STATE OF WASHINGTON

FACT SHEET FOR NPDES PERMIT WA-002515-1
COLUMBIA GENERATING STATION

Permit Type:
Combined National Pollutant Discharge Elimination System (NPDES) Permit and State Waste Discharge Permit to Ground Water

Permit Number:

WA-002515-1

Permittee:

Energy Northwest

Permitting Authority:
Energy Facility Siting Evaluation Council
Olympia, WA 98504-3172

February 23, 2001

SUMMARY

The Energy Facility Site Evaluation Council (Council) has made a tentative decision to issue a new permit, effective through April 9, 2006 to Energy Northwest (formerly Washington Public Power Supply System) for the discharge to the Columbia River, and to ground water, of non-process wastewaters and stormwater associated with nuclear-fueled steam electric power generation.

This fact sheet explains the nature of the proposed discharge, the Council's decisions on limiting the pollutants in the wastewater, and the regulatory and technical basis for those decisions.

PUBLIC INVOLVEMENT OPPORTUNITY

Interested persons are invited to comment on this tentative decision. Comments on the draft permit will be received for 30 days following the day of publication of the notice in the following local newspapers: the Tri-City Herald, the Yakima Herald Republic, and the Spokesman Review.

All written comments submitted during the comment period will be retained by the Council and considered in making the final decision on the application for a permit. The Council will provide copies of the application, the tentative decision and the fact sheet on request. Persons who submit written comments will be notified of the final decision.

The applicant or anyone affected by or interested in the tentative decision may request a public hearing. The request must be filed within the 30-day comment period, and must indicate the interest of the party filing such a request and the reasons why a hearing is warranted. The Council will hold a public hearing on April 9, 2001 at:

Rowe Six Conference Center
Building 1
4224 6th Ave. SW
Lacey, WA 98504

Please submit written comments to the Council at the following address, to the attention of Michelle Elling:

EFSEC
PO Box 43172
Olympia, WA 98504-3172

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BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

LOCATION AND SITE CHARACTERISTICS

The Columbia Generating Station, for which application for renewal of a wastewater discharge permit has been made, is located on the U.S. Department of Energy (USDOE) Hanford Site, in Benton County, about 12 miles north of Richland, Washington. The site includes several buildings and structures on about 100 acres three (3) miles west of the Columbia River.

INDUSTRIAL ACTIVITY

The primary activity at the site is the production of commercial electrical power from nuclear energy. The nuclear reactor is the boiling-water type. It uses light water as the moderator and enriched uranium in pellet form as the nuclear fuel. Demineralized water passes around zirconium tubes containing the reactor fuel in the core and is converted to steam at about 70 atmospheres (1000 psi). The electrical generator is turned by a steam-powered turbine converting thermal energy to mechanical energy and ultimately to electrical energy. The overall efficiency of energy conversion is on the order of 33%. Columbia Generating Station produces about 7.2 billion kilowatt-hours annually, representing about 12% of the electricity sold by the Bonneville Power Authority and about 4% of the power consumed in the Northwest. About 1100 persons are employed at the facility. Activities at the site pertinent to this permit are the production of water suitable for use in the steam cycle, for other plant equipment, and for cooling systems, as well as a potable water supply, and the flushing and maintenance of these systems.

CURRENT PERMIT STATUS

The current permit for this facility was issued October 9, 1995. The permit has an expiration date of October 9, 2000. Reapplication forms were received by EFSEC on April 10, 2000. On the basis of this application, which was deemed timely and sufficient, the last permit continues in effect until a new permit decision is made.

SUMMARY OF COMPLIANCE WITH THE CURRENT PERMIT

In July of 1996, a leaking bypass valve allowed discharges of cooling water during two biofouling treatments, in violation of permit discharge conditions. The non-compliance was properly reported and no significant environmental impact was determined. The valve was repaired with a blind flange to prevent reoccurrence. No other violations of any of the numeric or narrative effluent limitations or of any other terms and conditions of the permit have been reported or are otherwise known to the permitting authority.

SCOPE OF THE DRAFT PERMIT

Water is used at the nuclear power plant for various purposes. The scope of the NPDES permit is intended to cover discharges of pollutants (those not otherwise covered by EFSEC Resolution or other authority such as the Nuclear Regulatory Commission) in any wastewater discharges to waters of the state. There are three defined point-source discharges described in the permit application, one to surface water (Columbia River), two to land (potentially to ground water).

The regulation of handling, treatment, storage, disposal and releases of dangerous and radioactive wastes are not within the scope of this permit. Neither is the discharge of sanitary sewage, which is covered instead by EFSEC Resolution.

WASTEWATER DESCRIPTIONS

A schematic water flow diagram is included for reference as Exhibit 1.

SURFACE WATER DISCHARGES - OUTFALL 001

There are three separate internal waste streams that enter the discharge conveyance to surface water. The major one, in terms of volume, is the "blowdown" from the circulating cooling water system which cools the steam condenser and associated machinery. This water (circulated at approximately 600,000 gallons per minute) is cooled, in turn, mainly by the evaporative process in six mechanical draft cooling towers, and recycled.

The cooling tower evaporation and "drift" losses average 13,500 gallons per minute. Even with replenishment of these losses with new water, the evaporation concentrates the dissolved solids in the circulating water to the point that they would cause excessive deposition in the system, impeding efficiency. To limit the build-up of mineral salts to tolerable levels, a small portion (<0.5%) of the water is released to the river as "blowdown." Chemicals are added also to retard deposition of solids and to limit corrosion and biological growth in the system. The almost continuous blowdown discharge, which normally varies between 800 and 4000 gallons per minute, would be expected to contain heat, residuals from any treatment additives, constituents of the intake Columbia River water (concentrated by evaporation), and system corrosion products.

Another wastewater stream that is directed through this same conveyance to the Columbia River is blowdown from the "service water system." This is a separate cooling water supply and distribution system which serves two purposes: it is available to cool the reactor in the event of malfunction of the regular cooling system, and to remove residual heat from the reactor during reactor shutdown periods. The system has twelve million gallons of water in two interconnected basins with an evaporative spray cooling system. Blowdown of this system is done infrequently (the last discharge was in March 1997) to reduce concentrations of sulfur and chloride or to drain a basin for maintenance. According to the permit application, this discharge, when it occurs, may reach 4000 gallons per minute. This discharge would be expected to contain the same pollutants and constituents as the circulating cooling water blowdown, i.e. water treatment residuals, concentrated minerals and other constituents of the makeup water, and some material corrosion and wear products.

A third contributor to discharges from Outfall 001 is described as "radioactive waste treatment system effluent" or "processed radwaste water." This is treated wastewater from the "primary water system" (reactor water for steam production) that must occasionally be discharged when the inventory becomes excessive or when the quality in terms of organic content does not meet specifications. The primary water (produced on site), is very pure (conductivity generally less than 0.2 µmho/cm) but still has the potential for some radioactive contamination. For this reason it is filtered and subjected to ion exchange treatment to reduce radioactive impurities prior to discharge. Discharge

of this wastestream is by batch only (15,000 gallons at up to 190 gpm), after assurance that NRC-dictated radioactivity discharge limitations will be met. Water management at the station has been such that there has not been a discharge of this wastewater stream since September 1998.

GROUND WATER DISCHARGES - OUTFALLS 002 & 003

There are several separate internal wastestreams that contribute to the discharges from Outfall 002. They are:

(1) Wastewater from the potable water production system, which processes either river or well water by multimedia filtration with flocculent assistance. This wastewater, or filter backwash, which amounts to 15,000-25,000 gallons in volume, two or three times per week, would be expected to contain the removed natural impurities and the flocculent.
(2) Wastewater (estimated average 17,000 gallons per day) from the demineralized water treatment system, which produces water for the reactor steam cycle from the potable water supply. This wastewater, composed of instrument flush water and reverse osmosis reject water, would be expected to contain the removed natural impurities.
(3) Storm water runoff from the plant building roof drains (estimated annual average 1800 gallons per day).
(4) Wastewater from the sump in the General Services Building (GSB) basement and floor drains in the Diesel-Generator Building (DGB). The GSB sump discharges very infrequently and collects water from equipment drains and area floor drains. Water sources directed to the sump include HVAC units, intake air washers, pump and valve leakage, demineralized water storage tank overflows, and floor washings. A level switch activates the sump pump and causes the collected water to be discharged to the stormwater pond. A discharge of 3000 gallons might occur two or three times per year. The DGB floor drains are connected directly to the stormwater pipe. Among the few sources of water in the DGB are the diesel engine cooling jackets from which approximately 3,800 gallons of water treated with a nitrite-based corrosion inhibitor are drained about once per year.
(5) Wastewater from the three "non-radioactive" sumps in the Turbine Generator Building. This is from equipment leakage, washing, and maintenance activities (such as condenser drainage) which may be routed to Outfall 002 via the storm water drainage system after it has been sampled and determined to have no detectable radioactivity. The normal alignment of these sumps is to the radioactive wastewater treatment system that discharges to Outfall 001.

The discharge from Outfall 003 comes from the backwashing of a "side-stream" recirculating filtration system installed to continuously filter out algae and other suspended material in the standby service water system basins (or residual water from the cleaning of these basins). The service water filtration units are normally operated from May through October. The expected pollutants in this wastestream would be the removed materials plus any residual from chemicals added to the service water system.

STORM WATER RUNOFF

Plant building roof drains are routed to Outfall 002. Storm water runoff from other parts of the site, including building roofs and paved areas, is routed to dry wells or enters the

soil directly. There is no runoff which would be regarded as "associated with industrial activity", and there is no discharge of storm water to surface waters. No NPDES storm water discharge permit is required.

RECEIVING WATERS

SURFACE WATER

Outfall 001 discharges to the Columbia River. The Columbia River at the point of discharge is specifically designated Class A (excellent). Characteristic or designated uses for Class A fresh water bodies include: water supply (domestic, industrial, agricultural); stock watering; salmonid and other fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation. Water quality of Class A water bodies shall meet or exceed the requirements for all or substantially all uses. Distinctive narrative and numerical water quality criteria for this class are set out at WAC 173-201A-030(2)(c) and WAC 173-201A-040(3). Special temperature criteria for this specific water body segment are set out at WAC 173-201A-130(21).

One segment of this portion of the Columbia River is listed as not meeting the water quality standard for pH, possibly due to the effect of surface water impoundments. The nonattaining segment is just downstream of John Day Dam (136.15 river miles downstream from the facility). Occasional pH measurements above the water quality criteria of 8.5 are also noted at the Vernita Bridge station, approximately 45 river miles upstream of the facility, but not at a frequency high enough to warrant listing of that segment of the Columbia River. High pH may be a concern in the future for the segment where the Permittee discharges. The average river flow at USGS gauging station 12472800, at river mile 394.5 (upstream), has been about 120,000 cubic feet per second (cfs). Minimum flow is on the order of 42,000 cfs (Flow is regulated by 10 major reservoirs and numerous smaller ones in the watershed).

GROUND WATER

Outfalls 002 and 003 discharge to the ground and the wastewater is presumed to reach the ground water. All ground waters in the state are considered waters of the state and are subject to the Water Quality Standards for Ground Waters of the State of Washington, codified in Chapter 173-200 WAC. The top of the uppermost, unconfined aquifer is 50 - 60 feet below the ground surface in the site area. It varies in thickness from 50 to 200 feet. Ground water flow is predominately from west to east, toward the Columbia River. There are multiple confined aquifers beneath this one, also generally flowing toward the river.

In the vicinity of Columbia Generating Station the unconfined aquifer carries a well-documented plume of nitrate and tritium contamination as a result of past activities of the Department of Energy on the Hanford Site. The ground water in the discharge areas is to some degree affected. The ground water quality criterion for nitrate is marginally exceeded sometimes in samples that have been taken in the immediate area. Measurements of tritium in wells in the discharge areas have not indicated exceedance of tritium criteria.

DISCHARGE OUTFALLS

Outfall 001 enters the Columbia River at river mile 351.75. A buried 18-inch pipe emerges approximately 175 feet from the shoreline at low flow. On the end of the pipe, just above the channel bed and normal (90°) to the direction of river flow, is a slot-nozzle, 32 inches wide and 8 inches in height aimed upward at a 15° angle.

Outfall 002 discharges through a concrete weir to an unlined channel that empties into a small, infiltrating pond located approximately 1500 feet northeast of the plant.

Outfall 003 is a pipe discharge to a surface depression about 500 feet south of the service water ponds.

WATER POLLUTION CONTROL MEASURES

DISCHARGES TO OUTFALL 001

The almost continuous blowdown discharge from the main condenser circulating cooling water system is interrupted during halogen biocide (sodium hypochlorite and sodium bromide) additions to the system, until the level of total residual halogen degrades to something less than 0.1 mg/L, confirmed by analyses of two samples taken at least 15 minutes apart.

The main condenser circulating cooling water is adjusted for pH to assure that blowdown discharges are within the technology-based, categorical effluent limits. This has involved the addition of sulfuric acid to depress pH, which would tend to be higher than the effluent limit (9.0) with the concentration of the dissolved solids and addition of the treatment chemicals used to control corrosion and scaling of system components.

The standby service water is treated with hydrogen peroxide as a biocide, rather than halogen compounds. Hydrogen peroxide quickly dissipates, leaves no residual toxicity, and has been found to be at least as effective a biocide as the halogens for this particular system.

Radwaste wastewater is not discharged unless prior testing shows that it meets the NRC standards for radiological releases. There has been no discharge since September of 1998.

DISCHARGES TO OUTFALLS 002 AND 003

There are no active pollution control measures taken on any of the wastestreams that make up these discharges to ground.

CHEMICAL ADDITIVES

Certain chemicals are added to the main condenser cooling water to maintain cooling efficiency and protect the system components from corrosion. The applicant has provided a comprehensive summary of these chemicals, where they are used, the consumption rates, and purposes. This information is tabulated as Exhibit 2.

POLLUTION PREVENTION MEASURES

A spill prevention, control and countermeasures plan for oil products and hazardous substances stored and used at the site has been developed and implemented in accordance with the requirements of Section 311 of the Clean Water Act and the attendant regulation, 40 CFR 112.

RESOURCE CONSERVATION, RECLAMATION & REUSE

The facility uses a closed-cycle, non-contact cooling system for cooling the main condenser. Water makeup for this system to replace evaporation, cooling tower drift, and blowdown is about 3% of the circulating water flow. Water in the primary steam power cycle is reused to the maximum extent practicable.

EFFLUENT CHARACTERISTICS

OUTFALL 001

For the purposes of preparing an NPDES permit application, sampling and analysis of the discharge for certain parameters is specified in the federal regulations. These results, for Outfall 001, provided by the Permittee in their permit renewal application are shown in Table 1. The results include, in addition to the basic list of parameters required for non-process wastewaters, those parameters (chlorine and zinc) which are limited by categorical effluent guidelines for this particular non-process wastewater.

Table 1 - Outfall 001 Monitoring Results

Pollutant	Maximum Value	Average of Values	Units	No. of Samples
BOD5		<2	mg/L	1
COD		24	mg/L	1
TOC		9	mg/L	1
TSS	69	13.6	mg/L	21
Ammonia (as N)		0.023	mg/L	1
Flow	8.0	2.02	MGD	1095
Temp. (winter)	24	19	°C	Estimate
Temp. (summer)	30	25	°C	Estimate
pH	6.6 - 8.9 (range)			Cont.
Chlorine		<0.1	mg/L	*
Oil & Grease		<0.1	mg/L	1
Phosphorus		0.89	mg/L	1
Tritium	1600	516	pCi/L	12
β radioactivity	22.0	11.7	pCi/L	36
Chromium		<0.001	mg/L	6
Copper	0.243	0.057	mg/L	37
Zinc	0.079	0.033	mg/L	21
Asbestos		<0.196	10^6 fibers/L	1

* This result represents the permit limit, not a sample.

In addition to the specific chemical and parameter measurements summarized above, "whole effluent toxicity" testing on live animals has been performed frequently on this discharge during the current and previous permit terms (since 1984). No significant toxicity has been indicated by any of the testing, even without the dilution effect. Extensive in-situ aquatic

biology studies conducted from 1983 through 1986 concluded that the discharge had no discernable effect on the river benthic and periphyton communities in the area of the outfall.

OUTFALL 002

Table 2 summarizes the application data submitted for Outfall 002. The data includes discharge monitoring data acquired in 1997 through 1999 and additional data on the discharge quality provided by the Permittee in their permit renewal application.

Although the permit currently in effect required monitoring of the discharge at Outfall 002 for specific parameters, covering three different discharge situations (to try to characterize separately the contributing waste streams), the data in Table 2 is the combination of those site specific parameters. This blending could result in widely varying, and perhaps misleading data. For example, data characterizing a batch release of 1500 gallons from the diesel generator building floor drains is given equal weight with a flow-composite sample collected over a 24-hr period in which 36,000 gallons from multiple sources passed the sampler.

Table 2 - Outfall 002 Monitoring Results

Pollutant	Maximum Value	Average of Values	Units	No. of Samples
BOD5		<2	mg/L	1
COD		<10	mg/L	1
TOC		1.2	mg/L	1
TSS		<1	mg/L	1
Ammonia (as N)	1.20	0.26	mg/L	12
Flow		0.033	MGD	
pH	7.5 - 9.9 (range)			12
Fluoride	0.5	0.2	mg/L	12
Nitrate	68	11.2	mg/L	12
Nitrite	162	31	mg/L	12
Organic Nitrogen	2.2	0.82	mg/L	12
Oil & Grease	1.1	<1	mg/L	12
Phosphorus	1.15	0.32	mg/L	12
Tritium	3700	288	pCi/L	128
β radioactivity	17	3.4	pCi/L	129
Sulfate	150	45	mg/L	12
Iron	1.590	0.287	mg/L	13
Manganese	0.033	0.012	mg/L	13
Chromium	0.047	0.010	mg/L	5
Copper	0.236	0.046	mg/L	13
Lead	0.020	0.012	mg/L	5
Mercury	0.0002	<0.0002	mg/L	13
Zinc	0.266	0.109	mg/L	13
Chloride*	18.8	8.6	mg/L	6
Dissolved Solids*	222	149	mg/L	6
Conductivity*	374	249	µS/cm	6

* Results are for 24-hour composite samples only.

OUTFALL 003

The permit currently in effect requires monitoring of the discharge at Outfall 003 for specific parameters. Table 3 summarizes these data for thirteen (13) batch releases sampled during 1997-1999 and an additional sample collected in January 2000 for different parameters to be included by the Permittee in the permit application.

Table 3 - Outfall 003 Monitoring Results

Pollutant	Maximum Value	Average of Values	Units	No. of Samples
BOD5		<2	mg/L	1
COD		35	mg/L	1
TOC		13	mg/L	1
TSS		17	mg/L	1
Ammonia (as N)	7.8	0.96	mg/L	13
Flow	0.052	0.002	MGD	
Temp. (winter)	25 (oper. limit)		°C	
Temp. (summer)	25 (oper. limit)		°C	
pH	7.7 - 9.2 (range)			13
Fluoride	0.6	0.3	mg/L	13
Nitrate	0.2	<0.1	mg/L	13
Nitrite	0.2	<0.1	mg/L	13
Organic Nitrogen	110	42	mg/L	13
Oil & Grease	1.1	<1	mg/L	13
Phosphorus	14.0	4.59	mg/L	13
Sulfate	56	50	mg/L	13
Barium	0.620	0.289	mg/L	13
Iron	52.0	18.4	mg/L	13
Manganese	4.6	2.1	mg/L	13
Cadmium	0.010	0.004	mg/L	13
Chromium		0.006	mg/L	1
Copper		0.26	mg/L	1
Lead	0.370	0.189	mg/L	13
Mercury		<0.0002	mg/L	1
Zinc	4.5	1.5	mg/L	13
Nickel		<0.005	mg/L	1
Chloride	21	16.5	mg/L	1
Dissolved Solids	450	352	mg/L	1
Conductivity	630	487	µS/cm	1

PERMIT REQUIREMENTS APPLICABLE TO THE DISCHARGES

ALL RECEIVING WATERS

State law (RCW 90.48.160) requires any person who conducts a commercial or industrial operation of any type, which results in the disposal of solid or liquid waste material into waters of the state (ground or surface), to procure a permit before disposing of such material.

The Revised Code of Washington declares it “to be the public policy of the State of Washington to maintain the highest possible standards to insure the purity of all waters of the state and to that end will require the use of all known available and reasonable treatment and other measures by industries and others to prevent and control the pollution of the waters of the state.” (RCW 90.48.010)

SURFACE WATERS

The Clean Water Act makes the discharge of any pollutant to waters of the U.S. unlawful without a permit so authorizing (Section 301a). Title IV of the federal Clean Water Act establishes the National Pollutant Discharge Elimination System (NPDES) permit program. Every point source discharger must obtain a permit from EPA or an authorized state. EPA or a delegated state permitting authority may issue a permit to discharge pollutants (Section 402) upon condition that the discharge meets certain requirements. The permit must assure: (1) that the discharge meets any applicable and appropriate technology-based requirements (these can be numerical limitations based on demonstrated capability of available technology applications and/or “best management practices” to prevent and control discharges of pollutants) and (2) that it does not in any case cause or contribute to violations of the applicable receiving water standards.

The Washington Administrative Code and the National Toxics Rule (WAC 173-201A and 40 CFR Part 131) establish water quality standards for state surface waters. Permits for discharges of pollutants may not allow the discharge to cause or contribute to violations of these standards even under the most critical conditions. These standards provide for a limited "mixing zone" in the receiving water at the point of discharge within which the standards may be exceeded.

A "best management practices program" must be submitted with the application by discharges who use, manufacture, store, handle or discharge any pollutant listed as toxic or hazardous under sections of the Clean Water Act.

GROUND WATERS

The Washington Administrative Code (WAC 173-216) implements the discharge permit requirement of RCW 90.48, establishing the conditions on which a permit may be authorized. These include application of "all known available and reasonable methods of prevention, control and treatment" and "any conditions necessary to preserve or protect beneficial uses for ground water."

The Washington Administrative Code (WAC 173-200) establishes water quality standards for state surface waters. Permits for discharges of pollutants may not allow the discharge to cause or contribute to violations of these standards. Standards are the same for all state ground waters.

BASIS FOR DECISIONS ON EFFLUENT

In this section, the bases for the effluent limitations in the permit are explained. For each outfall, appropriate technology-based limits will first be explored, and then those for water quality based limits.

Technology-based effluent limit guidelines have been established and promulgated by EPA for certain categories of industries. Steam electric power generating is one such categorical industry, with limitations codified at 40 CFR Part 423. These will be applied to the pertinent discharges from this site and are deemed to satisfy, for those discharges, the state requirement that all known available and reasonable methods to prevent and control pollution be used. Unless they might violate water quality standards, they will be the permit effluent limits for the guideline parameters.

Water quality based effluent limit evaluations will be based on the most stringent water quality criterion for the pollutant and the minimum calculated receiving water mixing zone dilution factors at "critical conditions" of receiving water flow and pollutant loading. These minimum dilution factors were calculated for the previous permit issuance and that evaluation is deemed still applicable to the situation. Any constituents or effects of the discharge, whether or not addressed by effluent guidelines but which might cause or contribute to water quality violations, are subject to evaluation of the need for water quality based limits.

OUTFALL 001

TECHNOLOGY-BASED EFFLUENT LIMIT CONSIDERATIONS

The EPA effluent limit guidelines for recirculated cooling water blowdown include limits on pH (within the range 6.0 to 9.0), free available chlorine concentration (0.5 mg/L maximum and 0.2 mg/L average and no discharge of chlorine for more than 2 hours per day) and on any of 126 identified "priority pollutants" which are contained in any of the treatment chemicals added (no detectable amount for all except chromium, 0.2 mg/L and zinc, 1.0 mg/L). There is also a "no discharge" effluent limit guideline for PCBs.

None of the additives used contain the chromium and zinc salts that are the basis for the categorical effluent guidelines for these metals, nor do they contribute detectable quantities of the 126 other priority pollutants limited by the effluent guidelines. In accordance with the effluent guidelines, the draft permit places no limits on any of these so long as none of the additives contain them.

An exception to the chlorine limit based on site consideration (as is provided for in the regulation) has been granted in past permits. The negotiated alternative limit is 0.1 mg/L total residual chlorine (or other halogen) with no duration limit.

Both the regular and standby cooling water systems, which discharge at Outfall 001 are recirculated cooling water and therefore are covered by the effluent limit guideline. The third component, the "radwaste water" is an insignificant contributor in terms of volume and the effluent guideline parameters. Therefore, these technology-based limits will be deemed applicable to the whole discharge at anytime at Outfall 001.

The above-described technology-based limits apply to the discharge unless discharges at these limits would potentially cause or contribute to violations of receiving water quality standards.

WATER-QUALITY-BASED LIMIT CONSIDERATIONS

Information provided in the application indicates that the chemicals which are added for water treatment do not contribute detectable quantities of priority pollutants, so no water quality impact assessment for these is required.

Temperature

There are no categorical effluent limit guidelines for heat input or temperature impacts. Although the facility uses a closed-cycle cooling system, heat contained in the blowdown stream is an obvious, potentially significant pollutant input from these categorical cooling water discharges, worthy of a water quality impact analysis. The receiving water temperature criterion for the stretch of the river to which Outfall 001 discharges is 20° C, with an allowable increase due to a single discharge of as little as 0.3° C. An analysis of temperature impacts prepared for the previous permit renewal of the highest anticipated discharge temperature (30° C) showed that at critical flow conditions, there would be no reasonable potential for violation of the receiving water temperature standards outside the mixing zone. This analysis is deemed still applicable to the current situation. The permitting authority has determined that there is no basis for temperature limits but monitoring will be required for reevaluation of temperature effects at the next permit renewal.

Halogens

The technology-based limit for chlorine is 0.1 mg/L. At this discharge concentration, the calculated maximum chlorine concentration at the mixing zone boundary for aquatic life acute toxicity (11% dilution; 9% effluent) is 0.009 mg/L. The aquatic life acute toxicity criterion is 0.019 mg/L and the chronic toxicity criterion is 0.011 mg/L.. The calculated chlorine concentration at the mixing zone boundary for aquatic life chronic toxicity (50% dilution; 2% effluent) is 0.002 mg/L. Therefore, discharge of chlorine at the technology-based limit would not exceed receiving water standards.

pH

The pH criterion for this Class A fresh water body is within the range of 6.5 to 8.5. An earlier analysis of the impact of discharge pH at the technology-based limit extremes (6.0 and 9.0) showed that, with receiving water dilution, there would be no reasonable potential for violation of the receiving water pH standards outside the mixing zone. This previous analysis is deemed still applicable to the current situation. Accordingly, it is the determination of the permitting authority that the technology-based limits on pH will be protective of the designated uses of river water, and therefore are the limits which apply.

Copper

There are no categorical limits for copper in this discharge and copper is not contained in any of the chemical additives used. Still, copper has been detected in the discharge in concentrations higher than the receiving water criteria. The potential that it might cause or contribute to violations of water quality standards outside the allotted mixing zone is here assessed. The major source is most likely corrosion of the admiralty brass components of the condenser cooling system. A lesser source is copper in the intake water, which is concentrated by evaporation in the recycled cooling water. The last permit set limits on copper based on a finding that data showed a reasonable potential to violate copper criteria. An interim limit was set effective immediately, and by special condition, a compliance schedule was provided to meet the final effluent limits.

The compliance schedule specified dates by which the Permittee was to submit a formal request, with supporting material, to adjust the limit (July 1, 1998) and if they could not, or if the Council could not approve the request, to submit an engineering report presenting options for attaining the limit (January 31, 2000). A request was submitted June 29, 1998, and a revised request was submitted Feb. 3, 1999.

The revised request proposes substantially higher (and seasonal) copper limits based on a water effects ratio study which shows that the in-situ toxic effects of copper occur at higher concentrations than the laboratory condition on which the copper criteria are based. The study shows that the effect varies seasonally, owing to the higher binding capacity of the river water in March through November. The Council accepts these limits, therefore they will be deemed applicable to the whole discharge at any time at Outfall 001.

Asbestos Fibres

Five of the six cooling towers use an asbestos cement material in the tower packing or fill. The existing permit required the facility to analyze the effluent at Outfall 001 once per permit cycle for asbestos fibres. The effluent was sample in September of 1999, with no amphibole or chrysotile fibres detected in the waste stream. This monitoring is important, due to the expected degradation of the concrete exposing friable asbestos over time. The Permittee will be required to monitor asbestos fibres once per permit cycle in the draft permit.

Tritium

In the vicinity of Columbia Generating Station the unconfined aquifer carries a well-documented plume of nitrate and tritium contamination as a result of past activities of the Department of Energy on the Hanford Site. The ground water in the discharge areas is to some degree affected. The monitoring and reporting of tritium in groundwater at this location is included in the scope of monitoring programs approved and overseen by the U.S. EPA, the U.S. Dept of Energy, and the State of Washington. Plant effluent is monitored under programs overseen by the Nuclear Regulatory Commission and the Department of Health. Therefore, monitoring of tritium at Outfalls 001 and 002 will not be imposed in this draft permit.

Acute and Chronic Toxicity

The current permit includes acute and chronic toxicity limits that are imposed through monitoring requirements. As discussed above, this extensive monitoring involving three species and fifteen separate whole-effluent toxicity tests between March 1997 and December 1999 disclosed no significant toxicity. In addition, the Permittee has an extensive record of prior testing, including salmonid flow-through tests that show the discharge to Outfall 001 to be nontoxic. For these reasons no toxicity monitoring is imposed in the draft permit. Through the general conditions, the Permittee will be required to inform the permit authority of any changes affecting the character of the discharge.

OUTFALL 002

TECHNOLOGY-BASED EFFLUENT LIMIT CONSIDERATIONS

The discharge at Outfall 002 includes some of the waste-streams identified in the categorical effluent limit guidelines, but the guidelines do not necessarily apply to discharges to ground (or ground water). Regulatory technology-based requirements are limited to the general state requirement that "all known available and reasonable methods (AKART) of treatment, prevention and control of the discharge of pollutants be applied".

The pollutants that are discharged to Outfall 002 are primarily those in the wastewater streams from the treatment of river water for plant water supplies. These are the suspended and dissolved impurities removed from the river water plus any residuals from the added water treatment processes. Particulate residuals would be filtered out in the soil and some dissolved impurities may be adsorbed. There is no further known and reasonable treatment; reasonable methods of prevention and control are limited to control at the source, e.g. chemical usage and process control. In the best professional engineering judgement of the permit writer, all known available and reasonable methods of prevention and control are being applied.

WATER-QUALITY-BASED LIMIT CONSIDERATIONS

The current permit has required regular monitoring to assess the discharge from Outfall 002 for certain parameters. The results are reflected in the permit application and summarized in Table 2. The discharge itself meets the ground water criteria for all measured parameters except pH, nitrate and iron.

Monitoring of the ground water itself was undertaken as a condition of the current permit to assess actual impacts on the receiving ground water. It has already been pointed out that the discharge quality as represented by Table 2 is misleading. The apparently very high nitrate/nitrite concentrations in the discharge are not representative in that they reflect the current permit's requirement that 25% of Outfall 002 samples be taken during the discharge of one very small contributor to the whole discharge (3500 gallons in 11,000,000 gallons annually, 0.03%). The agglomeration and averaging of all the analytical results does not take into account the relative flow volumes and therefore

skews the result such that it is not at all representative of the discharge. This has affected other parameter data, including pH and iron.

On the basis of the above analysis, the Council has proposed a change to the monitoring requirements on the discharges from Outfall 002. Monitoring would be reduced to sampling three (3) times a year with sample points limited to the floor drains in the Diesel-Generator Building and the unlined pond. Also, Mercury, Nitrogen (total organic as N), Ammonia (as N), Phosphorus (total P), and Oil & Grease parameters will no longer be required to be monitored by the Permittee. One new parameter, Nickel, has been added to the monitoring list, as recommended by the Permittee in their permit renewal application.

OUTFALL 003

TECHNOLOGY-BASED LIMIT CONSIDERATIONS

The discharge at Outfall 003 does not include any of the wastestreams identified in the categorical effluent limit guidelines. As was the case for the discharge from Outfall 002, regulatory technology-based requirements are limited to the general state requirement that "all known available and reasonable methods of prevention and control of the discharge of pollutants be applied". Again, particulate matter will be filtered out in the soil, and there is no further known available and reasonable technology to remove dissolved pollutants from the wastestream. In the best professional engineering judgement of the permit writer, all known available and reasonable methods of prevention and control of pollutant discharges are being applied.

WATER-QUALITY-BASED LIMIT CONSIDERATIONS

The current permit required specific monitoring to assess the discharge from Outfall 003 for certain parameters. The results are reflected in the permit application and summarized in Table 3. The discharge itself meets the ground water criteria for all measured parameters, except for pH (upper limit), iron, manganese and lead. These all substantially exceed the numeric criteria.

Ground water monitoring through a hydrogeology study was undertaken as a condition of the current permit to assess impacts of the discharge from Outfall 003 on the receiving ground water. This monitoring demonstrated the effluent did not alter groundwater quality with respect to pH, iron, and manganese. Conclusions regarding lead are less certain because the level of detection for groundwater samples exceeded the criterion. The draft permit includes continued monitoring for lead in the discharge to help explain the fate of the lead as it is measured in the soil and ground water.

BASIS FOR MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process and effluent controls are functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

In addition to the monitoring required to assess compliance with effluent limits, monitoring is required of several parameters at Outfall 002 and one parameter (lead) in the discharge at Outfall 003. Such conditions are authorized by the general authority to establish conditions in state waste discharge permits as needed to prevent or reduce discharges of pollutants to waters of the state.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited in accordance with the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories.*

BASIS FOR OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 273-220-210).

OUTFALL 003 – LEAD ASSESSMENT

Discharge monitoring at Outfall 003 during the term of the current permit has revealed discharges of lead in concentrations of three or four times the ground water criterion. Special Condition S4 is intended to investigate the source and measures of control. Such conditions are authorized by the general authority to establish conditions in state waste discharge permits as needed to prevent or reduce discharges of pollutants to waters of the state.

SOLID WASTE DISPOSAL

The authority for this condition comes from Chapter 173-201A WAC.

BEST MANAGEMENT PRACTICES PROGRAM

This authority and obligation for this condition comes from 40 CFR 125.102 - 125.104.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual industrial NPDES permits issued by the Council.

FACILITY OPERATION

Condition G1 states that the Council will modify or revoke and reissue the permit to conform to more stringent toxic effluent standards or prohibitions. Condition G2 requires the Permittee to comply with all conditions of the permit. Condition G3 describes the penalties for violating permit conditions. Condition G4 requires the Permittee to properly operate and maintain all facilities. Condition G5 requires the Permittee to control its production in order to maintain compliance with its permit. Condition G6 defines the term "upset" and its application to instances of violations. Condition G7 regulates the intentional bypass of wastes from all or any portion of a treatment works. Condition G8 requires the Permittee to allow the Council to access the treatment system, production facility, and records related to the permit.

PERMIT CHANGES

Condition G9 specifies conditions for modifying, suspending or terminating the permit. Condition G10 requires the Permittee to apply to the Council prior to increasing or varying the discharge from the levels stated in the permit application. Condition G11 requires the Permittee to give notice of planned changes that would affect the characteristics of the facility effluent. Condition G12 requires the Permittee to construct, modify, and operate the permitted facility in accordance with approved engineering documents. Condition G13 requires the Permittee to report anticipated non-compliance. Condition G14 addresses recently discovered relevant facts or incorrect information concerning the permit application to be submitted to the Council. Condition G15 addresses the notification requirements of 40 CFR 122.21 and 40 CFR 122.44. Condition G16 addresses the requirements when the permit is transferred.

ADDITIONAL MONITORING

Condition G17 incorporates the requirements under Section 307(a) of the Clean Water Act for toxic pollutants automatically, without modification to the permit. Condition G18 notifies the Permittee that additional monitoring requirements may be established by the Council.

OTHER REGULATORY REQUIREMENTS

Condition G19 prohibits the reintroduction of removed substances back into the effluent. Condition G20 incorporates by reference all other requirements of 40 CFR 122.41 and 122.42. Condition G21 prohibits the Permittee from using the permit as a basis for violating any laws, statutes or regulations. Condition G22 clarifies that the permit does not convey property rights. Condition G23 relates to permit renewal.

EXHIBIT 1

SCHEMATIC WATER FLOW DIAGRAM

{Placeholder for Powerpoint file}

EXHIBIT 2

SUMMARY OF CHEMICAL ADDITIVES TO COOLING WATER

Columbia Generating Station Water Treatment Chemical Consumption

System and Chemical	Frequency	Annual Use (lb/yr)		Description of Use
		Average	Maximum	
Circulating Water/Turbine Service Water				
Sulfuric Acid	Continuous	1,530,000	1,700,000	pH Control
Sodium Hypochlorite	Batch 2-3 times/wk	540,000	615,000	Biocide
Sodium Bromide	Batch 2-3 times/wk	85,000	100,000	Biocide
AMPs Copolymer	Continuous	79,000	82,000	Dispersant, Corrosion Control Aid
Polyphosphate Blend	Continuous	78,000	85,000	Corrosion Control
Sodium Tolyltriazole	Continuous	27,000	28,000	Corrosion Control
Standby Service Water				
Hydrogen Peroxide (50%)	Batch - seasonal	311,000	396,000	Biocide
Bulab 6002 (quarternary amine)	Batch - 0-2 times/yr	3,300	7,400	Biocide
Sodium Silicate	Batch	17,600	47,700	Corrosion Control
Sodium Tolyltriazole	Batch - 0-1 times/yr	< 100	500	Corrosion Control
Potable Water				
Sodium Hypochlorite (12%)	Semi-continuous	17,000	18,500	Disinfectant
Alum (aluminum sulfate)	Continuous	7,700	8,000	Coagulant Aid
Polymer	Continuous	13	14	Filter Aid
Demineralized Water				
Oxalic Acid	Semi continuous	60	100	Silica Analyzer Reagent
Sulfuric Acid	Semi continuous	50	100	Silica Analyzer Reagent
Ascorbic Acid	Semi continuous	60	100	Silica Analyzer Reagent
Ammonium Molybdate	Semi continuous	80	120	Silica Analyzer Reagent
Closed Cooling Loops				
Nalco 2100	Batch as required	200	400	Corrosion Inhibition- Diesel Jacket Water
Sodium Nitrite	Batch as required	200	300	Corrosion Inhibition for misc. closed loops
Sodium Hydroxide	Batch as required	<1	1	pH Control in misc. closed loops
Standby Liquid Control				
Borax	Batch as required	200	400	Reactivity Control (Backup)
Boric Acid	Batch as required	200	400	Reactivity Control (Backup)
Auxiliary Boiler				
Sodium Sulfite	Batch as required	15	40	Oxygen Scavenger
Sodium Hydroxide	Batch as required	10	25	pH Control