Craver, Patti

From: Logan, Dennis
Sent: Tuesday, July 03, 2012 9:39 AM
To: Susco, Jeremy; Subin, Lloyd; Grange, Briana
Cc: Krieg, Rebekah; Cooper, Paula; Klementowicz, Stephen
Attachments: History of NRC and NMFS coordination on protecting salmonids at Columbia Generating Station.docx

All,

Paula Cooper, Becky Krieg, and I did some background research on the history of NRC and NMFS coordination on protecting salmonids at Columbia Generating Station. The results are attached. Note that the name of the plant, the name of NMFS, the name of NRC, and the owner of the plant have all changed over this history.

NMFS has been involved in the design and monitoring of the Columbia Generating Station's intake structure since the beginning (1970 or 1971). Due partially to NMFS's concerns, WPPSS (the owner before Energy Northwest) changed the original design of the intake structure from an infiltration system (designed to minimize effects on salmonids) to the present perforated cylinders oriented parallel to the river flow (also designed to protect salmonids). Twice in the past, NMFS proposed monitoring programs to test the efficacy of the intake structure design, and WPPSS performed the monitoring first in 1979 and 1980 and then in 1985. All monitoring tests showed no entrainment or impingement of salmonids at the intake structure.

I thought this would be useful information for today's call.

Dennis

B/90

History of NRC and NMFS coordination on protecting salmonids at Columbia Generating Station

1970

Bureau of Commercial Fisheries becomes NMFS and moves from the Dept. of Interior to the Dept. of Commerce.

1971 (August 19)

Washington Public Power Supply System submits ER for

"Nuclear Project No. 2" AKA "Hanford No 2"

Makeup water for cooling tower to be drawn from Columbia River using "an advanced concept intake facility" that infiltrates water through a filter bed underlain by perforated pipes along the shore of the Columbia River.

"A major concern for fish protection has led to the infiltration scheme which will essentially eliminate adverse effects" (Section 2.3.3.1 - page 1).

System includes "a backflush system to clear the intake system if it should be clogged."

"A river bottom system filter will also be evaluated."

1972 Draft ES. Request for Comments.

1972 (Oct. 31)

Letter to AEC from Daniel R. Muller, Secretary of the Interior, U.S. Department of the Interior Responding to AED request for Comments on Draft ES:

> "It appears that the uniquely designed infiltration-bed intake system will protect aquatic organisms from significant entrainment and impingement losses during project operations. If operating experience proves it to be satisfactory, similar intakes at other power plants using closed-cycle cooling may also be considered. However, the effects of periodic backflushing, which may be necessary to clean the intake system, is not discussed. Our major concern is with silting which will result. Therefore, we think that a special operational monitoring study should be conducted by the applicant for at least the first 2 years of project operation to determine the effects. We suggest that the study plan and monitoring should be done in concert with the Bureau of Sport Fisheries and Wildlife of this Department and the Washington Departments of Game and Fisheries."

1972 (December)

Final Environmental Statement related to the proposed Hanford Number Two Nuclear Power Plant, Washington Public Power Supply System, Docket No. 50-397

Section V.2.a. Effects of the Intake Structure

"The intake for the makeup of water for the cooling towers and condenser cooling system will be an infiltration-bed system along the shoreline of the Columbia River in which the water enters the pumping system through a sand and gravel bed overlain by cobble."

"The design for the intake structure essentially eliminates entrainment or impingement of aquatic organisms. Although minute organisms may penetrate the filter bed, the quantities will be less than 0.16% of the inventory in the river, assuming a uniform distribution in the water. The design velocity of water through the infiltration bed is less than that reported as the sustained swimming capability of fish larvae and fry [14, 15] and the system is expected to have no measurable effects on fish by impingement or entrapment. The surface composition of the infiltration bed will be overlain by coarse gravel and large cobble and is not a substrate expected to be sought out by spawning salmonids. In addition, some authorities believe that spawning salmon seek out areas of upwelling whereas the water flow in the filter system will be downward and, therefore, not attractive to spawners [64] (This point is not generally agreed upon by all authorities.) [65] "

1974 (December)

Schrieber, D.L., C.D. Becker, and R.L. Chitwood. 1974. Intake System Assessment for Central Columbia River. *American Society of Civil Engineers Journal of the Power Division*, Vol. 100, No. 2, December 1974, pp. 139-155.

Study done by USAEC Headquarters, PNNL, Battelle, and WPPSS. Tech. Lib. Microfiche.

"Four intake systems (vertical traveling screens, infiltration beds, perforated pipes located above the stream bed in the river channel, and perforated pipes located above the bed in an off-stream channel) are selected and considered for detailed evaluation of potential environmental impact. Based on all considerations of potential impacts, **the best alternative is perforated pipes** located above the river channel bed This intake system is also the most economical to construct, operate, and maintain. A pivotal issue in assessing the environmental impact is the potential for impingement and entrainment of macroscopic planktonic organisms and juvenile fish without or with little swimming ability. As this impact depends largely upon approach velocities, the infiltration beds and perforated pipes located above the river channel bed are both well suited to minimize impingement and entrainment."

1975

Engineer Design for Perforated Pipe system is in ADAMS.

1977. (March 21)
Letter from WPPS to NRC. Subject: WPPS Nuclear Project No. 2. Environmental Report – Operating License Stage, Submittal for Docketing. Page 3.4-4. ADAMS No. .ML102180050.

Propose to use "...two perforated pipe inlets supported offshore above the bed of the river and approximately parallel to the river flow..."

September 1974 – March 1980
Studies of fish communities at WNP-2 Intake.

1982 Report (WPPSS. 1982. Technical Review of the Aquatic Monitoring Program of WNP-2. Mucge, J.E., T.B. Stables, and W. Davis III. September 1982)

"The WNP-2 intake structure was inspected for fish impingement in December 1978 and May - December, 1979 by consultants and .by Supply System divers in the summers 1980-1982. During the inspections **no impinged fish were observed** on the intake screens. **(6)**

Fish entrainment sampling and collection efficiency testing at WNP-2 was performed May 1979 through May 1980. **Analysis of 69 entrainment samples revealed no fish eggs or fish larvae. (6)** During these tests the makeup water pumps were operated in a manner that approximated plant operating conditions. Further discussion of potential impingement/entrainment impacts is presented in Section 7.2 of this report."

1981 (September 18)
Letter from Dale Evans, Division Chief, NMFS to R. Auluck, NRC Licensing project Manager, NRC with comments on draft EIS for operation of WPPSS Nuclear Project No. 2. Pages A-21 and A-22.

"5.5.2.1 Cooling-Water Intake Impacts
Entrainment
Page 5-10, paragraph 2. Potentia1 entrainment losses of emergent salmonid fry are partly based on the assumption that these fish are evenly distributed throughout the river upstream of the intakes. We question the validity of the licensee's assumption and feel potential entrainment impacts could be greater than estimated in the DEIS.

The assumption is not based on site-specific or other biological data and therefore cannot be considered scientifically valid. The Mains and Smith study (1964)1 conducted in the mid-Columbia vicinity during 1954-55 indicated that migrating juveniles had a preference for the shallower shoreline areas. Nevertheless, the same study found that 43 percent of the juveniles migrated in deep water."

"5.5.3 Ecological Monitoring
5.5.3.2 Aquatic
Page 5-12, paragraph 1. The DEIS states an operational monitoring program will be conducted .in accordance with the Environmental Protection Plan to be issued as part of the project Operating License by the Commission. At our request, special conditions were included in the Licensee's water withdrawal permit requiring impingement and entrainment studies. Although tests conducted during 1979-80 did not identify fishery resource problems, we are concerned that test results may not necessarily tell us what may occur during actual project operation. Discussions are currently underway regarding expansion of Priest Rapids and Wanapum Dams both upstream of WNP-2. Agreement on minimum river flows has yet to be reached'. If, in the future, river flows below Priest Rapids are consistently near the minimum, river conditions during the juvenile outmigration could be significantly different from those which existed during 1979-80 tests.

Most 1979-80 entrainment sampling and impingement observations were made when river flows.were considerably greater than 50,000 cfs. River flows concurrent with April/May entrainment sampling ranged from 57,000 - 150,000 cfs. We are concerned that the ongoing mid-Columbia discussions could potentially result in low river flows during peak fry migration. If this should occur, additional testing at low flows will be desirable. Initially, we envision diver intake observations. If problems are identified, subsequent bypass velocity measurement and entrainment sampling would be requested."

1985.
WPPSS Report on results of studies proposed by NMFS.
Washington Public Power supply System. 1985. Operational Ecological Monitoring Program for Nuclear Plant 2. 1985 Annual Report. Prepared by Environmental Programs Department.

Page 12-1
"In January 1983, the National Marine Fisheries Service (NMFS) presented the Supply System with comments/concerns regarding the entrainment study portion of the Operational Environmental Monitoring Program (Evans, 1983). In response to NMFS concerns, entrainment sampling was increased to cover the period from July 15 to September 15, during one summer/full time period when the plant has reached at least 75% load (Sorensen 1983).

WNP-2 reached approximately 75 percent thermal load in November, 1984. The entrainment studies conducted in 1985 were designed to fulfill the requirements set forth in EFSEC [State of Washington Energy Facility Site Evaluation Council] Resolution No. 214 and to address the concerns of NMFS."

Evans, Dale R. January 14, 1983, National Marine Fisheries Service, Letter to K.R. Wise, WNP-2 Operational Monitoring Program.

Pages 12-3 and 12-4.

"12.3 RESULTS AND DISCUSSION

Entrainment samples were collected on 25 occasions from April 1985 through September 1985 and contained no fish, fish eggs, or larvae. Over 294 hours of sampling was performed with an average sampling period of just under 12 hours (Table 12-1)."

"Sixty-nine entrainment samples collected from May 1979 through May 1980 revealed no fish, fish eggs or larvae (Beak, 1980). Including these studies, over 976 hours of entrainment sampling has been performed on the WNP-2 intake structures.

In summary, entrainment sampling during 1985 at water withdrawal rates associated with thermal loads of 75% or greater indicates no apparent impact on Columbia River salmonid populations."