Craver, Patti

From: Logan, Dennis
Sent: Wednesday, May 09, 2012 3:34 PM
To: 'Richard Domingue'
Cc: Cooper, Paula
Subject: RE: NRC response to NMFS additional information request
Attachments: 2012-05-08 Additional Info request responses for NMFS .docx

Rich,

Since we have not been able to reach each other by phone, I am sending the information that we have at this time, as I explained in my last phone message. We are waiting for the aquatic chemistry reports from the plant. We have confirmed that the plant installed titanium condensers in 2011, as we had remembered.

The other information is on the attached form, as you requested. That form includes your original questions on the first page. In the reference section, you can examine the references that appear with an Agencywide Document Access and Management System (ADAMS) accession number by using NRC's web-based ADAMS at the following URL: http://adams.nrc.gov/wba/. These references are and have been publically available. By cutting and pasting the "ML#" (starting with ML...) at the end of the reference into the system where instructed, ADAMS will retrieve the references, and you can read them or print them as you need.

Impingement and entrainment information appears in the Washington Public Power Supply System (WPPSS) reports.

I will send the aquatic chemistry reports when we receive them. Please call if you have any other questions.

Ms. Paula Cooper has replaced Dan Doyle as Project Manager. Her number is 301-415-2323. Please call me or Paula if you have any other questions.

Dennis

From: Richard Domingue [mailto:richard.domingue@noaa.gov]
Sent: Wednesday, May 02, 2012 5:06 PM
To: Logan, Dennis
Subject: NRC response to NMFS additional information request

Dennis, On April 11, 2012 we recieved a notice of the final EIS for license renewal for the Columbia Generating Station. As we previously submitted an additional information request to facilitate further consideration of NRC's request for NMFS' concurrence with NRC's determination that the proposed action would not likely adversely affect ESA-listed anadromous fish species, I looked in the attached disc and found nothing that clearly referenced our AIR. If the final EIS contains the requested information, please direct me to its location.

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Richard Domingue
503-231-6858

B/61

To: Dan Doyle, Nuclear Regulatory Commission
From: Rich Domingue, National Marine Fisheries Service

RE: Additional Information Request regarding license renewal of The Columbia Generating Station Consultation No. F/NWR/2011/05286.

We have identified two aspects of the Columbia Generating Station configuration and operations as presented in Supplement 47 of the Generic EIS for License Renewal of Nuclear Plants, Regarding the Columbia Generating Station that have a potential to adversely affect fish species listed under the ESA, or covered under the Magnuson Stevens Act: the cooling system make-up water intake, and effluent outfall 001. At present insufficient information is available to NMFS to evaluate these potential adverse effects. We request the following information.

1. Copies of impingement and/or entrainment studies conducted on the existing intake screens. Your letter of December 20, 2011 refers to two entrainment studies that have been conducted on the existing intakes conducted in 1979-1980 and 1985 as providing evidence that the existing screens are not likely to adversely affect ESA-listed fish species. Please provide copies of these studies, including methods and results for our consideration.

2. A complete intake screen design report. NMFS has developed a fish screen design summary form that provides information pertinent to evaluating the likely effectiveness of water intake screens to avoid or minimize take of listed species (attached). Please complete the attached screen design summary form except those areas we have identified as not applicable (N/A). Some of the requested information is available in the Draft EIS you have provided. However, we need all of the information requested and placing all pertinent information in the summary format would assist our timely review.

3. While the 001 outfall discharges a small amount of water, its physical and chemical characteristics are not well defined and could adversely affect individual fish passing in the immediate vicinity of the outfall. Because the condenser tubing has been replaced, effluent data from the period prior to this replacement does not accurately represent the characteristics of this waste stream. NMFS expects that effluent conditions have improved since this upgrade. Please provide water quality characteristics for this outfall collected pursuant to NPDES permit WA0025151-1 summarized on a quarterly basis (seasonal) over a period of at least one year. NRC should estimate the potential effects of this discharge on Upper Columbia River spring Chinook salmon and steelhead and Upper Columbia River summer/fall Chinook salmon and Columbia River coho (for which essential fish habitat has been designated under the Magnuson-Stevens Act). Both direct effects (e.g. toxicity to salmonids) and indirect effects (e.g. in the event that discharged effluent is warmer than the Columbia River, a potential would exist for additional predation by introduced warm water fishes that may be attracted to and enhanced by the warmer water provided by the outfall) should be considered. The potential for adverse effects varies by season and NRC should address potential adverse effects on each inland life stage and pay particular attention to fry and juvenile life stages as these life stages are most susceptible to adverse water quality conditions. Your draft EIS cites thermal drift studies that were conducted in 1985 (WPPSS 1986) as evidence that heated effluent from the cooling system does not adversely affect anadromous fish that may encounter the waste plume. Although we anticipate that the current effluent characteristics are not the same as those prior to the condenser tubing replacement, please provide a copy of this study for our consideration.

Juvenile Fish Screen Design Summary

Provided by: U.S Nuclear Regulatory Commission, Rockville, MD   Date: 05/08/2012

Contact information: Dennis Logan, Biologist, USNRC, Phone 301-415-0491
Paula Cooper, Project Manager, USNRC, Phone 301-415-2323

I. Description of site including name of diverted stream, type of diversion, type of headgate, metering device, site name.

Response:

The Columbia Generating Station (CGS) is operated by Energy Northwest (EN). Its circulating water system is a closed cycle cooling system that removes heat from the condenser and transfers it to the atmosphere through evaporation using six mechanical draft cooling towers (EN 2010a). The circulating water pumphouse circulates the water from the condenser through the cooling towers and back again at a rate of about 550,000 gallons per minute (gpm) (35 cubic meters (m3 per second (sec)). The temperature of the cooling water in the circulating water system increases about 30 degrees Fahrenheit (F) (17 degrees Celsius (C)) as the water flows through the condenser. The cooling towers rise 60 ft (18 m) above the basin and are approximately 200 ft (61 m) in diameter at the base of the towers. The makeup water pumphouse is located 3 mi (5 km) east of the plant and houses three 800 horsepower makeup water pumps.

CGS withdraws water from the Columbia River through an intake system . The circulating water system uses water from the Columbia River to replenish the water lost from evaporation, drift, and blowdown from the cooling towers. The intake system for CGS consists of two 36 inch (in.) (91 centimeter (cm)) diameter buried pipes that extend 900 ft (274 m) from the pumphouse into the river, about 300 ft (91 m) from the shoreline at Columbia River Mile (RM) 352 (WPPSS 1980). The pipes make a 90 degree bend and extend slightly above the surface of the riverbed. Each of the pipes ends with an intake structure (20 ft (6 m) in length) mounted above the riverbed and approximately parallel to the river flow. The location of the intake screens is in the deepest part of the channel, and the river bottom varies around the intake structure from exposed Ringold conglomerate to boulders, cobble, gravel, and sand (WPPSS 1987).

Each intake structure is composed of two intake screens that are each 6.5 ft (2 m) in length and mounted end to end. The remaining length of the intake structure consists of two solid cones at either end of the structure. The intake screens consist of an outer and inner perforated pipe sleeve (WPPSS, 1986). The outer sleeve has a 42 in. (107 cm) diameter sleeve with 3/8 in. (9.5 millimeter (mm)) diameter holes (composing 40 percent of the surface area). The inner sleeve has a 36 in. (91 cm) diameter sleeve with 3/4 in. (19 mm) diameter holes (composing 7 percent of the surface area). The intake screens are designed to distribute the water flow evenly along its surface.

The intake system is designed for a withdrawal capacity of 25,000 gpm. Actual makeup water withdrawal during operating periods averages about 17,000 gpm. This is about 0.1 percent of the minimum river flow in the vicinity of CGS or 0.03 percent of the average annual flow (EN 2010a).

II. Water Surface Elevation (WSE) Data. Generally indicate method used to determine and estimate flows and elevations. Elevations can be relative to local benchmark, and period of record should be limited to the downstream juvenile migration season.

Response: Flow varies seasonally and typically peaks from April through July during spring runoff and is lowest from September through October. The means of monthly flows recorded by the U.S. Geological Survey (USGS) below Priest Rapids Dam during water years 1960 through 2008 range from 79,300 cubic feet/second (cfs) (in September) to 202,000 cfs (in June). Mean annual flows for the same period ranged from 80,650 cfs in 2001 to 165,600 cfs in 1997 and averaged 117,823 cfs. For water years 1984 through 2008, coincident with the period of CGS operation, measured flows averaged 113,712 cfs (USGS 2010). The higher flows occur during the downstream juvenile salmon migration season.

The impact of upstream impoundments has been to dampen flows during spring freshets and to limit flooding. Flows vary daily and hourly as water as upstream impoundments, such as Priest Rapids Dam, release water to meet electrical demands. Flow is also regulated seasonally to limit the impact on spawning salmon. Due to fluctuating river flows in this reach, river stage can vary in excess of 10 feet on a daily basis. The river channel near the CGS site varies between 1200 and 1800 ft wide for low water and normal high water stage, respectively. River depth varies from about 25 to 45 ft for normal high water and flood high water levels.

Elevation of the intakes in relation to the river is shown in Figure 1.

1. River WSE and streamflow near site of bypass return (open channel diversions only) - Not Applicable.

a. 5% exceedence flow = CFS, WSE =

b. 95% exceedence flow = CFS, WSE =

2. River WSE and streamflow at point near diversion

Response: The diversion system used reflects values of CFS and WSE at the point of intake on the screen. Using the average mean annual flow for June (to coincide with peak juvenile migration season) from 1960 through 2008, the Columbia River flow value is 202,000 cfs, and would be considered high water flow with a surface water elevation of 373 feet msl (mean sea level) (USGS 2010). The velocity through the external screen openings is approximately 0.5 feet per second under normal operating conditions where 12,500 gpm are removed through both intake structures (WPPSS 1980). This velocity is about a tenth of river velocities measured near the perforated pipes, which range from 4 to 5 fps (1.2 to 1.5 m/s) (WPPSS, 1986).

a. 5% exceedence flow = CFS, WSE = 226000 cfs, WSE varies about 25–45 ft for normal high water and flood high water levels (USGS 2012)

b. 95% exceedence flow = CFS, WSE = 56800 cfs, WSE varies about 25–45 ft for normal high water and flood high water levels (USGS 2012)

3. Diverted flow and associated WSE on the screen

Response: See answer to #2 above. Maximum diversion would occur at pumping capacity, or 25,000 gpm (55.7 cfs). Normal diversion is described as 17,000 gpm. There is no minimum diversion, although during outages the diversion could be reduced to 0 cfs.

a. Maximum diversion = CFS, WSE = 55.7 cfs, WSE at top of screen is 341 ft msl

b. Normal diversion = CFS, WSE = 37.9 cfs, WSE at top of screen is 341 ft msl

c. Minimum diversion = CFS, WSE = 0 cfs

III. Screen structure

1. Type of screen (rotary drum, fixed vertical, etc.): Attach detailed drawing of screen, including dimensions, mesh, seals

Response:

Each intake structure is composed of two intake screens that are each 6.5 ft (2 m) in length and mounted end to end. The remaining length of the intake structure consists of two solid cones at either end of the structure. The intake screens consist of an outer and inner perforated pipe sleeve (WPPSS 1986). The outer sleeve has a 42 in. (107 cm) diameter sleeve with 3/8 in. (9.5 millimeter (mm)) diameter holes (composing 40 percent of the surface area). The inner sleeve has a 36 in. (91 cm) diameter sleeve with 3/4 in. (19 mm) diameter holes (composing 7 percent of the surface area). The intake screens are designed to distribute the water flow evenly along its surface. The intake structure is mounted above the riverbed and approximately parallel to the river flow, about 300 ft (91 m) from the shoreline at Columbia River Mile (RM) 352. The location of the intake screens is in the deepest part of the channel, and the river bottom varies around the intake structure from exposed Ringold conglomerate to boulders, cobble, gravel, and sand (WPPSS 1980, 1987).

The intake system is designed for a withdrawal capacity of 25,000 gpm. Actual makeup water withdrawal during operating periods averages about 17,000 gpm. This is about 0.1 percent of the minimum river flow in the vicinity of CGS or 0.03 percent of the average annual flow (EN 2010a).

Figure 2 shows a schematic of the intake (plan and section views). Figure 3 shows a spare perforated pipe for the intake structure.

2. Angle of screen relative to ditch flow: Not Applicable

3. Screen cleaning mechanism (drum rotation, backspray, brushes etc.):

Response: The perforated pipe surface serves as the water cleaning facility. The outer sleeve is designed to prevent trash and fish entrainment and the inner sleeve is designed to provide uniform intake velocities through the outer sleeve perforations (WPPSS 1980). Since 1978, visual inspection by scuba divers has shown that biofouling by algae, insect larvae, debris, or sponges has not affected operation of the intakes.

Originally, a backwash system was planned for screen cleaning using low velocity flow reversal through the perforations. The perforated sleeves themselves were designed to reduce the potential for debris collection and to permit complete removal for periodic inspection, cleaning, repair and replacement (WPPSS 1980). Monthly inspections of the intake system for biofouling, maintenance, and impingement were performed using scuba divers starting in 1978. After 1986, inspection frequency was reduced to semiannual surveys performed in April and October. Since 1978, no impingement of fish on the screens has been observed. Since 1978, biofouling by algae, insect larvae, debris, or sponges has not affected operation of the intakes (WPPSS 1986, 1987, 1988).

4. Screen cleaner powered by (electric motor, paddlewheel, hydraulic motor, etc.): Not applicable.

5. Minimum submerged screen area:

Response: Both of the intakes are submerged. Each cylindrical perforated pipe intake has an effective area of approximately 30 feet (ft) by 46 ft (9.1 meters (m) (WPPSS 1987).

6. Length of screen:

Response: Each intake structure is composed of two intake screens that are each 6.5 ft (2 m) in length and mounted end to end.

7. Bottom and top elevation of flow area of the screen:

Response: The top of the intake screens is at 341 ft msl (WPPSS 1980), and the bottom elevation sits just above the river bed, which is at 328 ft msl.

8. Screen diameter (drum or cylindrical screens): NA

Response: The CGS intake system consists of a perforated pipe with and outer screen sleeve and an inner screen sleeve. The outside sleeve has a 42-in. diameter, and the inside sleeve has a 36-in. diameter (EN 2010a).

9. For pump intake screens, list brand, model, cleaning mechanism:

No cleaning mechanism is needed.

10. Describe inspection, operations and maintenance program.

Response: Scuba divers perform semiannual inspections in April and October of the intake system to assess biofouling, fish impingement, and need for maintenance (WPPSS 1986, 1987, 1988).

IV. Recommended bypass return pipe (if applicable) Not Applicable.

1. Pipe diameter =

2. Length required (to preferred outfall site) =

3. Pipe slope (rise/run) =

4. Bypass flow and flow control device (weir length or orifice size):

5. Outfall type (submerged, free-fall, open channel):

6. Approximate river velocity at outfall =

7. Minimum outfall depth =

8. Ditch invert elevation =

V. Other site characteristics and constraints (examples: fish species/life stage present, access problems, stream characteristics at bypass outfall site, construction site problems, excessive cut/fill, land owner problems, irrigation season, river flow, construction window, ice jam problems, sedimentation potential, winter operation required for stock water, consolidation potential, irrigation methods that impact indicated water surface elevations, screen location constraints, road/bridge construction required, excessive or unusual debris load etc.). Indicate method of coping with constraints.

Response: No constraints identified.

VI. Site sketch. Include screen location, river geometry near screen site.

Response: See Figures 2 and 4.

VII. Ditch cross sections (if applicable). Include invert elevations relative to benchmark, distance between cross-sections, and water surface elevation. Not Applicable

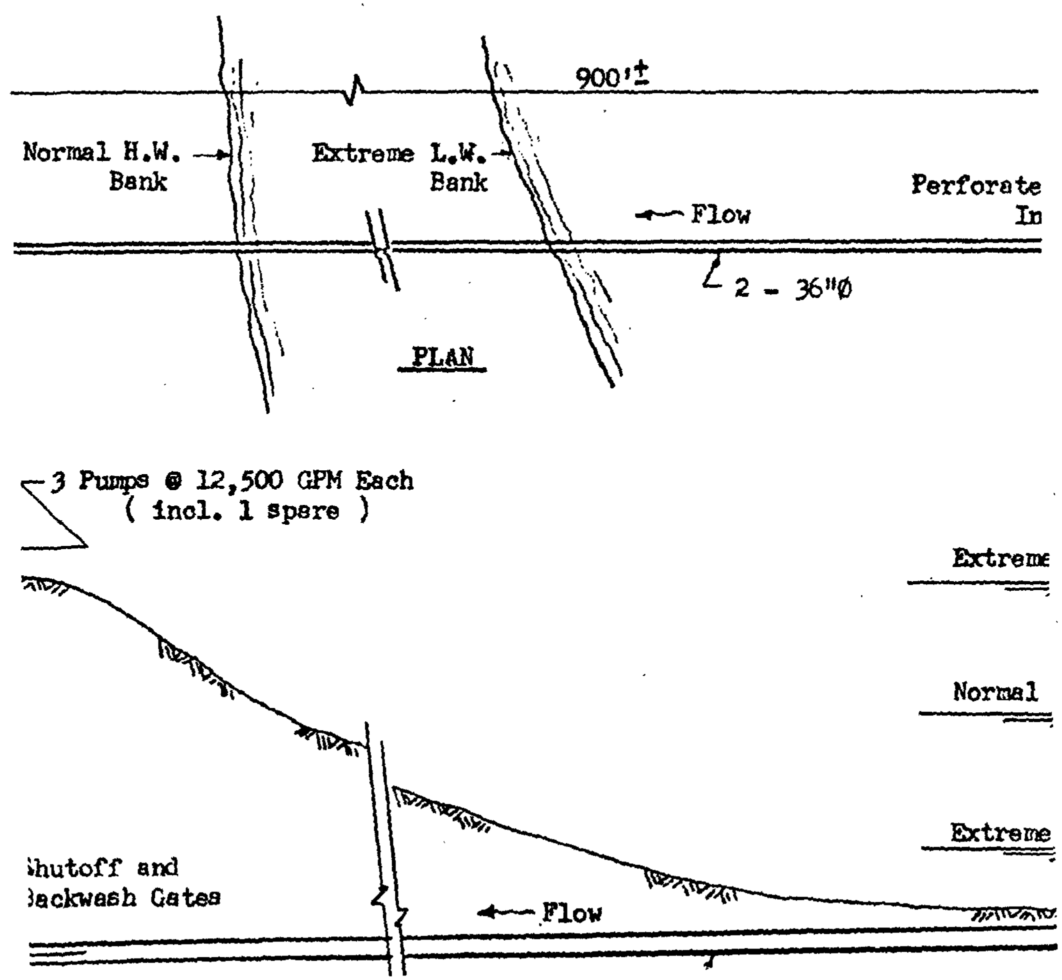

Figure 1. Intake system plan and profile

(WPPSS 1980)

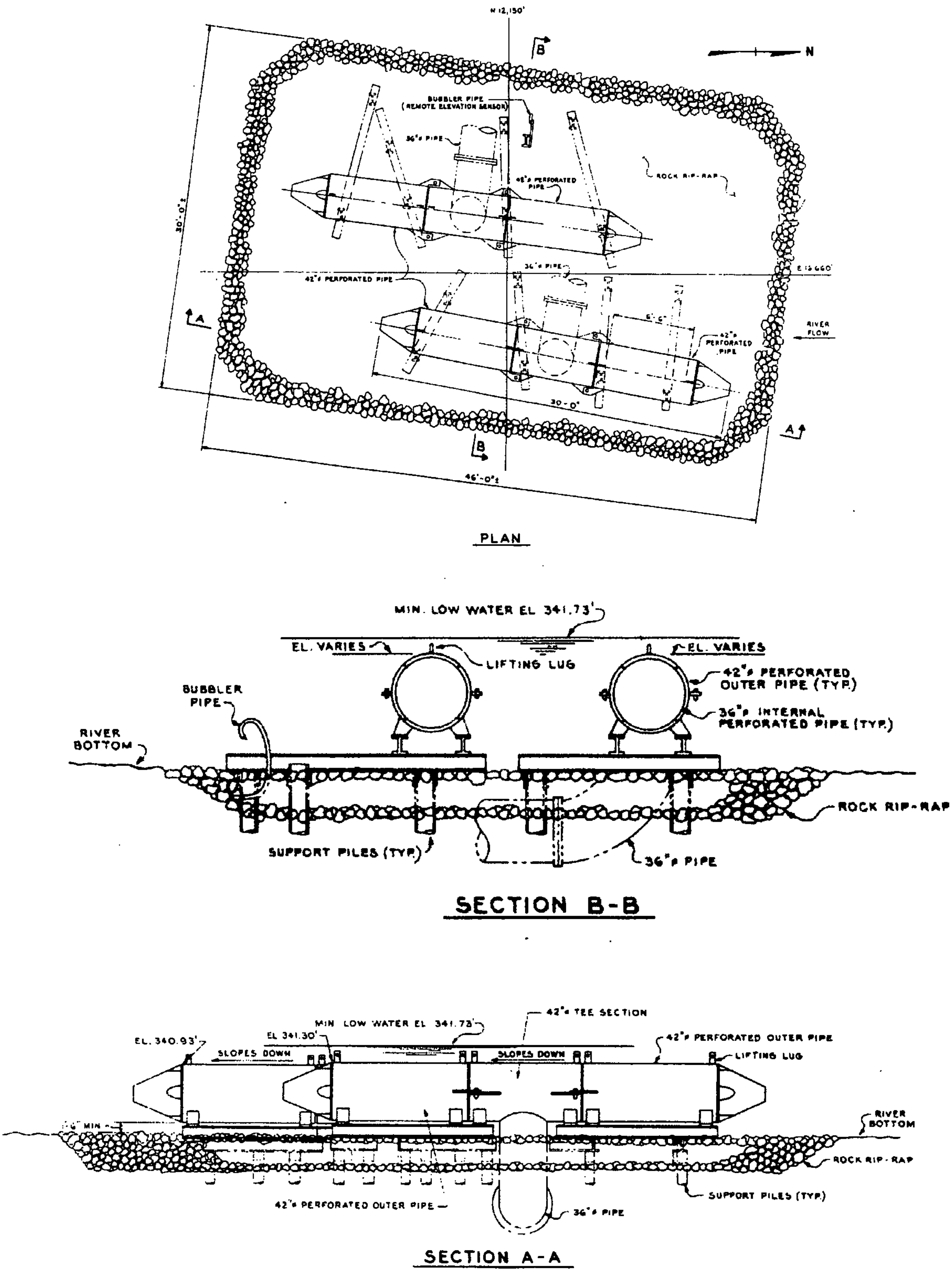

Figure 2. Perforated intake plan and section

(WPPSS 1980)

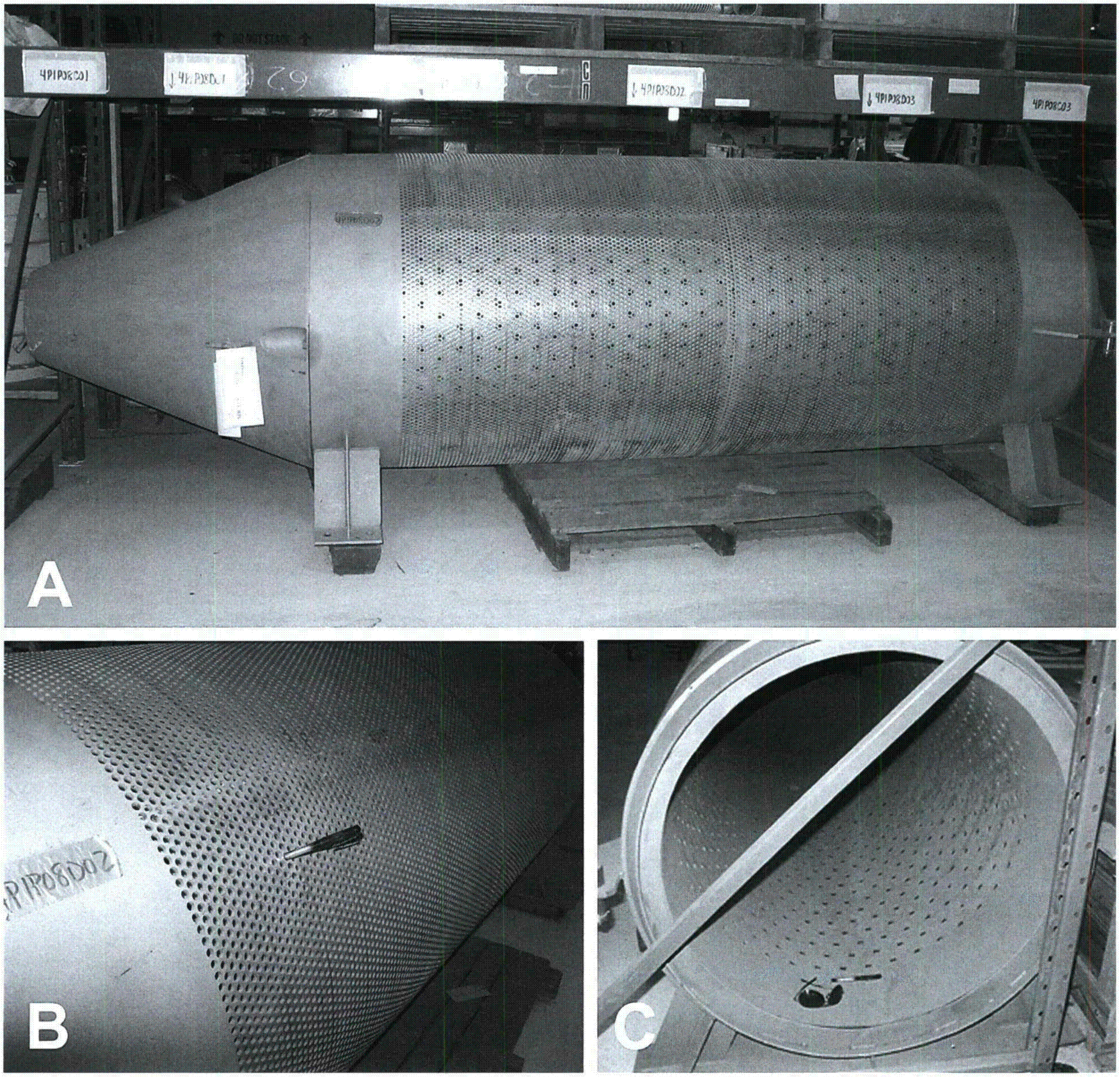

Figure 3. Spare perforated pipe for the intake screen at CGS.

"A" side view; "B" close up of outer sleeve; and "C" end view showing inner sleeve of perforated pipe

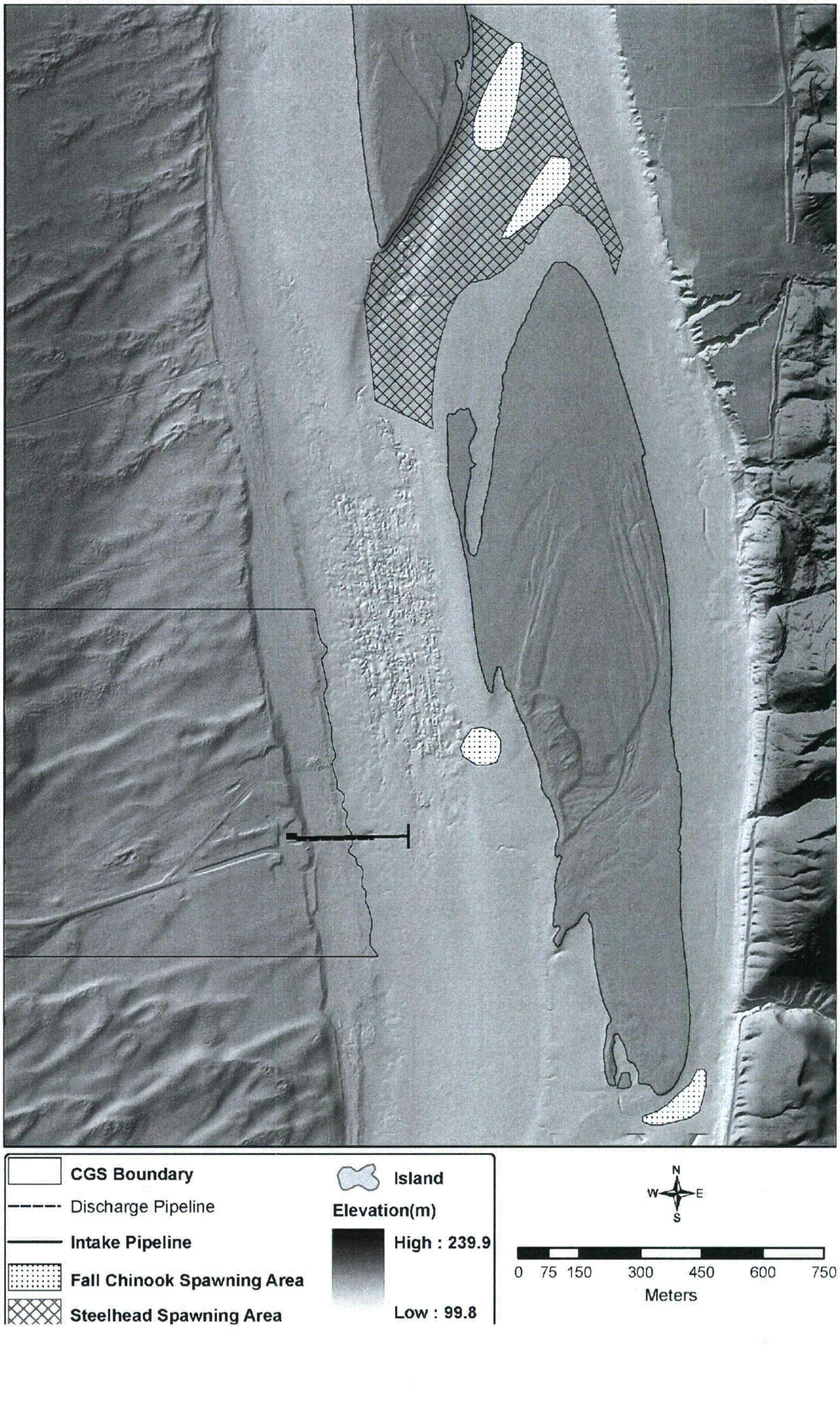

Figure 4. Location of pumphouse, pipelines, intakes, and outfalls

(EN 2010b, Poston et al. 2008)

References

References that appear with an Agencywide Document Access and Management System (ADAMS) accession number can be accessed through NRC's web-based ADAMS at the following URL: http://adams.nrc.gov/wba/.

[EN]Energy Nothwest. 2010a. Columbia Generating Station, License Renewal Application, Applicant's Environmental Report, Operating License Renewal Stage. Document No. 50-397, License No. NPF-21. Richland, Washington. ADAMS No. ML100250666

[EN]Energy Nothwest. 2010b. Letter from S.K. Gambhir, Vice President, Technical Services, EN, to Document control Desk, NRC [in response to letters from W.S. Oxenford dated January 19, 2010 and D. Doyle dated July 8, 2010]. Subject: Columbia Generating Station, Docket No. 50-397 Response to Request for Additional Information License Renewal Application. G02-10-108. August 9, 2010, ADAMS No. ML102380287.

Poston, T.M., J.P Duncan, and R.L. Dirkes (eds.). *Hanford Site Environmental Report for Calendar Year 2007 (Including Some Early 2008 Information)*. Pacific Northwest National Laboratory, Richland, Washington. September 2008. PNNL-17603.

[USGS] U.S. Geological Survey. 2010 "Online Report—USGS Surface-Water Monthly Statistics for Washington. USGS 12472800 Columbia River Below Priest Rapids Dam, WA." Available at <http://waterdata.usgs.gov/wa/nwis/monthly?referred_module=sw&site_no=12472800&por_12472800_22=1180614,00060,22,1917-10,2009-09&start_dt=1960-01&end_dt=2008-12&format=html_table&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list> (accessed July 27, 2010).

[USGS] U.S. Geological Survey. 2012. USGS 12472800 COLUMBIA RIVER BELOW PRIEST RAPIDS DAM, WA. Available at <http://waterdata.usgs.gov/nwis/nwisman?> (accessed February 15, 2012).

[WPPSS] Washington Public Power Supply System. 1980. *Environmental Report, Operating License Stage Docket No. 50-397, WPPSS Nuclear Project No. 2*. Richland, Washington. ADAMS No. ML102180050.

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[WPPSS] Washington Public Power Supply System. 1988. *Operational Ecological Monitoring Program for Nuclear Plant 2—1987 Annual Report*. Richland, Washington. ADAMS No. ML102380289.