

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 Site Evaluation Council
Olympia, WA 98504-3172

2006

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

SUMMARY

The Energy Facility Site Evaluation Council (Council) has made a tentative determination to reissue a National Pollutant Discharge Elimination System (NPDES) permit to Energy Northwest (formerly Washington Public Power Supply System) for discharge to the Columbia River, and to ground water, of 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.

The Permittee's compliance with the conditions of the existing permit, issued April 9, 2001, has been excellent. No exceedences of effluent limitations has occurred and all discharge monitoring reports and other records have been submitted in a timely manner. Furthermore, the Permittee has sampled its discharges for parameters not explicitly required in the permit, and has submitted the results to the Council and the Department of Ecology as required.

The structure and many of the requirements and conditions of this proposed permit are similar to the existing permit. However, there are some additional requirements for the discharge to the Columbia River (Outfall 001). The dilution factors and effluent limits in the existing permit are of concern to the Council because they were determined using methodologies that are now considered outdated, since newer methodologies are available. Specifically, the guidance for studies to determine dilution factors and water quality-based effluent limits for copper have been updated in recent years. Consequently, the proposed permit contains a five year Schedule of Compliance, which requires the Permittee to update the studies using the revised guidances and determine appropriate dilution factors and effluent limits for copper.

The Schedule of Compliance requires the Permittee to:

- inspect the outfall and diffuser for structural integrity and sediment deposition;
- determine new dilution factors using a Council-approved methodology;
- assess pollutants in the discharge for compliance with the applicable surface water quality standards;
- calculate revised water quality-based copper limits; and,
- recharacterize whole effluent toxicity in the discharge based on the revised dilution factors.

The goal of the Schedule of Compliance is to verify compliance with the state's Surface Water Quality Standards (Chapter 173-201A) and Ground Water Quality Standards (Chapter 173-200 WAC).

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

The proposed permit retains the existing effluent limits during the next five years to allow the Permittee the opportunity to assess compliance of its discharges with the applicable water quality standards. Effluent limits and other permit requirements may be revised at the next permit renewal based on the findings of the assessments.

Monitoring requirements for temperature and turbidity in the discharge to surface water have been added to verify compliance with the applicable surface water quality standards. In addition, monitoring for chromium and zinc have been formally incorporated into the permit, although the Permittee has sampled the discharge for these parameters previously. Numeric effluent limitations for chromium, zinc, temperature, and turbidity are not established in the proposed permit, but the Permittee is required to monitor the discharge for these parameters. The technology-based limits for chromium and zinc are not incorporated into the permit at this time because they will be assessed for compliance with the water quality standards as part of the effluent mixing study. The proposed permit does not require routine monitoring of the receiving water for temperature and turbidity, but the effluent mixing study must address compliance with the water quality standards for these parameters. The Council will reevaluate the need for limits and additional routine monitoring after reviewing the reports required by the Schedule of Compliance.

The proposed permit reauthorizes two discharges to ground (Outfalls 002 and 003). Review of past studies addressing compliance of these discharges with the state's Ground Water Quality Standards (Chapter 173-200) did not identify any current issues of concern. The limitations and routine monitoring for the two discharges to ground remain unchanged. However, the proposed permit requires the Permittee to recharacterize the ground water in the vicinity of Outfalls 002 and 003 during the third year of the permit. The data collected will be used to assess the need for further treatment or limits on the discharges to ground water at the next permit renewal.

TABLE OF CONTENTS

INTRODUCTION 4

BACKGROUND INFORMATION 5

 DESCRIPTION OF THE FACILITY 5

 Location and Site Characteristics 5

 Industrial Activity 5

 Scope of this Draft Permit 5

 Descriptions of Wastewater Streams 5

 Discharge Outfalls 9

WATER CONSERVATION, RECLAMATION & REUSE 9

PERMIT STATUS 9

SUMMARY OF COMPLIANCE WITH THE PERMIT ISSUED 9

WASTEWATER CHARACTERIZATIONS 9

 Outfall 001 9

 Outfall 002 10

 Outfall 003 12

PROPOSED PERMIT LIMITATIONS 13

 SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS 16

 Numerical Criteria for the Protection of Aquatic Life 17

 Numerical Criteria for the Protection of Human Health 17

 Narrative Criteria 17

 Antidegradation 17

 Critical Conditions 17

 Mixing Zones 18

 Description of the Receiving Water 19

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

Surface Water Quality Criteria.....19

Consideration of Surface Water Quality-Based Limits for Numeric Criteria.....20

Whole Effluent Toxicity.....24

Human Health24

Sediment Quality.....25

GROUND WATER QUALITY LIMITATIONS25

OUTFALL 00226

OUTFALL 00326

SCHEDULE OF COMPLIANCE.....27

MONITORING REQUIREMENTS28

LAB ACCREDITATION29

OTHER PERMIT CONDITIONS29

REPORTING AND RECORDKEEPING29

BEST MANAGEMENT PRACTICES (SPILL) PLAN.....29

SOLID WASTE PLAN.....29

GENERAL CONDITIONS.....30

PERMIT ISSUANCE PROCEDURES30

PERMIT MODIFICATIONS30

RECOMMENDATION FOR PERMIT ISSUANCE30

REFERENCES FOR TEXT AND APPENDICES.....30

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION.....32

APPENDIX B--GLOSSARY33

APPENDIX C--TECHNICAL CALCULATIONS37

APPENDIX D--PREVIOUS ENVIRONMENTAL MONITORING STUDIES.....38

APPENDIX E--RESPONSE TO COMMENTS.....40

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

INTRODUCTION

The federal Clean Water Act (CWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the state of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Energy Facility Site Evaluation Council (Council) authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the state include procedures for issuing permits (Chapter 463-76 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Council will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Council's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix E--Response to Comments.

GENERAL INFORMATION	
Applicant	Energy Northwest
Facility Name and Address	Columbia Generating Station PO Box 968 (Mail Drop PE20) Richland, WA 99352
Type of Facility:	Steam-Electric Power Generation
SIC Code	4911
Discharge Location for Outfall 001	Waterbody name: Columbia River, River Mile 351.75 Latitude: 46° 28' 17" N Longitude: 119° 15' 45" W.
Water Body ID Number for Outfall 001	WA-CR-1030
Discharge Location for Outfall 002	Waterbody name: Ground Water Latitude: 46° 28' 26" N Longitude: 119° 19' 43" W.
Discharge Location for Outfall 003	Waterbody name: Ground Water Latitude: 46° 28' 03" N Longitude: 119° 19' 48" W.

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 between 8 and 9 billion kilowatt-hours annually, representing about 12% of the electricity sold by the Bonneville Power Administration 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 include 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.

SCOPE OF THIS 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) and two to land (potentially to ground water). The regulation of handling, treatment, storage, disposal and release 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.

DESCRIPTIONS OF WASTEWATER STREAMS

Outfall 001 - Surface Water Discharges

Three separate internal waste streams 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 is circulated at

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

approximately 600,000 gallons per minute, cooled 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 the salts 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 blowdown discharge is almost continuous, flowing at a volume of between 800 and 4,000 gallons per minute. The discharge contains heat, residuals from treatment additives, constituents of the intake Columbia River water (concentrated by evaporation), and system corrosion products.

Periodically, the main condenser becomes scaled, reducing plant efficiency to the point that chemical cleaning of the main condenser becomes necessary. Blowdown to the river will be stopped and a cleaning agent will be added to the circulating water system. At the completion of the cleaning process, if any permit condition is not met, circulating water will be pumped to a storage location using temporary pumps and piping. During this pumping process, the concentration of constituents in the circulating water will be reduced by the addition of makeup water from the river. When the circulating water meets all conditions for the discharge, blowdown to the river will be initiated. After the condenser cleaning process is completed, the stored water will be treated (if necessary) to meet discharge requirements, then discharged. Any sediment from the cleaning process will be analyzed and disposed of in accordance with the permittee's solid waste control plan.

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 non-contact cooling water supply and distribution system which serves two purposes: it cools the reactor in the event of malfunction of the regular cooling system, and removes residual heat from the reactor during reactor shutdown periods. The system contains approximately twelve million gallons of water in two interconnected basins with an evaporative spray cooling system. Blowdown of this system is conducted 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 4,000 gallons per minute. This discharge contains 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 $\mu\text{mho/cm}$) but still has the potential for some radioactive contamination. For this reason it is filtered and treated through an ion exchange process 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

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

radioactivity discharge limitations will be met. This wastewater stream has not been discharged since September 1998 due to the Permittee's water management practices.

Outfalls 002 & 003 - Ground Water Discharges

There are several 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 through 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, contains 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, contains 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 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 3,000 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 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 discharge contains the removed materials plus any residual from chemicals added to the service water system.

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

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. However, the Permittee is advised to consult with Ecology's Central Regional Office to determine the need for a stormwater discharge permit.

Sanitary Waste

Sanitary waste from the Permittee's facility is piped to a treatment system that uses aeration lagoons and facultative stabilization ponds. This wastewater treatment facility is located about ½ mile southeast of CGS. Sanitary wastewater is not covered by this permit and will not be addressed further in this fact sheet.

A summary of all process wastewater and other discharges is taken from the permit application and presented in Table 1.

Table 1: Summary of Process Wastewater Discharges

Outfall No.	Wastestream	Average Flow	Treatment and Comments
001	Circulating Cooling Water Blowdown	1.82 MGD	Neutralization, halogenation, discharge to river, sedimentation disposed onsite
001	Radioactive Waste Treatment System Effluent		Filtration, ion exchange, infrequent discharge to river
001	Standby Service Water	0.05 MGD	Disinfection, infrequent discharge to river
002	Potable Water Treatment	0.010 MGD	Intermittent discharge to evaporation/percolation pond
002	Demineralized Water Treatment	0.017 MGD	Discharge to evaporation/percolation pond
002	Nonradioactive Plant Equipment	<0.001 MGD	Intermittent discharge to evaporation/percolation pond
002	Building Roof Drains	0.002	Intermittent discharge to evaporation/percolation pond
002	HVAC Airwash Drain	0.007	Seasonal discharge to evaporation/percolation pond
003	Standby Service Water	0.002	Filtration, intermittent discharge to ground

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

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 perpendicular 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 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.

PERMIT STATUS

The existing permit for this facility was issued on April 9, 2001. The permit placed effluent limitations on temperature, total residual halogen, pH, copper, and flow for discharges to the Columbia River (Outfall 001). Narrative limitations protecting present and future beneficial uses of ground water were placed on the discharges to ground (Outfalls 002 and 003).

An application for permit renewal was submitted to the Council on October 7, 2005.

SUMMARY OF COMPLIANCE WITH THE PERMIT ISSUED

The facility last received an inspection on December 6, 2005.

During the history of the existing permit, the Permittee has remained in compliance based on Discharge Monitoring Reports (DMRs) and other reports submitted to the Council and inspections conducted quarterly by the Council and the Department of Ecology.

WASTEWATER CHARACTERIZATIONS

Wastewater characterizations presented in this section were taken from the permit application and DMRs submitted by the Permittee.

OUTFALL 001

Results for Outfall 001 are shown in Table 2. Results only for those priority pollutants (1) present above the method detection level and (2) for which numerical water quality criteria are established are included in the characterization.

Table 2 - Outfall 001 Monitoring Results

Parameter	Units	Maximum Value ¹	Average of Values ²	No. of Samples
BOD ₅	mg/L	<2.0	NA	1
COD	mg/L	25.0	NA	1
TOC	mg/L	8.9	NA	1
TSS	mg/L	49	12.1	36
Ammonia (as N)	mg/L	0.180	0.060	36
Flow	MGD	8.4	2.54	1310
pH	Standard Units	7.1-8.9 ³	NA	Continuous
Chlorine	mg/L	<0.1 ⁴	NA	250
Fluoride	mg/L	1.2	0.45	36
Oil & Grease	mg/L	<1.0	NA	1
Phosphorus, Total	mg/L	9.4	3.5	36
β radioactivity	pCi/L	23.7	12.9	34
Aluminum, Total	mg/L	0.43	NA	1
Arsenic, Total	mg/L	0.016	NA	1
Barium, Total	mg/L	0.14	NA	1
Cadmium, Total	mg/L	0.0004	NA	1
Chromium, Total	mg/L	0.029	0.0023	36
Copper, Total	mg/L	0.330	0.041	52
Lead, Total	mg/L	0.0026	0.00052	36
Nickel, Total	mg/L	0.0063	NA	1
Selenium, Total	mg/L	0.0014	0.0013	4
Zinc, Total	mg/L	0.079	0.0216	36
Bromoform	µg/L	4.0	NA	1
Asbestos	10 ⁶ fibers/L	<0.166	NA	1
1 < means less than the indicated value. For all values except chlorine, the indicated value is the method detection limit.				
2 NA means not applicable because only one sample was taken or, in the case of pH, the range of values are given.				
3 Indicates the range of monitoring results.				
4 Chlorinated wastestreams are batch-released and not discharged until chlorine concentration complies with the effluent limit of 0.1 mg/L.				

OUTFALL 002

Table 3 summarizes the application data submitted for Outfall 002. The table includes data characterizing conventional, nonconventional and priority pollutants in the discharge. Results only for those priority pollutants (1) present above the method detection level and (2) for which numerical ground water quality criteria are included in the characterization.

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 3 are the combination of those

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

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 3 - Outfall 002 Monitoring Results

Parameter	Units	Maximum Value¹	Average of Values²	No. of Samples
BOD ₅	mg/L	<2.0	NA	1
COD	mg/L	<10	NA	1
TOC	mg/L	2.0	NA	1
TSS	mg/L	19	NA	1
Ammonia (as N)	mg/L	<0.03	NA	1
Flow	MGD	0.168	0.039	Continuous
pH	Standard Units	7.2 – 8.2 ³	NA	8
Fluoride	mg/L	0.17	0.12	8
Nitrate	mg/L	0.56	0.26	8
Nitrite	mg/L	0.25	0.08	8
Organic Nitrogen	mg/L	<0.1	NA	1
Oil & Grease	mg/L	21.7	NA	1
Phosphorus, Total	mg/L	0.23	NA	1
β radioactivity	pCi/L	38.3	4.4	36
Sulfate	mg/L	34	23.6	8
Barium, Total	mg/L	0.037	NA	1
Iron, Total	mg/L	0.30	0.148	8
Manganese, Total	mg/L	0.035	0.0093	8
Cadmium, Total	mg/L	0.0004	NA	1
Chromium, Total	mg/L	0.001	0.0005	8
Copper, Total	mg/L	0.011	0.0045	8
Lead, Total	mg/L	0.0012	0.00027	8
Nickel, Total	mg/L	0.0031	0.00178	8
Selenium, Total	mg/L	0.0013	NA	1
Zinc, Total	mg/L	0.096	0.047	8
Chloroform	μg/L	1.7	NA	1
Chloride	mg/L	16	12	6
Total Dissolved Solids	mg/L	220	177	6
Conductivity	μS/cm	350	283	6
1 < means less than the indicated value. For all values except chlorine, the indicated value is the method detection limit.				
2 NA means not applicable because only one sample was taken or, in the case of pH, the range of values are given.				
3 Indicates the range of monitoring results.				

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

OUTFALL 003

Table 4 summarizes effluent characteristics for the discharge from Outfall 003. Results are presented only for those priority pollutants which (1) are present above the method detection level and (2) for which numerical ground water quality criteria are included in the characterization.

Table 4 - Outfall 003 Monitoring Results

Parameter	Units	Maximum Value	Average of Values ¹	No. of Samples
BOD ₅	mg/L	2.8	NA	1
COD	mg/L	43	NA	1
TOC	mg/L	9.8	NA	1
TSS	mg/L	22	8.9	39
Ammonia (as N)	mg/L	0.088	0.042	39
Flow	MGD	0.063	0.022	77
pH	Standard Units	8.2 – 9.0 ²	NA	39
Fluoride	mg/L	0.37	0.27	39
Nitrate	mg/L	0.06	0.02	38
Organic Nitrogen	mg/L	1.0	NA	1
Oil & Grease	mg/L	1.6	NA	1
Phosphorus, Total	mg/L	1.5	0.43	39
Sulfate	mg/L	85	54.3	39
Barium, Total	mg/L	0.072	NA	1
Iron, Total	mg/L	0.330	0.133	39
Manganese, Total	mg/L	0.022	0.0081	39
Cadmium, Total	mg/L	0.0003	NA	1
Chromium, Total	mg/L	0.0032	0.0005	39
Copper, Total	mg/L	0.019	0.0085	39
Lead, Total	mg/L	0.96	0.173	8
Nickel, Total	mg/L	0.0024	NA	1
Selenium, Total	mg/L	0.0043	NA	1
Zinc, Total	mg/L	0.067	0.0099	39
Chloride	mg/L	14	13	12
Total Dissolved Solids	mg/L	420	388	12
Conductivity	µS/cm	580	535	12
1 NA means not applicable because only one sample was taken or, in the case of pH, the range of values are given.				
2 Indicates the range of monitoring results.				

PROPOSED PERMIT LIMITATIONS

Federal and state regulations require that effluent limitations set forth in a NPDES permit must be the more stringent of either technology- or water quality-based. Technology-based limitations are based upon the treatment methods available to treat specific pollutants. Technology-based limitations are set by regulation or developed on a case-by-case basis (40 CFR 125.3, and Chapter 173-220 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Management Standards (Chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36). The more stringent of these two limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents listed in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the state of Washington were determined and included in this permit. The Council does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, or do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee must notify the Council.

General Comments

The Permittee has performed extensive environmental monitoring during past permit cycles. Briefly, the monitoring included: dilution modeling for the discharge to the Columbia River, 12 years of water quality monitoring within the authorized mixing zones for numerous constituents in the discharge, bioassay tests of the effluent, benthic surveys of the riverbed in the vicinity of the outfall, and ground water quality monitoring. Monitoring of the receiving water within the mixing zones to verify compliance with the water quality standards was conducted from 1983 to 1995. Due to the consistency of compliance with the water quality standards, direct monitoring of the river was discontinued in 1995 with the permission of the Council. The complete list of environmental monitoring conducted by the Permittee is contained in Appendix D of this fact sheet.

Review of earlier work to determine the existing dilution factors identified significant concerns about the methodology used. The Permittee's dilution factors are used: (1) in the determination of the reasonable potential for pollutants in the discharge to exceed the water quality standards, (2) to calculate water quality-based effluent limits for copper, and (3) to evaluate whole effluent toxicity in the discharge. Due to the Council's concerns for the validity of the existing dilution factors, the proposed permit contains a Schedule of Compliance to allow the Permittee the opportunity to conduct a mixing zone study to determine dilution factors using updated modeling methodologies. Using the revised dilution factors, the Permittee is required to (1) calculate new

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

water quality-based effluent limits for copper, (2) evaluate the other pollutants in the discharge for compliance with the water quality standards, and (3) recharacterize the discharge for whole effluent toxicity. These permit requirements are discussed more thoroughly in the following sections of this fact sheet.

The review of past reports evaluating the impacts of the Permittee's two discharges to ground water have not identified any new concerns. Therefore, the conditions in the proposed permit concerning these discharges remain largely unchanged from the existing permit. However, as part of the Schedule of Compliance, the Permittee is required to recharacterize ground water quality upgradient and downgradient of the outfalls to verify compliance with the ground water quality standards.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Technology-based effluent limit guidelines for discharges to surface water 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. The fact sheet associated with the existing permit does not specify which effluent guidelines, or technological performance standard, was applied to the surface water discharge. The options are: the best practicable control technology currently available (BPT) in § 423.12; the best available technology economically achievable (BAT) in § 423.13; or, the new source performance standards (NSPS).

The writer of this proposed permit has determined that the BAT performance standard was applied because facilities were required to achieve compliance with the BAT standards by 1989. Furthermore, the engineering and licensing associated with the Permittee's facility predates the adoption date of Part 423, which was November 19, 1982, so the NSPS guidelines are not applicable to the Columbia Generating Station. Therefore, the requirements of this permit concerning the discharge to surface water are based on the BAT effluent limit guidelines contained in § 423.13.

Both the regular and standby cooling water systems that discharge from Outfall 001 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 all times at Outfall 001.

Subsection 423.13 addresses the following pollutant parameters: pH; polychlorinated biphenyl (PCB) compounds; total residual chlorine/total residual halogen; iron; and the 126 priority pollutants, especially chromium, copper, and zinc. The basis of limits for each pollutant, or group of pollutants, is discussed in the following paragraphs.

pH

The fact sheet associated with the existing permit stated that the pH limits in the permit are based on the categorical limits of 6 to 9. However, the limits in the permit, as issued, are 6.5 to 9.0. No explanation of the discrepancy was given in the fact sheet.

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

In any case, the existing limits of 6.5 to 9.0 are more stringent than the categorical limits. They have been demonstrated to be achievable and, therefore, are retained as technology-based limits on the basis of best professional judgement (BPJ).

Temperature

The existing permit contains the following narrative effluent limit for temperature as footnote 3: The temperature of the circulating cooling water blowdown shall not exceed, at any time, the lowest temperature of the circulating cooling water, prior to the addition of makeup water, except that the temperature of the blowdown may be less than the temperature of the river. The language of the footnote was taken from the Federal Register, Volume 39, Number 196. See the CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA section of this fact sheet for further discussion of temperature in the discharge.

PCB Compounds

Federal regulations prohibit any discharge of PCB compounds.

Free Available Chlorine/Total Residual Halogen

The categorical guidelines (§423.13(d)(1)) specify a maximum free available chlorine limit of 0.50 mg/L and an average concentration of 0.2 mg/L. Subsection (d)(2) further limits the discharge of chlorine to no more than two hours per day "unless the discharger demonstrates . . . that discharge for more than two hours is required for macroinvertebrate control". This exception has been granted in past permits. The negotiated alternative limit is 0.1 mg/L total residual halogen with no duration limit.

Chlorine is a member of the halogen family on the periodic table. The remaining halogens are fluorine, bromine, iodine, and astatine. Some of the chemicals used at the Permittee's facility contain these halogens and could potentially be discharged to surface water. A total residual halogen limit of 100 µg/L is retained in the permit as a regulated parameter because it has been demonstrated to be achievable. The limit of 100 µg/L total residual halogen is more stringent limit than a total residual chlorine limit of 100 µg/L. This limit was found to have no reasonable potential to exceed the surface water quality criteria with the current dilution factors.

Priority Pollutants

Appendix A of Part 423 lists 126 priority pollutants. The Permittee's facility is prohibited from discharging any of these pollutants in 'detectable amounts', except the metals chromium and zinc. The categorical limits for chromium and zinc are as follows:

Table 5: Categorical Limits and Maximum Measured Concentrations

Parameter	Categorical Limits		Maximum Measured Concentration
	Maximum Daily	Average Monthly	
Chromium, in mg/L	0.2	0.2	0.029
Zinc, in mg/L	1.0	1.0	0.079

The most recent application contains data indicating the discharge contains chromium and zinc in detectable concentrations (see Table 2). Section 122.44(e)(1) gives the state discretion to establish effluent limits for toxics when they "are or may be discharged at a level greater than the level which can be achieved by the technology-based treatment requirements appropriate to the permittee". As can be seen in Table 5, chromium and zinc are present in the discharge at concentrations more than a magnitude below the recommended categorical limits. The large sample set of 36 monitoring events indicates little likelihood of exceedences of the technology-based limits. Apparently, previous permits did not include limits because the permit writers interpreted §122.44(e)(1) to mean limits were not necessary. However, EPA's Region 10 office policy requires incorporation of categorical effluent limit guidelines as permit limits regardless of whether there is a likelihood of their being exceeded. Therefore, the proposed permit incorporates the above effluent guideline limits as effluent limits in Special Condition S1.A of the permit. As part of the effluent mixing study in the Schedule of Compliance, the Permittee is required to assess the compliance of the technology-based limits with the water quality standards for chromium and zinc.

Special Condition S1.B of the existing permit contains the following language: "There shall be no detectable amount of priority pollutants (listed in 40 CFR Part 423, Appendix A) in the effluent *from chemicals added for cooling system maintenance*" (italics added). The proposed permit retains this narrative, technology-based effluent limit. The Permittee has pointed out that this language is meant to address only chemical additives used for cooling tower maintenance, and doesn't apply to the entire discharge. However, the effluent mixing study required by this permit will assess compliance with the water quality standards for all identified constituents in the entire discharge, whether they result from chemical additives, sloughing from piping, or any source.

See the **Consideration of Surface Water Quality-Based Limits for Numeric Criteria** section of this fact sheet for further discussion concerning the applicable water quality-based criteria and reasonable potential determinations for these metals.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 requires that waste discharge permits be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Surface water quality-based effluent limitations may be based on an individual waste load allocation

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

(WLA) or on a WLA developed during a basin wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the state of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The EPA has promulgated 91 numeric water quality criteria for the protection of human health that are applicable to Washington State (40 CFR 131.36). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the state of Washington.

ANTIDegradation

The state of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall be protected. More information on the state Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the water body's critical condition. The critical condition represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

MIXING ZONES

This permit authorizes acute and chronic mixing zones around the point of discharge as allowed by Chapter 173-201A WAC, *Water Quality Standards for Surface Waters of the State of Washington*. The Water Quality Standards stipulate the following criteria be met before a mixing zone is allowed. The requirements and Ecology's actions are summarized as follows:

1. The allowable size and location be established in a permit.

This permit specifies the size and location of the allowed mixing zone.

2. Fully apply "all known available and reasonable methods of prevention, control and treatment" (AKART).

The technology-based limitations determined to be AKART are discussed in an earlier Section of this fact sheet (see Technology-based Limitations).

3. Consider critical discharge condition.

The critical discharge condition is often pollutant-specific or water body-specific and is discussed above.

4. Supporting information clearly indicates the mixing zone would not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses, result in damage to the ecosystem or adversely affect public health.

The Council or Ecology has reviewed the information on the characteristics of the discharge, receiving water characteristics, the discharge location, and past environmental studies. Based on this information, the Council believes this discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem or adversely affect public health.

5. Water quality criteria shall not be violated (exceeded) outside the boundary of a mixing zone.

A reasonable potential analysis, using procedures established by USEPA and the Council or Ecology, was conducted for each pollutant to assure there will be no violations of the water quality criteria outside the boundary of a mixing zone.

6. The size of the mixing zone and the concentrations of the pollutants shall be minimized.

The size of the mixing zone (in the form of the dilution factor) has been minimized by the use of design criteria with low probability of occurrence. For example, the reasonable potential analysis used the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor and the lowest flow occurring once in every 10 years.

7. Acute Mixing Zone

a. Acute criteria met as near to the point of discharge as practicably attainable

The acute criteria have been determined to be met at 10% of the distance of the chronic mixing zone at the ten year low flow.

b. The concentration of, and duration and frequency of exposure to the discharge, will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.

The toxicity of pollutants is dependent upon the exposure which in turn is dependent upon the concentration and the time the organism is exposed to that concentration. For example, EPA gives the acute criteria for copper as “freshwater aquatic organisms and their uses should not be affected unacceptably if the 1- hour average concentration (in µg/l) does not exceed the numerical value given by $(0.960)(e^{(0.9422[\ln(\text{hardness})] - 1.464)})$ more than once every three years on the average.” The limited acute mixing zone authorized for this discharge will assure that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water assuring that it will not cause translocation of indigenous organism near the point of discharge.

8. Comply with size restrictions

The mixing zone authorized for this discharge meets the size restrictions of WAC 173-201A.

9. Overlap of Mixing Zones

This mixing zone does not overlap another mixing zone.

DESCRIPTION OF THE RECEIVING WATER

The facility discharges to the Columbia River, which is designated as a Class A receiving water in the vicinity of the outfall. Treated municipal wastewater and industrial wastewaters are discharged to the river from facilities located in the Wenatchee area. In addition, discharges of contaminated ground water from the Hanford Reservation into the Columbia River have been documented and continue to occur. Characteristic uses of the river include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation. Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, EPA has promulgated human health criteria for toxic pollutants (40 CFR 131.36). Criteria for this discharge are summarized below:

Table 6: Applicable Surface Water Criteria

Parameter	Criteria
Temperature	20 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units with a human-caused variation not to exceed 0.5 standard units above or below the criteria
Turbidity	less than 5 NTU above background
Toxics	No toxics in toxic amounts (see Consideration of Surface Water Quality-Based Limits for Numeric Criteria—Toxic Pollutants in the following section for criteria for toxics of concern for this discharge)

The temperature criteria for Class A waters is generally 18°C. However, WAC 173-201A-130(21) establishes a "special condition" of 20°C in the vicinity of the outfall for the Columbia River. The special condition states: "temperature shall not exceed 20.0°C due to human activities. When natural conditions exceed 20.0°C, no temperature increase shall be allowed which will raise the receiving water temperature by greater than 0.3°C; nor shall such temperature increases, at any time, exceed $t=34/(T+9)$ ".

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Council has determined to be AKART. Mixing zones are authorized as noted above and are defined as follows:

The existing dilution factors were established in the 1995 permit using the PLUMES methodology. Previously, there had been no need to determine dilution factors because compliance monitoring was done at the edges of the authorized mixing zones. The calculated dilution factors are very close to estimates based on maximum effluent flows and low river flows assumed in the 1985 thermal plume study. The aquatic life-based acute and chronic dilution factors are:

Table 7: Existing Permitted Dilution Factors

Acute	Chronic
11	50

The existing dilution factors are retained in the proposed permit on an interim basis until the effluent mixing study required by this permit is approved by the Council. See the Schedule of Compliance section of this fact sheet for more discussion concerning the necessity for, and requirements of the effluent mixing study.

Determination of Reasonable Potential to Exceed the Surface Water Quality Standards

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs some distance away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of surface water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The impacts of temperature, pH, chlorine, ammonia, chromium and zinc were determined as shown below, using the dilution factors at critical conditions described above.

Temperature--The impact of the discharge on the temperature of the receiving water was modeled by the Permittee in 1980. In 1985, after the plant started operation, the Permittee conducted a Thermal Plume study in the receiving water demonstrating that the discharge would maintain compliance with water quality standards under a variety of river flow conditions. The Permittee also monitored the temperature of the receiving water from 1984 to 1995 as part of the Water Quality Monitoring required by the Council.

As was stated earlier in this fact sheet, the Columbia River is considered water quality-impaired for temperature. The EPA and the state Department of Ecology are currently conducting a joint TMDL study to correct the impairment. The EPA issued a guidance document for implementing the temperature water quality standards in April 2003. (EPA, 2003) The document states that, due to the non-conservative nature of heat loading in a water body and the agency's finding that impairment of the river is caused primarily by non-point sources, numeric effluent limits for point sources discharges are not always warranted (p. 42). In lieu of numeric limitations, the EPA recommends that a study be conducted to determine a discharger's impact to the receiving water, followed by establishment of limits, if necessary (p. 43). As part of the effluent mixing study required by this permit, the Permittee is required to assess compliance of temperature in the discharge with the state's water quality standards. The existing narrative limit will be retained in the permit during the Schedule of Compliance. The necessity for a numerical final temperature limit will be determined in the effluent mixing study.

In the event the approved TMDL establishes a wasteload allocation for the Permittee's facility, the Council reserves the right to reopen and modify the permit accordingly, or may incorporate a temperature wasteload allocation at the next permit reissuance.

pH--The surface water quality criteria for pH are between 6.5 to 8.5 standard units, with allowance for a human-caused variation not to exceed 0.5 standard units above or below the criteria. The Permittee's discharge complies with the criteria without the need for dilution; so no further analysis to exceed the criteria is necessary. Therefore, the existing permit limits of 6.5 to 9.0 are retained in the proposed permit.

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

Turbidity--The existing permit does not require monitoring of turbidity. However, turbidity within the mixing zone was studied as part of the Water Quality Monitoring Program conducted by the Permittee from 1983 to 1995. Based on the results of this monitoring, the Council determined that the turbidity in the discharge did not result in a significant increase of turbidity of the Columbia River.

Based on the TSS data submitted by the Permittee in the most recent permit application, the discharge does contain turbidity. The criteria for turbidity allows no more than a 5 NTU increase over background turbidity. As the point of compliance for turbidity is at the edge of the chronic mixing zone, it is likely the Permittee's discharge does not likely exceed the water quality criteria. Therefore, this permit does not establish effluent limits for turbidity, but does require the Permittee to assess turbidity in the discharge for compliance with the updated state water quality standards for turbidity as part of the effluent mixing study.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempt from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: ammonia, chlorine/halogens, chromium, copper, and zinc. A reasonable potential analysis (See Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

Ammonia, Chlorine, Chromium, and Zinc

The determination of the reasonable potential for ammonia, chlorine, chromium, and zinc to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The critical condition in this case occurs during the warm weather months of July through September. The critical condition is relevant specifically to ammonia, because its toxicity is determined by temperature and pH. The parameters used in the critical condition modeling are as follows: acute dilution factor 11, chronic dilution factor 50, receiving water temperature 21.67°C, and hardness of 50 mg/L, as CaCO₃.

Table 8: Criteria Used in Reasonable Potential Analysis for Toxic Pollutants, in µg/L

Parameter	Water Quality Criteria	
	Acute	Chronic
Ammonia	3,200	520
TRC/TRH	19	11
Chromium, Trivalent	311.04	100.90
Chromium, Hexavalent	15	10
Zinc, Total	63.61	58.09

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

Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal.

Determinations of reasonable potential resulted in no reasonable potential for ammonia, chromium, or zinc to exceed the water quality criteria.

Regarding chromium, the analysis was inexact because the federal NPDES permit application requires chromium be characterized as total recoverable, while the state's surface water quality criteria specify trivalent and hexavalent chromium. Criteria for both trivalent and hexavalent chromium are presented in the table. Criteria for hexavalent chromium are more stringent because this species of the metal is more reactive, resulting in greater toxicity to aquatic life. The reasonable potential analysis for chromium was conducted using the more stringent hexavalent chromium criteria and the maximum effluent concentration reported in the application, and no reasonable potential was found. However, the proposed permit requires the Permittee to assess all toxics in the discharge for compliance with the applicable water quality standards as part of the effluent mixing study.

Concerning chlorine/halogen, the existing permit contains a relatively stringent limit of 0.1 mg/L, or 100 µg/L, of total residual halogen. The Permittee discharges the blowdown wastewater only after two consecutive samples indicate halogen concentrations of less than 100 µg/L. This concentration was used in the reasonable potential determination. No reasonable potential was found for the discharge to exceed the water quality criteria for chlorine.

Copper

Regarding copper, the fact sheet associated with the current permit contains the following discussion:

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 assessed here. 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

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

March through November. The Council accepts these limits, therefore they will be deemed applicable to the whole discharge at any time at Outfall 001.

The existing effluent limits for copper are retained in the proposed permit as interim limits during the Schedule of Compliance. Final limits will be determined in the effluent mixing study and incorporated into the permit as a permit modification.

Regarding other metals present in the discharge, the Permittee may provide data clearly demonstrating the seasonal partitioning of the dissolved metal in the ambient water in relation to an effluent discharge. Metals criteria may be adjusted on a site-specific basis when data are available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Metals criteria may also be adjusted using the water effects ratio approach established by EPA, as generally guided by the procedures in *USEPA Water Quality Standards Handbook*, December 1983, as supplemented or replaced.

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing.

WET testing has been conducted multiple times during previous permit cycles. In recent tests performed on 100% discharge water, acute toxicity averaged 98% survival, with no single test producing less than 90% survival. Chronic definitive tests performed in 1997 resulted in no mortalities at the Acute Critical Effluent Concentration (ACEC) and at the Chronic Critical Effluent Concentration (CCEC). The ACEC and CCEC were calculated by the permit writer and represent, respectively, concentrations of 9% and 2% effluent in river water. One of the chronic definitive tests indicated chronic toxicity in a sample containing 50% effluent. Since dilution factors may be revised as a result of the upcoming effluent mixing study required by the proposed permit, the Permittee is required to recharacterize the acute and chronic toxicity in the discharge after new dilution factors have been approved by the Council. The necessity for WET limits will be evaluated at the next permit renewal.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

At this time, the Council has determined that the applicant's discharge does not contain chemicals of concern based on existing data or knowledge. However, the Permittee is

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

required to evaluate the discharge for compliance with the human health criteria as part of the effluent mixing study.

SEDIMENT QUALITY

The state has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards allow the Council to require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Council has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards. This determination is based on the low concentrations of TSS in the discharge (LTA=12.9 mg/L) and that the velocity of the Columbia River would inhibit deposition. However, the Permittee is required to investigate the riverbed in the vicinity of the outfall for sediment deposition during the required outfall inspection.

GROUND WATER QUALITY LIMITATIONS

The state has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect beneficial uses of ground water. Permits issued by the Council must be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

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 by the past activities. At times, the ground water quality criterion for nitrate is marginally exceeded, by activities from other than the Permittee, 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 criterion.

The maximum concentrations of pollutants discharged from Outfalls 002 and 003 that are regulated by the ground water criteria in WAC 173-200-040 are presented in Table 10. The applicable criteria are included for comparison. Shaded boxes indicate exceedance of the numeric ground water criteria as measured in the effluent prior to infiltration to ground water.

Table 10: Maximum Discharge Concentrations and Applicable Ground Water Criteria

Parameter	Units	Outfall 002 Maximum Value	Outfall 003 Maximum Value	Ground Water Criteria
pH	S. U.'s	7.2 – 8.2	8.2 – 9.0	6.5 – 8.5
Fluoride	mg/L	0.17	0.37	4.0
Nitrate	mg/L	0.56	0.06	10
β radioactivity	pCi/L	38.3	Not Detected	50
Sulfate	mg/L	34	85	250
Barium, Total	mg/L	0.037	0.072	1.0
Iron, Total	mg/L	0.30	0.330	0.30
Manganese, Total	mg/L	0.035	0.022	0.05
Cadmium, Total	mg/L	0.0004	0.0003	0.01
Chromium, Total	mg/L	0.001	0.0032	0.05
Copper, Total	mg/L	0.011	0.019	1.0
Lead, Total	mg/L	0.0012	0.96	0.05
Selenium, Total	mg/L	0.0013	0.0043	0.01
Zinc, Total	mg/L	0.096	0.067	5.0
Chloroform	µg/L	1.7	Not Detected	7.0
Chloride	mg/L	16	14	250
Total Dissolved Solids	mg/L	220	420	500

OUTFALL 002

The discharge at Outfall 002 includes some of the wastestreams 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 prevention, control, and treatment (AKART) of pollutants in the discharge 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 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 judgement of the permit writer, AKART is being applied.

OUTFALL 003

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 AKART be applied. Again, particulate matter will be filtered out in the soil, and there is no known available and reasonable technology to remove dissolved pollutants from the

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

wastestream. In the best professional judgement of the permit writer, AKART is being applied to the discharge.

Ground water monitoring through a hydrogeology study was undertaken as a condition of the 1996 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. The draft permit includes continued monitoring for lead in the discharge. In the event lead concentrations increase the Council reserves the right to reinstitute ground water quality monitoring.

A ground water monitoring study was conducted during the 1990's to assess the impact of the discharges from Outfalls 002 and 003 to ground water quality. The final report was issued in April 1999. This report was reviewed in support of the proposed permit. The review found that there is a limited amount of ground water monitoring data, all included in the 1999 report. No subsequent ground water analytical results have been provided. The data provided show a reduction in levels from upgradient to downgradient sample results for most reported constituents.

SCHEDULE OF COMPLIANCE

The proposed permit establishes a five-year Schedule of Compliance that requires the Permittee to assess compliance of the discharge with the state's Surface Water Quality Standards (Chapter 173-201A WAC) and Ground Water Quality Standards (Chapter 173-200 WAC). The Permittee has had an excellent compliance record during previous permit cycles and the Schedule of Compliance should not be construed as a punitive measure. However, some of the conditions and requirements in the existing permit, primarily the dilution factors, were based on methodologies and procedures that are now considered outdated, since newer methodologies are available.

The existing dilution factors were used to calculate the water quality-based copper effluent limits. Furthermore, they are used at every permit renewal in the determination of reasonable potential for pollutants in the discharge to exceed the water quality standards. The dilution factors were also used to assess the whole effluent toxicity (WET) and human health impacts of the discharge on the receiving water. Concerning the existing copper limits, not only were the existing dilution factors used to determine the limits, but the guidance and requirements for determining a water effects ratio have since been revised by EPA and Ecology. For these reasons the proposed permit includes a compliance schedule to allow the Permittee the time to revise the dilution factors using newer methodologies and assess the impacts of the discharge to the receiving water.

In the best professional judgement of the permit writer a five-year Schedule of Compliance is warranted because of the number and complexity of tasks required by the permit. The permit specifies milestones, as required by the federal regulations (40 CFR 122.47(a)(3)). During the first year of the permit cycle, the Permittee is required to evaluate the outfall diffuser to assure that it is operating as designed and to provide the proper data for the mixing study.

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

During the second year a mixing study will be conducted to develop revised dilution factors and evaluate whether pollutant concentrations in the discharge are in compliance with the numeric water quality criteria for aquatic and human health. Although the priority pollutant scan conducted by the Permittee for the present permit application did not identify any pollutants with human health criteria, the mixing study will require additional characterization of the discharge. In addition, the Permittee is required to differentiate the trivalent and hexavalent chromium in the discharge, to reflect the format of the water quality criteria. During the third year the Permittee will conduct WET Testing.

The proposed permit also requires the reassessment of the impacts, if any, of the discharges to ground water. The purposes of the required ground water study are to determine: (1) whether any changes have occurred in ground water quality as a result of the discharges, (2) compliance with the ground water quality standards, including the antidegradation rule, (3) the need for discharge or ground water limits, and (4) the need for revisions to the existing ground water monitoring program. The permit requires the submittal of a scope of work to the Council for review and approval. The scope of work is required to contain a discussion of the hydrogeology of the site and the useability of the existing monitoring wells. The Council anticipates that much of the scope of work for the 1999 study can be revised and used in this submittal. In addition, Energy Northwest is required to submit an updated quality assurance project plan (QAPP), or analogous sampling and analysis plan, to the Council for review and approval during the second year of the permit cycle. Sampling of upgradient and downgradient wells is required to be conducted during the following year.

The permit requires reports to be submitted to the Council at each milestone. A summary report is required to be submitted with the next application for permit renewal. The summary report will integrate the results of the discrete tasks of the compliance schedule and, as necessary, propose numerical effluent limits or any additional measures to be taken to assure compliance with the water quality standards. All reports are subject to review and approval by the Council. Findings of the report will form the basis of the requirements and conditions of the next permit.

In the event the Permittee needs more time to fulfill the tasks contained in the Schedule of Compliance and the Council feels more time is warranted, the proposed permit allows the Permittee to request an extension of the compliance schedule.

MONITORING REQUIREMENTS

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

The monitoring schedule is detailed in the proposed permit under Special Condition S2. 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.

The monitoring program in the proposed permit has been revised from the existing permit. The proposed permit adds the requirement that the discharge from Outfall 001 be sampled for

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

temperature, turbidity, chromium, and zinc. The existing permit did not explicitly require sampling for these parameters. Monitoring for temperature and turbidity are required to verify compliance with the state's Surface Water Quality Standards. Regarding chromium and zinc, the Permittee has reported results from 36 metals samples during the last three years. This permit requires the discharge be sampled a minimum of twice per year for chromium and zinc, but Special Condition S3.D requires all additional sample results of the final effluent be reported to the Council.

The Schedule of Compliance in the proposed permit requires a comprehensive reassessment of the discharges to surface water and ground water for compliance with the applicable water quality standards. In addition to assessing the need for effluent limits and ground water limits, it is anticipated that the monitoring program for these discharges will be revised accordingly at the next permit renewal.

LAB ACCREDITATION

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

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The requirements of Special Condition S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

BEST MANAGEMENT PRACTICES (SPILL) PLAN

The Council has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Council has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the federal Clean Water Act and RCW 90.48.080.

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.

SOLID WASTE PLAN

The Council has determined that the Permittee has a potential to cause pollution of the waters of the state from leachate of solid waste. The Permittee submitted an update of its plan with the application for permit renewal. The Permittee recycles much of its solid wastes, including office paper, metal, and plastic, in accordance with the requirements with the company's ISO 14001 Environmental Management System.

This proposed permit requires, under the authority of RCW 90.48.080, that the Permittee update the solid waste plan designed to prevent solid waste from causing pollution of the waters of the

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

state. The updated plan is required to be submitted with the next application for permit renewal. In addition, the updated plan must be submitted to the local permitting agency for approval, if required by local ordinance.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Council may modify this permit to impose numerical limitations, if necessary, to meet Water Quality Standards for Surface Waters, Sediment Quality Standards, or Water Quality Standards for Ground Waters, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Council may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Council proposes that this proposed permit be issued for five (5) years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

2003. EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards. EPA 910-B-03-002. Region 10 Office of Water, Seattle, WA.

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

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

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Washington State Department of Ecology.

Laws and Regulations(<http://www.ecy.wa.gov/laws-rules/index.html>)

Permit and Wastewater Related Information
(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Council has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on (date) and (date) in (name of publication) to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Council will publish a Public Notice of Draft (PNOD) on (date) in (name of publication) to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Energy Facility Site Evaluation Council
PO Box 43172
Olympia, WA 98504-3172

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and reasons why the hearing is warranted. The Council will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Council will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Council's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Council by telephone, ??, or by writing to the address listed above.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AKART-- An acronym for “all known, available, and reasonable methods of treatment”.

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring --Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/state permits issued under both state and federal laws.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Responsible Corporate Officer-- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

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

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

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

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov>.

REASONABLE POTENTIAL CALCULATION

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in <i>Technical Support Document for Water Quality-based Toxics Control</i> , U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)																CALCULATIONS														
Parameter	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	State Water Quality Standard		Max concentration at edge of...		LIMIT REQ'D?	Effluent percentile value	Pn	Max effluent conc. measured (metals as total recoverable)	Coeff Variation	s	# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor														
			Acute ug/L	Chronic ug/L	Acute Mixing Zone ug/L	Chronic Mixing Zone ug/L																								
Ammonia			3200.0	520.0	18.68	4.11	NO	0.95	0.920	180.0	0.60	0.55	36	1.14	11	50														
Chlorine, Total Residual*			19.0	11.0	6.46	1.42	NO	0.95	0.988	100.0	0.60	0.55	250	0.71	11	50														
Chromium (Hexavalent)	0.982	0.962	15.0	10.0	2.96	0.64	NO	0.95	0.920	29.00	0.60	0.55	36	1.14	11	50														
Zinc	0.996	0.996	63.61	58.09	8.17	1.80	NO	0.95	0.920	79.00	0.60	0.55	36	1.14	11	50														
					#DIV/0!	#DIV/0!	#DIV/0!	0.95	#DIV/0!		0.60	0.55			#DIV/0!															
					#DIV/0!	#DIV/0!	#DIV/0!	0.95	#DIV/0!		0.60	0.55			#DIV/0!															
					#DIV/0!	#DIV/0!	#DIV/0!	0.95	#DIV/0!		0.60	0.55			#DIV/0!															
					#DIV/0!	#DIV/0!	#DIV/0!	0.95	#DIV/0!		0.60	0.55			#DIV/0!															

*-Regulated as Total Residual Halogen in the permit and fact sheet.

APPENDIX D--PREVIOUS ENVIRONMENTAL MONITORING STUDIES

Aquatic – Columbia River:

1972	Dye tests in river for dispersion model
1980	Mathematical Modeling of Cooling Tower Blowdown Plumes
1983 – 1995	Water quality <ul style="list-style-type: none">• Temperature (1983 – 1995)• Dissolved oxygen (1983 – 1995)• pH (1983 – 1995)• Alkalinity (1983 – 1995)• Conductivity (1983 – 1995)• Total residual chlorine (1983 – 1993)• Copper (1983 – 1995)• Zinc (1983 – 1995)• Iron (1983 – 1995)• Nickel (1983 – 1995)• Lead (1988 – 1995)• Cadmium (1988 – 1995)• Chromium (1988 – 1995)• Hardness (1983 – 1995)• Oil and grease (1983 – 1993)• Ammonia-nitrogen (1983 – 1992)• Nitrate-nitrogen (1983 – 1992)• Total phosphorus (1983 – 1995)• Inorganic Phosphate (1993 - 1995)• Orthophosphorus (1983 – 1992)• Sulfate (1983 – 1995)• Total dissolved solids (1983 – 1993)• Total suspended solids (1983 – 1992)• Turbidity (1983 – 1995)
1975 – 1987	Benthic microfauna
1977-80, 83 – 87	Periphyton
1978-79, 83–88	Fish impingement/intake structure fouling inspections

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

1984 – 1994	Bioassay in discharge water <ul style="list-style-type: none">• Oncorhynchus tshawytscha (chinook salmon) 1984-85,91,93• Oncorhynchus mykiss (steelhead) 1985• Hyalella azteca (amphipod crustacean) 1992• Daphnia pulex (water flea) 1991-93
1985	Thermal plume study
1985	Fish drift test
1985	Fish entrainment
1983 – 1990	Corbicula surveys

APPENDIX E--RESPONSE TO COMMENTS