reservoir. The McKenzie River was significantly impacted by turbidity related to the drawdown

well into the summer of 2002 and periodically following as a result of storm-related releases until construction was completed and the reservoir refilled beginning in January 2005. Following the initial drawdown of Cougar Reservoir, DDT and its breakdown products were discovered in the exposed silt beds within Cougar Reservoir and in forest floor organic material collected from the National Forest above Cougar Reservoir. Subsequent sampling downstream of the Cougar Project did not find DDT in McKenzie River water or sediment.

Discussion

EWEB's drinking water resource was significantly impacted by the Corps of Engineer's Cougar Project, and while EWEB supported the project for the overall benefit of the McKenzie River fishery, EWEB spent a substantial amount of money and staff time monitoring, treating, and participating in the response to the turbidity in the McKenzie resulting from the Cougar project. Karl Morgenstern and Mike McCann played a significant part in orchestrating EWEB's response to the Cougar Project. We are well aware of the impacts of the Cougar drawdown and do not wish to see it repeated in any way, shape or form as part of EWEB's implementation of the new FERC license at Carmen-Smith. We also do not believe that it could or that it will.

Under the Settlement Agreement, EWEB has agreed to build a fish ladder and downstream screen and passage system at Trail Bridge Dam. FERC is expected to include this requirement in the new license for Carmen-Smith. The federal fish agencies with prescriptive rights under Section 18 of the Federal Power Act will also require EWEB to construct a fish ladder and fish screen. EWEB has conceptual designs for both structures; the conceptual designs were used for settlement negotiations and to develop cost estimates for the structures. The preliminary construction plans developed for the Settlement Agreement assume that Trail Bridge Reservoir will be drawn down to a construction pool for three consecutive construction seasons, with two years (first and last) being a minimal drawdown and one year being a full reservoir drawdown. It appears that it is this information, which EWEB has shared freely but also identified as preliminary, that is causing concern regarding the potential for sediment release to the McKenzie downstream of the project.

The fact of the matter is that we currently do not know, and have not committed to, how we will construct the reservoir portions of the fish passage structures. It is of significant benefit to EWEB from a generation standpoint to be able to construct the facilities without a drawdown, and that may be possible. It may be that only a single drawdown is needed, or it may be that a significant drawdown, as envisioned previously, will be needed. EWEB's engineering contractor, CH2M HILL, is currently evaluating the conceptual fish passage design work done during the settlement negotiations. CH2M HILL is aware of EWEB's desire to eliminate or minimize the reservoir drawdown and will advise us of our options in the coming months.

If we do, in fact, need to lower the reservoir elevation at Trail Bridge to a minimal construction pool for one or more seasons, we do not believe that the turbidity downstream of the project will be anything like what was experienced during the Cougar project in either duration or magnitude. There are a number of reasons for this assessment. First and foremost, we would never be allowed to do what the Corps did to the McKenzie. Any construction project EWEB undertakes that involves in-water work requires a Clean Water Act Section 404 permit from the Corps of Engineers and an associated CWA Section 401 Certification from the State of Oregon (Oregon Department of Environmental Quality or DEQ). The 404 permit will contain limits on turbidity and best management practice requirements to limit impacts to the ecosystem. The 401 certification will contain turbidity limits and monitoring and reporting protocols. DEQ's standard limits for in-water

construction require project shutdown should turbidity exceed 10 percent above background or greater than 50 NTUs. Surprisingly, the Corps is not required to get a CWA 404 permit or CWA 401 Certification, so these protections were not in place at the time of the Cougar temperature control tower work.

In addition, Trail Bridge Reservoir is a much smaller reservoir than Cougar Reservoir (153,500 acre-feet of storage at Cougar compared with 2,263 acre-feet total volume at Trail Bridge), and it is operated in a much different manner. Cougar is used by the Corps to capture and store peak flood flows, which results in the capture of storm-transported silt. Trail Bridge has no capacity for capturing flood flows and storm flows are passed through the project via either the turbine or spillway. Storm-transported silt does not accumulate to any great extent in Trail Bridge Reservoir.

The Carmen-Smith Project also drains a much different watershed than the South Fork of the McKenzie River. The drainage area above Trail Bridge Reservoir (184 sq mi) is similar in size to the area above Cougar Reservoir (210 sq mi). However, the two drainages differ significantly in the area connected by surface hydrology and therefore available for sediment transport. Above Trail Bridge Reservoir, only 21.6 sq mi (11.7%) serve as a sediment source area. Whereas, above Cougar Reservoir greater than 190 sq mi (> 90%) are available as a sediment source area. The difference is due to the predominance of High Cascades terrain above Trail Bridge. The High Cascades terrain is relatively young volcanic rock with very little weathering and surface transport of water or sediment. High Cascades terrain comprises approximately 90% of the area upstream of Trail Bridge Reservoir (excluding the area above Smith Reservoir). In contrast, the South Fork McKenzie above Cougar is 60% Western Cascades terrain which is much older, highly weathered and dissected by streams, and prone to landslides. The end result is that the annual sediment yield into Trail Bridge Reservoir is approximately 4% of the sediment yield into Cougar Reservoir and because of difference in dominant geology, the sediment coming into Cougar Reservoir has a higher proportion of silt and clay that is susceptible to suspension. Studies conducted by EWEB for the relicensing of the Carmen-Smith Project found that the accumulated sediment in Trail Bridge Reservoir is predominately coarse gravel and cobble, probably related to transport during the 1964 and 1996 floods.

We do not have any sampling data for the presence of DDT in forest material or sediment at the Carmen-Smith Project. However, information obtained from the USDA Forest Service identifying aerial spraying patterns from the 1950s do not include the Carmen-Smith Project vicinity in the areas being treated with DDT for Spruce Budworm. Aerial spraying of DDT for Spruce Budworm control is considered to be the source of the material found in Cougar Reservoir sediments. Also, DDT, as a compound, is highly hydrophobic and absorbs strongly to clay and silt soil materials. As already described, the watershed above Cougar Reservoir has a much higher proportion of clay and silt than is found in the upper McKenzie watershed. For that reason, Cougar Reservoir's sediments support the accumulation and concentration of DDT. In contrast, Trail Bridge Reservoir, has very little silt accumulation in which to store DDT because there is very little silt that enters the reservoir and, because it is not a flood storage reservoir, silt and clay tend to pass through rather than accumulating. For these reasons, we do not believe that DDT is an issue of concern for the implementation of the Carmen-Smith work.

Finally, should EWEB need to draw down Trail Bridge Reservoir for construction, EWEB will build and follow a drawdown plan (schedule) that accounts for the drainage rate of the surrounding soils. This will enable the exposed soils to drain as the water level drops, coming to a safe equilibrium and limiting the potential for sloughing and soil slope failure. Sloughing and slope failure was the

primary cause of sediment mobilization during the initial phases of the Cougar draw down. We believe that this was due to the Corps lowering the reservoir water level too rapidly. Due to contracting issues, the Corps started their draw down of Cougar almost one month later than planned. They tried to make up for lost time by increasing the daily draw down rate. This resulted in saturated soils above the water line loading the slope and sloughing into the remaining reservoir pool. By contrast, EWEB's most recent full drawdown of Smith Reservoir (completed in 1982) was done slowly and according to plan, in a manner that resulted in no recorded incidents of increased turbidity. Calculating and following a safe drawdown rate will limit slope failure during drawdown.

In summary, EWEB staff do not currently know if a drawdown of Trail Bridge Reservoir will be necessary for the construction of the fish passage facilities required by the Settlement Agreement. We are currently working with our engineering consultants to evaluate our construction options. It is to EWEB's benefit to eliminate or minimize any draw down. If a draw down is necessary, EWEB will take any and all measures necessary to minimize downstream impacts to the McKenzie River. This is good environmental stewardship, and will also be required by the CWA permits required for construction. EWEB staff will keep the Board informed as we move forward with design and construction planning. The earliest a construction draw down may occur is 2013.

Recommendations/ Requested Action

No action requested at this time.