ADDENDUM TO THE FACT SHEET
FOR NATIONAL POLLUTANT DISCHARGE
ELIMINATION SYSTEM (NPDES)
PERMIT NO. WA-002496-1

I GENERAL INFORMATION

Facility:

Grays Harbor Energy Center
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FACT SHEET

II PERMIT MODIFICATION SUMMARY

EFSEC issued the current NPDES Permit to Grays Harbor Energy LLC for its Grays Harbor Energy Center (GHEC) facility on May 13, 2008. This permit addresses process wastewater discharges and stormwater discharges. EFSEC drafted the permit conditions while the GHEC was under construction. The GHEC began operations in July, 2008 and has run intermittently as a peaking plant, whenever the power market conditions are economically advantageous. However, soon after start of operations, several compliance issues emerged that resulted in routine exceedances of effluent limits. In response to the compliance issues, EFSEC issued a Notice of Incident (NOI) to the permittee on November 13, 2008. Subsequent investigation revealed that the permit writer made several errors in calculating effluent limits during permit development.

EFSEC proposes to make the following modifications to the existing permit; the permit modifications:

- Correct errors made in establishing and calculating effluent limits.
- Revise the existing schedule of compliance to incorporate results of comprehensive sampling of the discharge conducted in July and August 2009.
- Revise the monitoring program to reflect the changes in effluent limits and discharge data collected since the facility began operation.
- Incorporate revisions that reflect the permit conditions in the Industrial Stormwater General Permit issued by the Department of Ecology (Ecology) in October 2009.

This fact sheet addendum accompanies the draft permit and describes the proposed permit changes and EFSEC's rationale for making these changes. EFSEC will not modify the 2008 fact sheet because it is part of the administrative record for the discharge limits and conditions of the 2008 permit.

The use of the terms "existing" or "current" in this document refer to the 2008 permit or fact sheet. The use of the term proposed permit refers to the draft permit that is the focus of this modification.

The general organization of the fact sheet addendum is as follows:

Section I:	General Information identifies the name and the location of the permittee's facility
Section II:	Permit Modification Summary briefly describes the proposed revisions to the effluent limits, monitoring program, and schedule of compliance.
Section III:	Background describes the compliance history of the facility.
Section IV:	Wastewater Characterization identifies the pollutants present in the facility's discharge and their concentrations in the context of the existing effluent limits.
Section V:	Brief Description of the Permit Development Process is self-explanatory.
Section VI:	Proposed Permit Revisions describes revised permit requirements and their bases.

Section VII EFSEC Determination for Permit Issuance
Appendix A: Public Involvement
Appendix B: Flow Diagram of the Permit Development Process
Appendix C: Spreadsheets used to Calculate Effluent Limits
Appendix D: Flow Diagram of Process Wastewater System

The changes incorporated into this permit modification are limited to revision of:

- The interim effluent limits in Special Condition S1.B.
- The interim monitoring requirements in Special Condition S2.A.
- Stormwater requirements in Special Condition S2.C to be consistent with requirements contained in Ecology's Industrial Stormwater General Permit that was reissued in October 2009.
- Schedule of compliance submittal date requirements in Special Condition S5.

Summary of Effluent Limit Revisions

Table 1 summarizes the existing and proposed effluent limits. Section VI of this addendum describes the rationale and methodology EFSEC used to either retain or revise each effluent limit. In general, EFSEC revised the limits either to correct errors made in calculating the existing limits or to reflect actual discharge data collected since the facility began operations.

Table 1: Summary of Existing and Proposed Revised Effluent Limits

Parameter	Units	Existing Interim Effluent Limits		Proposed Interim Effluent Limits	
		Daily Maximum[1]	Monthly Average[2]	Daily Maximum	Monthly Average
Temperature	°C	16	NA	16	NA
Ammonia (as N)	mg/L	321	160	2.64	0.92
Free Available Chlorine	mg/L	0.5	0.2	0.5	0.2
Chloride	mg/L	18	9	Removed	Removed
Total Suspended Solids (TSS)	mg/L	100	30	100	30
Chromium, Total	µg/L	200	200	32.96	15.25
Oil and Grease	mg/L	20	15	20	15
Iron	mg/L	1.0	1.0	NA	1.0

NA - not applicable means the parameter is not regulated as a monthly average by the permit or the SCA.
Shaded areas indicate revised proposed effluent limits.

1. Maximum daily effluent limit means the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. For pollutants with limits expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For other units of measurement, the daily discharge is the average measurement of the pollutant over the day.
2. Average monthly effluent limit means the highest allowable average of daily discharges over a calendar month. To calculate the discharge value to compare to the limit, you add the value of each daily discharge measured during a calendar month and divide this sum by the total number of daily discharges measured..

In addition to correcting errors made in calculating effluent limits, this modification proposes to simplify the permit by eliminating an error made in the existing permit. The existing permit contains separate effluent limits for the oil/water separator discharge, as if it discharges to surface water. However, the facility reuses the oil/water separator discharge as makeup water in the recirculating cooling water system. EFSEC proposes to apply the effluent limits and relocate the monitoring locations for these parameters to the blowdown sample port, which better represents the discharge to the river. Section VI of this addendum describes the regulatory justification for these changes. EFSEC anticipates that, given the configuration of the facility, it will include monitoring of the oil/water separator discharges as part of the operations and maintenance (O&M) program, but the facility must evaluate this in the upcoming engineering report.

Summary of Monitoring Schedule Revisions

Table 2 contains a list of the existing and proposed parameters the facility must monitor. Section VI of this addendum describes the rationale EFSEC used to either retain or revise the monitoring program for each parameter. In general, EFSEC revised the monitoring schedule to either correct errors made in the existing permit or to reflect actual discharge data collected since the facility began operation.

Table 2: List of Process Wastewater Monitoring Parameters in the Existing and Proposed Permits

Parameters monitored in existing permit	Parameters to be monitored in modified permit
Flow	Flow
Temperature	Temperature
pH	pH
Free Available Chlorine	Free Available Chlorine
Total Suspended Solids	Total Suspended Solids
Arsenic	Arsenic
Ammonia	Ammonia
Priority Pollutants and PCBs	Priority Pollutants and PCBs
Chromium	Chromium
Iron	Iron
Oil and Grease	Oil and Grease
Chloride	Dissolved Oxygen
	Alkalinity
	Nitrate/Nitrite
	Ortho-Phosphate
	Total Phosphorus
	Sulfide
	Dissolved Solids, Total
	Copper, Total
	Zinc, Total
	Residual Chlorine, Total
	Turbidity

III BACKGROUND

The 2008 fact sheet describes conditions and issues existing at the facility when EFSEC issued the previous permit, during construction.

Issuance of Notice of Incident and Investigation

EFSEC issued the current NPDES Permit on May 13, 2008. The GHEC began routine operations in July 2008. On November 13, 2008, EFSEC issued a Notice of Incident (NOI) to GHE to document exceedances of effluent limits and failure to monitor that occurred between July 1, 2008 and September 30, 2008. Specifically, the NOI cited exceedances of the pH, chloride, and iron effluent limits and one failure to sample the discharge.

In September 2008 alone, GHE reported 13 exceedances of pH, chloride, and iron effluent limits. Subsequent investigation of the pH exceedances by GHE staff revealed a dysfunctional pH neutralization system. GHE replaced the entire system soon after and the facility has since complied with its pH limits.

The facility exceeded its chloride limits; however, the limits were miscalculated at the time of permit issuance. Section III of this addendum describes how this permit modification corrects this error. EFSEC compared the chloride concentrations in the discharge to the water quality criteria and determined the facility had no reasonable potential to violate water quality standards. Therefore, EFSEC proposed to remove the effluent limits in the permit modification.

The facility has exceeded its iron limits. EFSEC based the existing permit on a potentially outdated federal regulation. In addition, the facility has used a pipe fabricated of iron located beneath the power block. This proposed permit modification requires the facility to determine the applicability of the federal regulation, assess the iron contribution from the water conveyance pipe to the discharge, and propose final effluent limits and sampling locations for iron in an engineering report.

The failure to monitor citation in the NOI was caused by GHEC's inability to obtain the proper sample bottles for its first monitoring event in July 2008. Since July 2008, it has complied with all permit requirements regarding monitoring.

IV WASTEWATER CHARACTERIZATION

This section of the addendum characterizes GHEC's process wastewater. Routinely monitored parameters are characterized in Table 3. Priority pollutants in the discharge are characterized in Table 4.

Summary of routinely-monitored process wastewater data

The existing permit requires GHEC to routinely monitor its process wastewater discharge. Table 3 summarizes routinely monitored process wastewater data and provides existing effluent limits

for comparison. The Table depicts noncompliance with existing permit requirements with shaded cells and the following narrative further describes the violations.

Table 3: Wastewater Characterization of Routinely Monitored Parameters, except pH

Parameter	Units	Monthly Average[1]		Daily Maximum[2]	
		Effluent Limit	Highest Reported	Effluent Limit	Highest Reported
Temperature	°C	NA	NA	16	18.6
Ammonia (as N)	mg/L	160	0.39	321	2.05
Free Available Chlorine	mg/L	0.2	0.05	0.5	0.21
Chloride	mg/L	9	86.15	18	181
Total Suspended Solids (TSS)	mg/L	30	11.3	100	27
Oil & Grease	mg/L	15	5.5	20	11
Iron, Total	mg/L	1	2.97	1	9.65
Chromium, Total	µg/L	200	13.1	200	47.6

NA - not applicable means the parameter is not regulated as a monthly average by the permit.
Shaded areas indicate noncompliance with the existing permit.

1- Average monthly effluent limit means the highest allowable average of daily discharges over a calendar month. To calculate the discharge value to compare to the limit, you add the value of each daily discharge measured during a calendar month and divide this sum by the total number of daily discharges measured.

2- Maximum daily effluent limit means the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. For pollutants with limits expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For other units of measurement, the daily discharge is the average measurement of the pollutant over the day.

pH

EFSEC did not summarize pH effluent limits in Table 4 because simultaneous minimum and maximum limits are difficult to summarize. The existing permit contains pH minimum and maximum effluent limits of 6.5 and 8.5, respectively. The permit allows short excursions of these limits in accordance with federal regulations due to the continuously pH monitoring system that GHEC installed. The permitted excursions are that: 1) an individual excursion cannot exceed 60 minutes, 2) the total time of excursions during a calendar month cannot exceed 7 hours and 26 minutes, and 3) no excursion can be higher than 9.0 or lower than 6.0. GHEC reported one excursion of 9.3 on September 24, 2008. After investigation, it determined the pH neutralization system was inadequate and it replaced the entire system in 2008. GHEC has complied with its permit since it replaced the neutralization system.

Characterization of Priority Pollutants

40 CFR Part 423, Appendix A contains a list of 126 priority (toxic) pollutants regulated by EPA that are applicable to thermal power plant discharges. 40 CFR 423.15(j)(1) prohibits the discharge of any priority pollutants, except zinc, in the cooling water discharge. Ecology has

expanded the list of priority pollutants to include nutrients and other pollutants that can degrade waters of the state.

GHEC sampled the discharge for priority pollutants on July 29, 2009 and August 5, 2009. Table 4 summarizes the analytical results of the priority pollutant scans by the following fractions of the samples.

- Conventional
- Nonconventional
- Metals, cyanide, and total phenols
- Polychlorinated biphenyls (PCBs) and 2,3,7,8-tetra-chlorodibenzo-p-dioxin

The facility analyzed the samples for additional fractions, including volatile compounds, acid compounds, base neutral compounds, and pesticides, but since it did not detect any of these substances EFSEC did not include them.

The water quality criteria for five metals (cadmium, copper, silver, lead, zinc) are calculated using hardness in the receiving water. Hardness is a measure of the calcium and magnesium salts present in water and influences the toxicity of a metal (the higher the hardness, the lower the toxicity of a metal).

The last column in Table 4 lists the applicable surface water quality criteria for each parameter. The water quality criteria are included for comparison to the sample results. EFSEC used a hardness value based on the 10^{th} percentile value of 20 samples to calculate the criteria for the hardness-dependent metals. The facility collected hardness data during the receiving water study conducted in 2003-4.

Shaded areas in Table 4 indicate pollutants of concern that may exceed the numeric water quality criteria.

Table 4: Priority Pollutant Scan and Applicable Water Quality (WQ) Criteria

Pollutant	Units	7/29/09 Sample	8/5/09 Sample	WQ Criteria Acute/Chronic/ Human Health [a,b]
BOD_5	mg/L	ND	ND	NE
COD	mg/L	23.1	16.7	NE
TOC	mg/L	9.1	7.8	NE
Dissolved Oxygen	mg/L	8	9.32	8 (minimum)
Total Alkalinity	mg/L	20	19.5	NE/20/NE
Color	10 color unit	6	7	NE
Fecal Coliform	CFU/100 mL	<1	<1	200/100/NE[c]
Fluoride	mg/L	0.41	0.33	NE
Nitrate-Nitrite (as N)	mg/L	13	7.63	NE/NE/10
Nitrogen, Total Kjeldahl (as N)	mg/L	ND	0.28	NE
Ortho-Phosphate (PO_4 as P)	mg/L	3.21	2.51	NE

Pollutant	Units	7/29/09 Sample	8/5/09 Sample	WQ Criteria Acute/Chronic/ Human Health [a,b]
Phosphorus, Total	mg/L	2.83	4.27	NE
Oil and Grease	mg/L	3.5	ND	NE
Salinity	PSS	31.4	29.5	NE
Sulfate (as SO_4)	mg/L	475	382	NE
Sulfide	mg/L	2	ND	NE/2/NE
Sulfite	mg/L	4	ND	NE
Dissolved Solids, Total	mg/L	1046	984	NE/NE/250
Hardness, Total	mg/L	356	325	[d]
Aluminum, Total	µg/L	11.5	ND	750/NE/NE
Barium, Total Recoverable	µg/L	12.8	10.1	NE
Boron, Total	µg/L	59.4	48.2	NE
Iron, Total	µg/L	77.7	53.2	NE/1,000/300
Manganese, Total	µg/L	3.4	2.3	NE/NE/50
Magnesium, Total	µg/L	35,900	32,000	NE
Molybdenum, Total	µg/L	5.2	3.7	NE
Antimony, Total	µg/L	0.55	0.44	NE/NE/14[e]
Arsenic, Total	µg/L	41.1	33.1	360/190/0.018[f]
Beryllium, Total	µg/L	ND	ND	?
Cadmium, Total H	µg/L	ND	ND	0.65/0.31/NE
Chromium, (hexavalent) Dissolved	µg/L	ND	ND	15/10/NE
Chromium, Total	µg/L	4.1	3.5	311.04/100.9/NE[g]
Copper, Total H	µg/L	5.7	4.3	3.74/2.87/NE
Lead, Total H	µg/L	ND	ND	10.79/0.42/NE
Mercury, Total	µg/L	ND	ND	2.1/0.012/0.14
Selenium, Total	µg/L	1.1	1	20/5/170
Silver, Total H	µg/L	ND	ND	0.22/NE/NE
Thallium, Total	µg/L	ND	ND	NE/NE/1.7
Zinc, Total H	µg/L	20.9	15.3	29.27/26.72/NE
Cyanide, Total	µg/L	ND	ND	22/5.2/700
Phenols, Total	mg/L	0.01	0.01	NE/NE/21
Residual Chlorine, Total	µg/L	180	Not reported	19/11/NE

NE means the state has not established numeric freshwater water quality criteria for this parameter.
H indicates hardness was used to determine criteria.
a-Criteria from Chapter 173-201A WAC. Not all pollutants have numeric criteria.
b-Aquatic life water quality criteria, except as noted.
c-Fecal coliform criteria for this reach of the Chehalis River are categorized by use as primary (human) contact recreation and are described in Chapter 173-201A WAC, Table 200(2)(b) as follows: Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies/100 mL.
d-Hardness is not a pollutant, it's a characteristic of water used to determine the water quality criteria of some metals.
e-Antimony criterion expressed as inorganic.
f-Arsenic aquatic acute and chronic criteria expressed as dissolved, human health criterion expressed as inorganic.
g-Criteria expressed as trivalent chromium.

Table 5 summarizes pollutants of concern with criteria that the discharge exceeds or may exceed as determined from the priority pollutant scans.

Table 5: Summary of Priority Pollutants of Concern

Parameter	Comment
Dissolved Oxygen	WQ criterion
Alkalinity	Chronic aquatic life criterion
Nitrate/Nitrite	Human health criterion
Ortho-Phosphate and Total Phosphorus	The antidegradation narrative criterion
Sulfide	Chronic aquatic life criterion
Dissolved Solids, Total	Human health criterion
Copper, Total	Acute and chronic aquatic life criteria
Zinc, Total	Acute and chronic aquatic life criteria
Residual Chlorine, Total	Acute and chronic aquatic life criteria

One should note that further characterization of the discharge and receiving water may result in deletion of some parameters of concern and and addition of others. In addition, potential exceedances listed in Table 5 do not indicate violations of the water quality standards. A violation is a regulatory finding made after all factors are quantified and investigated. Additional data to characterize the receiving water will enable EFSEC to develop site-specific water quality criteria. For example, the copper and zinc water quality criteria are based on the hardness of the receiving water, but EFSEC does not have hardness data for this areas of the Chehalis River. Also, two discharge samples may not statistically represent the discharge. Furthermore, the permit writer does not have sufficient site-specific data to determine whether the discharge complies with the state's antidegradation policy, detailed in Part III of Chapter 173-201A WAC.

V BRIEF DESCRIPTION OF NPDES PERMIT DEVELOPMENT PROCESS

In order to put into context the problems in the existing permit and the basis for the proposed permit modifications, this section briefly describes the salient points of NPDES permitting as they relate to Satsop. Appendix A of this addendum includes a detailed flow diagram of the permit development process.

The EPA has established two types of effluent limits: technology-based and water quality-based. EPA bases categorical effluent limits for specific industrial categories (technology-based effluent limits) on the proven performance of the most efficient production processes and/or wastewater treatment systems. Ecology bases technology-based effluent limits for individual facilities on federal categorical limits, on the performance of the facility's wastewater treatment plant, on AKART (all known, available and reasonable methods of prevention, control and treatment) analyses, and on best professional judgment (BPJ). For example, Satsop's permit contains numeric effluent limits based on the demonstrated performance of circulating cooling water systems and oil/water separators. The compliance sampling point is generally located immediately at the end of the production treatment process, before commingling with other wastewater streams. EPA developed the federal categorical effluent limits for power plants in the early 1980's, based on what it then considered efficient production processes and treatment systems. EPA, after a multiyear study, has determined to revise the federal effluent guidelines for steam generating facilities (40CFR Part 423). You can find more information about EPA's process at: http://www.epa.gov/waterscience/guide/steam/

Permit writers base water quality-based effluent limits on the characteristics of the discharge and the receiving water, and calculate limits to comply with the state's surface water quality standards. The compliance sampling point for water quality-based limits is generally located near or at the discharge point to the receiving water, unless otherwise specified in the permit. If a facility has prepared and obtained approval for an engineering report that demonstrates it has done all that is technically and economically feasible (meets AKART standard) to reduce the impacts of the discharge, the permitting authority *may*, at its discretion authorize a mixing zone in the receiving water. (At this time the Satsop facility does not have an approved engineering report.)

The facility discharges to the Chehalis River. Other nearby point-source discharge includes the Elma Sewage Treatment Plant. Significant nearby non-point sources of pollutants include agricultural activities.

> Aquatic life uses are designated for the Lower Chehalis River receiving waters. All indigenous fish and nonfish aquatic species must be protected in waters of the state. The receiving water supports salmonid migration and rearing; and other fish migration, rearing, and spawning. Other uses include primary contact recreational use, all water supply uses, wildlife habitat, harvesting, navigation/boating, and aesthetic uses.

The Chehalis River near Outfall 001 is on Ecology's 303(d) list of impaired waterbodies because of excursions of fecal coliform and temperature beyond water quality criteria. High temperatures in the Chehalis River typically occur during the summer months of July and August. The proposed permit requires GHE to verify compliance with all applicable water quality standards,

including 303(d) listings and antidegradation, as part of the engineering report and water quality evaluation.

VI PROPOSED PERMIT REVISIONS

Rationale for Permit Modification

Since GHEC began operating in July 2008, it has collected adequate wastewater data to characterize the discharge. EFSEC reviewed the discharge data collected during the last 18 months to revise the effluent limits and monitoring schedule to more closely reflect the actual characteristics of the discharge and better protect the quality of the receiving water.

The current permit contains a schedule of compliance that requires GHEC to submit an engineering report that demonstrates through sampling and the AKART analysis that the facility complies with all applicable state and federal standards. EFSEC used the wastewater characterization and other recently available information to revise and refine the schedule of compliance and requirement for an engineering report in the proposed permit modification.

The current permit inappropriately regulates chloride in the discharge due to errors made in the calculations to assess the reasonable potential for this pollutant to exceed the state's surface water quality standards. The revised reasonable potential analysis conducted for the permit modification uses the correct water quality criteria and actual discharge data and demonstrates that chlorides in the discharge do not significantly impact receiving water quality. Therefore, the proposed permit modification removes the existing chloride effluent limits and the associated monitoring. This section describes EFSEC's rationale for retention or revision of each effluent limit. First, the analysis describes the existing limits to provide context, then it describes the proposed revision.

1. Effluent Limits

Cooling Water Discharges

Temperature

The existing maximum daily effluent limit for temperature is 16ºC. The Site Certification Agreement (SCA) specifies a limit established by agreement between Ecology and EFSEC. The facility exceeded the temperature limit once on March 13, 2009 as a result of operator error. The facility retrained the operator and revised the operations and maintenance manual. The 99th percentile of the DMR temperature data set is 15.46ºC. Therefore, the existing limit remains unchanged in the proposed permit. However, the permittee must evaluate compliance of the discharge temperature with the Total Maximum Daily Load Study conducted by Ecology for the Chehalis River in 2005 in the required engineering report.

Ammonia

The permit writer based the existing ammonia effluent limits on the maximum allowable mixing zones, because EFSEC needed to issue the permit before the facility began operation and the permit writer had no discharge data to analyze.

EFSEC calculated the proposed performance-based effluent limits using Ecology's standard spreadsheet, PERFORMLIM.xls (see appendix). Briefly, the permit writer mathematically transformed each of the 41 data points into its natural logarithm, calculated the lognormal mean and variance of the data set and then inserted the applicable values into the PERFORMLIM spreadsheet. Four compliance samples per month is a common sampling frequency for ammonia. The statistical methodology used by the spreadsheet complies with that specified in EPA's Technical Support Document for Water Quality-based Toxics Control (EPA 505/2-90-001). Once GHEC prepares and EFSEC approves an engineering report that determines the facility meets AKART requirements, EFSEC will reevaluate the discharge for compliance with water quality standards.

Free Available Chlorine

The permit writer obtained the existing technology-based effluent limits for free available chlorine from the new source performance standards in the federal regulations (40 CFR 423.15(j)(1)).

The proposed permit requires GHEC to evaluate in the engineering report whether the free available chlorine limits complies with the state's total residual chlorine water quality criteria. The engineering report must propose final limits based on the more stringent of the technology-based or water-quality based requirements.

Chlorides

GHEC exceeds the chlorides limits with every discharge; however, the permit writer made an error when calculating the limits. The chloride water quality criteria are expressed in mg/L (WAC 173-201A-240(3), footnote h), which is equal to 0.001 g/L. However, the permit writer entered the criteria into the spreadsheet as micrograms (µg/L), equal to 0.000001, or three magnitudes lower (more stringent) than the actual criteria. The error resulted in an erroneous finding of reasonable potential to exceed the water quality standards and an incorrect determination to include permit effluent limits.

EFSEC corrected the reasonable potential analysis for the proposed permit modification and found no reasonable potential. Therefore, the chloride limit has been removed from the proposed permit modification.

Chromium

The existing chromium and zinc effluent limits were obtained from the federal new source performance standards specified in 40 CFR Part 423.15. Chromium and zinc limits apply to discharges of cooling water blowdown and the sampling point is at blowdown sample port.

EPA developed the federal effluent guidelines for chromium prior to its 1996 ban on use of chromium for biocides in cooling towers as part of Clean Air Act Amendments. Reported concentrations of chromium in the facility's discharge have consistently complied with the federal technology-based standards. EFSEC proposes to include performance-based effluent limits in the modified permit because concentrations present in the discharge *may* exceed both the freshwater acute and chronic water quality criteria for hexavalent chromium although the reported total chromium value does not exceed the criteria for trivalent chromium. However, the facility currently samples its discharge for *total* chromium and the water quality criteria addresses the *trivalent* and *hexavalent* species of chromium. In the interest of protecting water quality, EFSEC proposes to include performance-based limits calculated with Ecology's PERFORMLIM.XLS in the modified permit. The proposed permit modification requires the facility to evaluate chromium in the engineering report. It must demonstrate how the facility will comply with the state's water quality standards and propose a revised monitoring program based on guidance in Ecology's Permit Writers Manual.

Zinc

The existing permit does not contain effluent limits for zinc and does not require routine monitoring of the discharge for this parameter. The priority pollutant scans conducted by the facility revealed zinc in the discharge. EFSEC proposes interim zinc limits presented in Table 1 of the draft permit. This proposed permit modification requires the facility to evaluate zinc in the engineering report for compliance with AKART and water quality standards and propose effluent limits and a revised monitoring program based on guidance in Ecology's Permit Writers Manual.

Oil/Water Separator Discharges

The federal regulations limit discharges from oil/water separator to surface waters. However, GHE reuses this wastestream in its cooling water makeup water. Because the facility does not directly discharge this wastestream to surface water, EFSEC has retained the existing TSS, oil and grease, and iron limits in the proposed permit modification, but has applied the limits to the discharge to the river.

In addition, EFSEC proposes that the facility measure TSS, oil and grease, iron, and copper in the cooling water discharge to provide data for verification of compliance with the surface water quality standards.

TSS, Oil and Grease

EFSEC based the TSS and oil and grease effluent limits in the existing permit on the new source performance standards in the federal regulations (40 CFR 423.15(c and d)).

EFSEC proposes to retain the existing TSS limits in the modified permit as interim effluent limits. This gives GHEC the opportunity to evaluate compliance with these limits in the

engineering report and if this will ensure compliance with the state's water quality criteria for turbidity. However, the proposed permit modification moves the point of compliance from the oil/water separator to the blowdown sample port. EFSEC proposes to change the point of compliance (and sample point) because the oil/water separator discharges to the cooling water makeup basin, not the Chehalis River. (See Appendix D for process wastewater diagram)

Washington State does not have water quality criteria for oil and grease, so EFSEC proposes to retain the existing limits in the modified permit. GHEC must evaluate whether or not the existing treatment for oil and grease meets AKART requirements. EFSEC changed the point of compliance (and sample point) for oil and grease for the same reasons as TSS.

Copper, Iron

Copper and iron effluent limits are applicable to discharges of chemical metal cleaning wastes (40 CFR 423.15(d)). The existing permit requires the facility to measure iron at the discharge of the oil/water separator.

EFSEC proposes interim copper limits presented in Table 1 of the draft permit. GHEC must evaluate copper in the discharge for compliance with AKART and water quality standards and propose effluent limits and a revised monitoring program based on guidance in Ecology's Permit Writers Manual. As with TSS, EFSEC proposes to change the point of compliance from the oil/water separator to the blowdown sample port because the oil/water separator discharges to the cooling water makeup basin, not the Chehalis River.

The current permit contains effluent limits for iron of 1 mg/L, as specified in 40 CFR 423.15(d). GHEC exceeded the categorical effluent limit 19 out of 41 samples, or approximately 46 percent of the time. Facility staff report that one of the pipes conveying water located beneath the generating plant is fabricated of iron and cannot easily be replaced. The chronic freshwater quality criterion for iron is 1 mg/L. EFSEC proposes to incorporate an interim monthly average and daily maximum iron limit of 1 mg/L into the permit, based on the chronic water quality criterion. The permit writer considered using the human health criterion of 300 µg/L in the permit as an effluent limit, but the human health criteria are based on a 70-year exposure, and the EFSEC anticipates that it will establish and incorporate the final effluent limits into the permit by January 2012.

The schedule of compliance requires GHEC to conduct an AKART analysis to determine applicability of the technology-based limits to the chemical wastes discharge and to determine whether concentrations of copper in the combined discharge comply with the water quality standards.

Table 6 summarizes the regulatory basis of the proposed interim effluent limits. Both Washington State and EPA categorize performance-based limits as a type of technology-based limit.

Table 6: Regulatory Bases of Proposed Effluent Limits

Parameter	Regulatory Basis
Temperature	MOU between EFSEC, Ecology, and WDFW
Ammonia (as N)	Technology-based (calculated using performance data)
Free Available Chlorine	Technology-based (40 CFR 423.15(j)(1))
Total Suspended Solids (TSS)	Technology-based (40 CFR 423.15(d))
Chromium, Total	Technology-based (calculated using performance data)
Oil and Grease	Technology-based (40 CFR 423.15(d))
Iron	Water quality-based using chronic aquatic criterion

2. Monitoring Schedule

This section describes proposed revisions to the existing monitoring schedule. The existing permit requires the facility to monitor the parameters listed in Table 7 above the heavy line. EFSEC proposes to require the facility to monitor the additional parameters listed below the thick horizontal line in Table 7. As explained above, EFSEC removed the chloride effluent limits and monitoring requirements from the proposed modified permit.

Table 7: Monitoring Schedule - Circulating Cooling Water Blowdown Discharge – Outfall 001

Parameter	Units	Sample Point	Minimum Sampling Frequency	Sample Type
Temperature	°C	Blowdown	Continuous [1]	Meter
Flow	MGD	Blowdown	Continuous [1]	Meter
pH	SUs	Blowdown	Continuous [1]	Meter
Free available chlorine	mg/L	Circulating Water or Blowdown	Continuous [2]	Meter or Grab
Total suspended solids	mg/L	Blowdown	Weekly	Grab
~~Chloride~~	~~mg/L~~	~~Blowdown~~	~~Weekly~~	~~Grab~~
Arsenic	µg/L	Blowdown	Weekly	Grab
Ammonia, Total as N	mg/L	Blowdown	Weekly	Grab
Priority Pollutants and PCBs	µg/L	Blowdown	Annual	Grab
Chromium	µg/L	Blowdown	Weekly	Grab
Dissolved Oxygen	mg/L	Blowdown	Weekly	Grab
Alkalinity	mg/L	Blowdown	Weekly	Grab
Nitrate/Nitrite	mg/L	Blowdown	Weekly	Grab
Ortho-Phosphate	mg/L	Blowdown	Weekly	Grab
Total Phosphorus	mg/L	Blowdown	Weekly	Grab
Sulfide	mg/L	Blowdown	Weekly	Grab
Dissolved Solids, Total	mg/L	Blowdown	Weekly	Grab
Copper, Total	µg/L	Blowdown	Weekly	Grab
Iron, Total	mg/L	Blowdown	Weekly	Grab
Zinc, Total	µg/L	Blowdown	Weekly	Grab
Residual Chlorine, Total	mg/L	Blowdown	Weekly	Continuous
Turbidity	NTU	Blowdown	Weekly	Grab

1 Continuous means uninterrupted - except for brief lengths of time for calibration, power failure, or for unanticipated equipment repair or maintenance. If monitoring equipment fails, Permittee must implement manual monitoring.

2 If the monitoring equipment malfunctions, the facility must collect grab samples every 4 hours. The facility must collect a grab sample at least weekly to demonstrate continuous monitor performance.

3. Schedule of Compliance and Engineering Report

The Schedule of Compliance requires GHEC to 1) develop and submit an engineering report for review and approval by EFSEC, and 2) implement the measures detailed in the approved engineering report.

Engineering Report – Content

State regulations require that all wastewaters be provided with all known, available and reasonable methods of prevention, control and treatment (AKART) before discharge to any waters of the state (WAC 173-201A-300(2)(d)). AKART is partially defined in WAC 173-201A-020 as an acronym for "all known, available, and reasonable methods of prevention, control, and treatment." AKART shall represent the *most current* methodology that can be reasonably required for preventing, controlling, or abating the pollutants associated with a discharge. AKART can include production processes and operational procedures that generate minimal levels of pollutants, treatment systems, and best management practices such as minimizing the amount of cooling system additives to the extent possible.
At this time, the facility has not prepared or obtained approval for an engineering report for the Satsop CT Project. Pages 6 and 7 of the 2008 fact sheet explain how the present situation developed. This section of the addendum more thoroughly justifies why GHEC must prepare an engineering report and refines the existing requirements for the engineering report based on data submitted since the facility began operation in May 2008.

Special Condition S5 of the existing permit contains a schedule of compliance to allow the permittee an opportunity to demonstrate compliance with the federal categorical standards, the state's technology-based standard of performance, and the state's water quality standards. The proposed engineering report, which is the centerpiece of the schedule of compliance, must contain a detailed analysis of all pollutants in the discharge to verify compliance with state and federal technology-based standards and state water quality standards. Verification of compliance with the water quality standards must include all applicable portions of the water quality standards, including the numeric criteria, antidegradation, whole effluent toxicity, and the human health standards in the National Toxics Rule.

In some cases, the facility may demonstrate compliance with older, less-stringent federal technology-based standards, but may not be able to demonstrate compliance with state technology-based AKART or water quality standards. For example, federal regulations allow GHEC to discharge up to 100 mg/L of TSS in its chemical metal cleaning wastes discharge, which it currently samples at the oil/water separator, but this performance standard may not comply with AKART or the state water quality standard for turbidity, as measured at the outfall. The turbidity criterion is very stringent and allows only a minor increase over upstream turbidity.

Federal regulations also allow up to 0.5 mg/L of free available chlorine in the cooling tower blowdown discharge. However, the state regulates discharges of chlorine to streams as total residual chlorine. The July 2008 priority pollutant scan revealed a residual chlorine concentration of 0.180 mg/L, more than nine times the acute water quality criteria of 0.019 mg/L. The engineering report must reconcile these different performance standards and determine which is the most stringent, as state and federal regulations require effluent limits in permits be based on the more stringent of all technology-based and water quality-based standards. Once EFSEC determines the facility meets AKART it may also choose to allow a mixing zone. The engineering report should also update the mixing zone evaluation.

EFSEC has concerns about the applicability of the technology-based effluent limits specified in the federal regulations due to the antiquity of the federal standards and the advanced design of the GHEC facility. EPA promulgated the categorical limits in 1983 based on then current technology, but the state of Washington defines AKART as the application of the *most current* technology to control, reduce, and prevent pollution. Ecology's Permit Writers Manual states: As a general rule . . . if the effluent guidelines are over 10 years old, the permit writer should do at least an analysis of unit processes design and efficiencies to determine that the effluent guidelines constitute AKART (p. IV.6). EFSEC determined that the engineering report required in Special Condition S5 of the permit will help it establish: 1) the applicability of the federal standards, 2) the appropriate effluent limits and 3) the appropriate monitoring frequencies and locations for pollutants in the discharge.

The AKART analysis must investigate best management practices (BMPs) and pollution prevention measures utilized by the industry. For example, laboratory results show the facility currently discharges TDS at approximately four times the human health criterion (1,000/250). The quantity of TDS a facility generates depends on the chemical additives it uses in the circulating cooling water system and the number of cycles before blowdown. Typically, removal of TDS from wastewater is extremely expensive. Possible solutions to the discharge of high levels of TDS could include the use of less additives or different additives, or reducing the number of cycles before blowdown. The facility should survey other similar power plants to help determine how they reduce their discharges of TDS. If the facility demonstrates it meets AKART then EFSEC may authorize a mixing zone so the facility meets water quality standards at the edge of the mixing zone.

As part of the engineering report, GHEC must recharacterize the receiving water near the outfall to update the 2003-4 receiving water study. An updated study is necessary to determine compliance with the water quality standards. Monitoring data older than five or more years is generally considered outdated. Furthermore, the nearest Ecology ambient monitoring station is located approximately 20 miles upstream at Porter, and Ecology typically does not sample the river at that location for metals and other parameters in the permittee's discharge. Collection of data near the outfall is necessary to verify compliance with the numeric and narrative water quality criteria, including antidegradation.

The engineering report must give special attention to pollutants in the discharge that present threats to the receiving water, such as nutrients and sulfide. Both pollutants can impact

aquatic life in the receiving water. For example, excessive nutrients in the discharge can reduce downstream dissolved oxygen levels and sulfide can directly impact aquatic life.

The engineering report must also address the high levels of iron in the discharge due to the iron water conveyance pipe because the existing discharge from the oil/water separator exceeds the federal technology-based performance standard of 1 mg/L for chemical metal cleaning wastes. The facility must determine whether the high levels of iron violate the federal standard and, if so, how to resolve the issue. It must also consider the chronic aquatic life and human health criteria for iron.

Engineering Report – Timeline

Table 8 shows the revised list of submittals to fulfill the schedule of compliance and their due dates.

Table 8: Compliance Schedule

Submittal	Due Date
Engineering Report Scope of Work	{3 months after permit issuance}
Quality Assurance Project Plan	{3 months after permit issuance}
Draft Engineering Report	{15 months after permit issuance}
Final Engineering Report	{21 months after permit issuance}
Implementation of the Engineering Report and Compliance with AKART and the Water Quality Standards	{27 months after permit issuance}
Request for Extension of Schedule of Compliance	As necessary

The permit allows GHEC to request an extension of the schedule of compliance for unforeseen circumstances. For example, good reason to extend the compliance schedule may include that the approved engineering report determines that the measures to achieve compliance require major modification of the plant or are so expensive as to require a significant budgetary outlay by the permittee. EFSEC will grant an extension at its discretion.

VII EFSEC DETERMINATION FOR PERMIT ISSUANCE

The EFSEC Manager has made a tentative determination to issue the modified NPDES Permit, No. WA-002496-1 for the Satsop CT Power Project, subject to appropriate changes or adjustments as may result from public comments, the public hearing record, or the U.S. Environmental Protection Agency (EPA) review. The permit expiration date will remain May 13, 2013. The proposed permit modification includes the following: 1) revised interim effluent limits; 2) revised schedules of compliance; and 3) other terms and special conditions.

Appendix A

Public Involvement

APPENDIX A: PUBLIC INVOLVEMENT INFORMATION

The Council tentatively plans to reissue a modified permit to the applicant listed on page 1 of this fact sheet addendum. The permit contains conditions and effluent limitations, which are described in the rest of this fact sheet addendum and the 2008 fact sheet.

The Council published a Public Notice of Draft (PNOD) on July 1, 2010 in the Aberdeen Daily World, Montesano Vidette, and the Olympian to inform the public that a draft permit and fact sheet are available for review. Interested parties were mailed the notice on July 1, 2010 and are invited to submit written comments regarding the draft permit. The draft permit and fact sheet are available for viewing at the EFSEC website: http://www.efsec.wa.gov/satsop.shtml. The draft permit, fact sheet, and related documents are also available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at EFSEC's office listed below, and at the W.H. Abel Memorial Library, 125 Main Street South, Montesano, WA 98563-3794. Written comments should be mailed to:

Jim La Spina
Energy Facility Site Evaluation Council
PO Box 43172
Olympia, Washington 98504-3172

Any interested party may comment on the draft permit within the 30-day comment period to the address above. The Council will hold a hearing on July 15, 2010 beginning at 6:30 pm at:

Montesano City Hall

112 North Main Street

Montesano, Washington

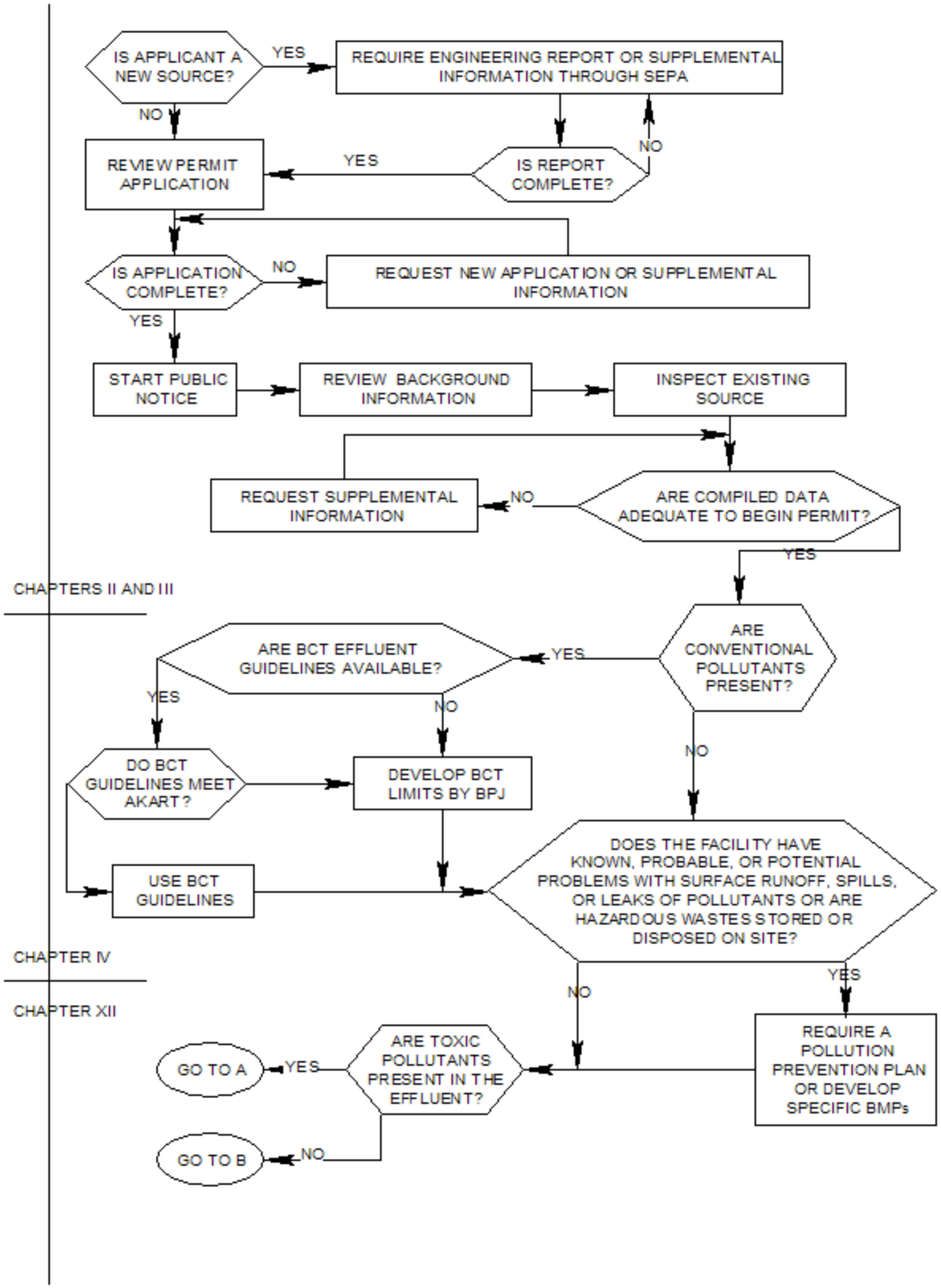
Comments should reference specific text followed by proposed modifications or concern when possible. Comments may address technical issues, accuracy, and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern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

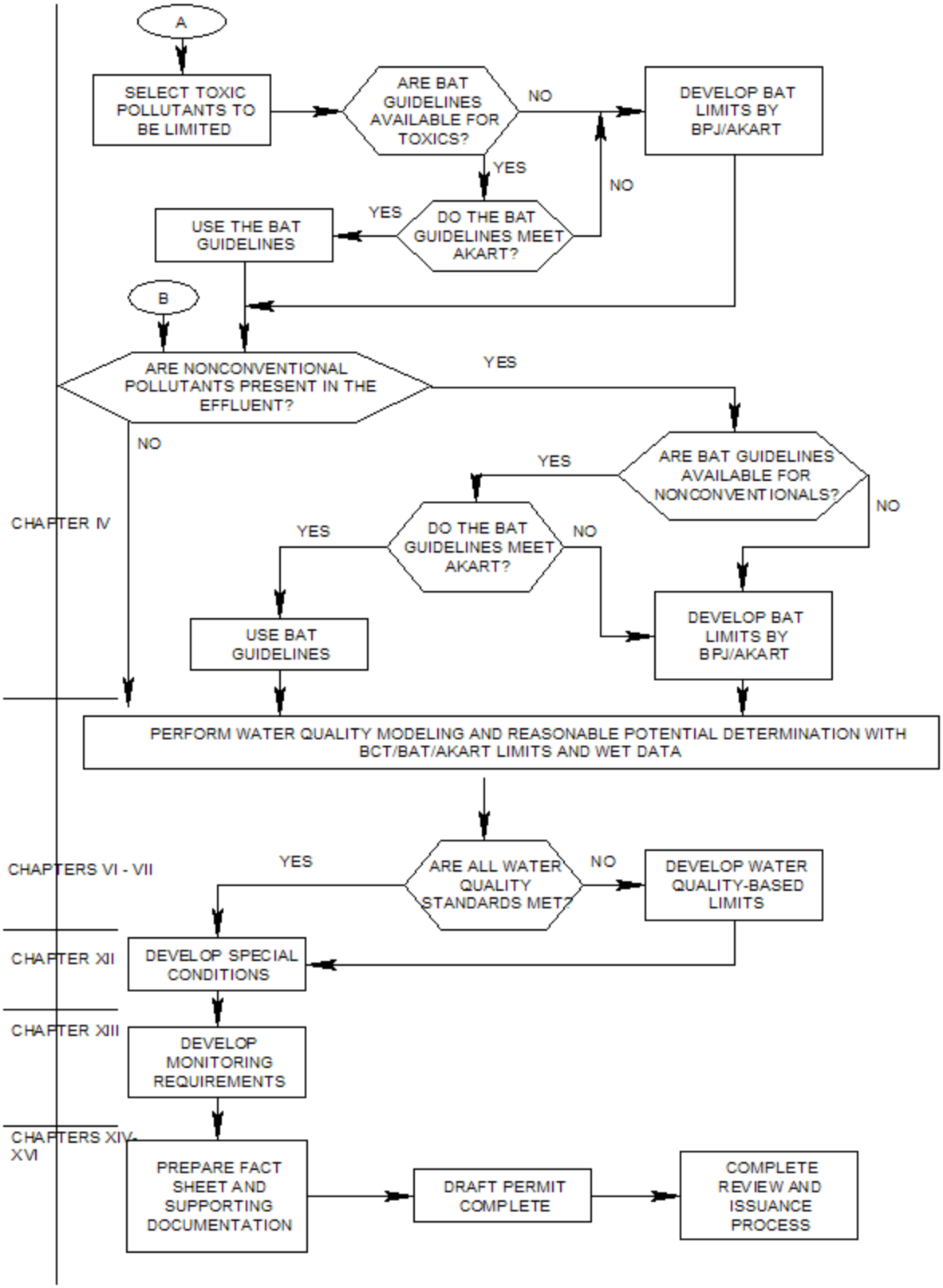
The Council will consider all comments received by 5 pm on August 2, 2010 in formulating a final determination to issue, revise, or deny the permit. The Council's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Council by telephone at (360) 956-2124, at the EFSEC web site at www.efsec.wa.gov, or by writing to the address

Appendix B

Flow Diagram of Permit Development Process


IS APPLICANT A NEW SOURCE?
YES
REQUIRE ENGINEERING REPORT OR SUPPLEMENTAL INFORMATION THROUGH SEPA
NO
REVIEW PERMIT APPLICATION
YES
IS REPORT COMPLETE?
NO
IS APPLICATION COMPLETE?
NO
REQUEST NEW APPLICATION OR SUPPLEMENTAL INFORMATION
YES
START PUBLIC NOTICE
REVIEW BACKGROUND INFORMATION
INSPECT EXISTING SOURCE
REQUEST SUPPLEMENTAL INFORMATION
NO
ARE COMPILED DATA ADEQUATE TO BEGIN PERMIT?
YES
CHAPTERS II AND III
ARE BCT EFFLUENT GUIDELINES AVAILABLE?
YES
ARE CONVENTIONAL POLLUTANTS PRESENT?
YES
NO
DO BCT GUIDELINES MEET AKART?
DEVELOP BCT LIMITS BY BPJ
NO
USE BCT GUIDELINES
DOES THE FACILITY HAVE KNOWN, PROBABLE, OR POTENTIAL PROBLEMS WITH SURFACE RUNOFF, SPILLS, OR LEAKS OF POLLUTANTS OR ARE HAZARDOUS WASTES STORED OR DISPOSED ON SITE?
CHAPTER IV
YES
NO
CHAPTER XII
GO TO A
YES
ARE TOXIC POLLUTANTS PRESENT IN THE EFFLUENT?
REQUIRE A POLLUTION PREVENTION PLAN OR DEVELOP SPECIFIC BMPs
GO TO B
NO


A
SELECT TOXIC POLLUTANTS TO BE LIMITED
ARE BAT GUIDELINES AVAILABLE FOR TOXICS?
NO
DEVELOP BAT LIMITS BY BPJ/AKART
YES
NO
DO THE BAT GUIDELINES MEET AKART?
YES
USE THE BAT GUIDELINES
B
ARE NONCONVENTIONAL POLLUTANTS PRESENT IN THE EFFLUENT?
YES
NO
ARE BAT GUIDELINES AVAILABLE FOR NONCONVENTIONALS?
YES
NO
CHAPTER IV
DO THE BAT GUIDELINES MEET AKART?
YES
NO
USE BAT GUIDELINES
DEVELOP BAT LIMITS BY BPJ/AKART
PERFORM WATER QUALITY MODELING AND REASONABLE POTENTIAL DETERMINATION WITH BCT/BAT/AKART LIMITS AND WET DATA
CHAPTERS VI - VII
YES
ARE ALL WATER QUALITY STANDARDS MET?
NO
DEVELOP WATER QUALITY-BASED LIMITS
CHAPTER XII
DEVELOP SPECIAL CONDITIONS
CHAPTER XIII
DEVELOP MONITORING REQUIREMENTS
CHAPTERS XIV-XVI
PREPARE FACT SHEET AND SUPPORTING DOCUMENTATION
DRAFT PERMIT COMPLETE
COMPLETE REVIEW AND ISSUANCE PROCESS

Appendix C

Spreadsheets Used to Calculate Effluent Limits

AMMONIA CRITERIA -- CALCULATION OF RECEIVING WATER pH, TEMPERATURE, HARDNESS

Date	pH	Temp
6/19/2006	7.37	17.3
7/24/2006	7.75	25.4
8/21/2006	7.8	20.1
9/25/2006	7.76	16.3
10/18/2006	7.61	12.3
11/15/2006	6.77	8.3
12/20/2006		5
1/24/2007	7.35	5.9
2/14/2007	7.34	7.4
3/21/2007	7.18	8.6
4/25/2007	7.21	11.8
5/23/2007	7.62	14.5
6/13/2007	7.5	16.3
7/18/2007	7.6	20
8/21/2007	7.98	19
9/25/2007	8.04	15.4
10/30/2007	7.36	
11/27/2007	7.26	4.6
12/17/2007	7.14	6
1/28/2008	7.08	2.8
2/27/2008	7.13	7.7
3/18/2008	7.17	7.4
4/22/2008	7.31	7.9
5/20/2008	7.55	17.4
6/17/2008	7.46	15.3
7/22/2008	7.81	19.2
8/19/2008		20.4
9/23/2008	7.87	15.7

Date	pH	Temp
6/19/2006	7.37	17.3
7/24/2006	7.75	25.4
8/21/2006	7.8	20.1
9/25/2006	7.76	16.3
6/13/2007	7.5	16.3
7/18/2007	7.6	20
8/21/2007	7.98	19
9/25/2007	8.04	15.4
6/17/2008	7.46	15.3
7/22/2008	7.81	19.2
8/19/2008		20.4
9/23/2008	7.87	15.7

90th %ile 7.98 20.37

HARDNESS
42.00
42.00
45.00
42.00
39.00
40.00
39.00
42.00
42.00
39.00
36.00
18.00
27.00
30.00
20.00
21.00
20.00
25.00
23.00
21.00

10th %ile 20.00

Ammonia - Receiving Water Characterization

6/19/2006	0.012
7/24/2006	0.01
8/21/2006	0.01
9/25/2006	0.016
6/13/2007	0.017
7/18/2007	0.012
8/21/2007	0.01
9/25/2007	0.013
6/17/2008	0.014
7/22/2008	0.01
8/19/2008	0.011
9/23/2008	0.011

90th %ile 0.016

Freshwater un-ionized ammonia criteria based on Chapter 173-201A WAC
Amended November 20, 2006

INPUT

1. Temperature (deg C):	20.37
2. pH:	7.98
3. Is salmonid habitat an existing or designated use?	Yes
4. Are non-salmonid early life stages present or absent?	Present

OUTPUT

1. Unionized ammonia NH3 criteria (mgNH3/L)	
Acute:	0.265
Chronic:	0.042
2. Total ammonia nitrogen criteria (mgN/L):	
Acute:	5.831
Chronic:	0.922

PERFORMANCE-BASED EFFLUENT LIMITS FOR AMMONIA

USE EXCEL TO PERFORM THE LOGNORMAL TRANSFORMATION
AND CALCULATE THE TRANSFORMED MEAN AND VARIANCE

LOGNORMAL TRANSFORMED MEAN =	1.5067
LOGNORMAL TRANSFORMED VARIANCE =	1.1346
NUMBER OF SAMPLES/MONTH FOR COMPLIANCE MONITORING =	4
AUTOCORRELATION FACTOR(ne)(USE 0 IF UNKNOWN) =	0
E(X) =	0.3909
V(X) =	0.322
VARn	0.4236
MEANn=	1.1512
VAR(Xn)=	0.081
MAXIMUM DAILY EFFLUENT LIMIT =	2.640
AVERAGE MONTHLY EFFLUENT LIMIT =	0.923

0.922615 0.857857

SPREADSHEET CREATED BY D. NUNNALLEE, REV. 1-92 BY G. SHERVEY											
Last revision date 9/03	FILENAME:										
FACILITY:	RUN DATE 7/1/2010										
	PREPARED BY:										
WATER QUALITY CRITERIA (in ug/L unless otherwise noted)											
	PRIOR	CAR	Water Quality Criteria				Human Health Criteria		Organoleptic	Metals Translators	
	ITY	CIN	Fresh		Marine				Effects	Freshwater	
Pollutant, CAS No. & Application Ref. No.	PLTNT	GEN?	acute	chronic	acute	chronic	Fresh	Marine		Acute	Chronic
ALKALINITY	N	N		20,000.							
ALUMINUM, total recoverable, pH 6.5-9.0 7429905	N	N	750								
ANTIMONY (INORGANIC) 7440360 1M	Y	N					14	4300			
ARSENIC (dissolved) 7440382 2M	Y	Y	360	190	69	36				1.00	1.00
ARSENIC (inorganic)	Y	Y					0.018	0.14			
CADMIUM - 7440439 4M Hardness dependent	Y	N	0.65	0.31	42.00	9.3				0.94	0.94
CHLORIDE (dissolved) in mg/L 16887006	N	N	860	230							
CHROMIUM(HEX) 18540299	Y	N	15	10	1100	50				0.982	0.962
CHROMIUM(TRI) -16065831 5M Hardness dependent	N	N	311.04	100.90							
COPPER - 744058 6M Hardness dependent	Y	N	3.74	2.87	4.80	3.10			1000.00	0.996	0.996
SOLIDS,DISSOLVED AND SALINITY	N	N		See Gold Book			250000.00				
IRON 7439896	N	N		1000			300.00				
LEAD - 7439921 7M Dependent on hardness	Y	N	10.79	0.42	210.00	8.10				0.47	0.47
MANGANESE 7439965	N	N					50.00	100.00			
MERCURY 7439976 8M	Y	N	2.10	0.012	1.80	0.0250	0.14	0.15		0.85	
NITRATE/NITRITE (N)	N	N					10000.00				
pH	N	N		6.5 - 8.5		7.0 - 8.5					
PHENOL 108952 10A	Y	N					21000	4600000	300		
SELENIUM 7782492 10M	Y	N	20	5	290	71	170.00	4200.00			
SILVER - 7740224 11M dependent on hardness.	Y	N	0.22	NA	1.90	NA				0.85	
SULFIDE, HYDROGEN SULFIDE 7783064	N	N		2.0		2.0					
THALLIUM 7440280 12M	Y	N					1.70	6.30			
ZINC- 7440666 13M hardness dependent	Y	N	29.27	26.72	90.00	81.00			5000.00	0.996	0.996

REASONABLE POTENTIAL CALCULATION

NPDES Permit No.

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 Technical Support Document for Water Quality-based Toxics Control, 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

				State Water Quality Standard		Max concentration at edge of...											
	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value		Max effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Parameter	Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*			*Pn*	*ug/L*	*CV*	*s*	*n*			
Ammonia				5.831	0.922	2.32	0.77	NO	0.95	0.922	2.05	0.60	0.55	37	1.13	1	3
Chloride				860000	230000	########	205029.01	NO	0.95	0.922	181000	0.60	0.55	37	1.13	1	1
Alkalinity				1000000	20000	75896.77	18974.19	NO	0.95	0.224	20000	0.60	0.55	2	3.79	1	4
Sulfide				1000000	2000.000	7589.68	1897.42	NO	0.95	0.224	2000.00	0.60	0.55	2	3.79	1	4
Aluminum				750.000	1000000	43.64	43.64	NO	0.95	0.224	11.50	0.60	0.55	2	3.79	1	1
Iron				1000000	1000.000	294.86	294.86	NO	0.95	0.224	77.70	0.60	0.55	2	3.79	1	1
Arsenic	1.00	1.00		360.000	190.000	155.97	155.97	NO	0.95	0.224	41.10	0.60	0.55	2	3.79	1	1
Copper	0.996	0.996		3.74	2.87	3.59	2.69	NO	0.95	0.224	5.70	0.60	0.55	2	3.79	6	8
Selenium				20.000	5.000	4.17	4.17	NO	0.95	0.224	1.10	0.60	0.55	2	3.79	1	1
Zinc	0.996	0.996		29.270	26.720	26.33	26.33	NO	0.95	0.224	20.90	0.60	0.55	2	3.79	3	3

WATER QUALITY BASED
PERMIT LIMIT CALCULATIONS

Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone.

	Permit Limit Calculation Summary									Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations							Statistical variables for permit limit calculation				
	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translator	Metal Criteria Translator	Ambient Concentration	Water Quality Standard Acute	Water Quality Standard Chronic	Average Monthly Limit (AML)	Maximum Daily Limit (MDL)	WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	LTA Coeff. Var. (CV)	LTA Prob'y Basis	Limiting LTA	Coeff. Var. (CV)	AML Prob'y Basis	MDL Prob'y Basis	# of Samples per Month	
PARAMETER			Acute	Chronic	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	decimal	decimal	ug/L	decimal	decimal	decimal	n	
Copper	6.0	8.0	0.996	0.996		3.74	2.87	**11.2**	**22.5**	22	22.96	7.2	12.1	0.60	0.99	7.2	0.60	0.95	0.99	4.00	1.00
Zinc	3.0	3.0	0.996	0.996		29.27	26.72	**43.9**	**88.2**	88	80.16	28.2	42.3	0.60	0.99	28.2	0.60	0.95	0.99	4.00	1.00
														0.60	0.99		0.60	0.95	0.99	4.00	1.00
														0.60	0.99		0.60	0.95	0.99	4.00	1.00
														0.60	0.99		0.60	0.95	0.99	4.00	1.00
														0.60	0.99		0.60	0.95	0.99	4.00	1.00
														0.60	0.99		0.60	0.95	0.99	4.00	1.00
														0.60	0.99		0.60	0.95	0.99	4.00	1.00
														0.60	0.99		0.60	0.95	0.99	4.00	1.00
														0.60	0.99		0.60	0.95	0.99	4.00	1.00
														0.60	0.99		0.60	0.95	0.99	4.00	1.00
														0.60	0.99		0.60	0.95	0.99	4.00	1.00
														0.60	0.99		0.60	0.95	0.99	4.00	1.00
														0.60	0.99		0.60	0.95	0.99	4.00	1.00

This spreadsheet calculates water quality based permit limits based on the two value steady state model using the State Water Quality standards contained in WAC 173-201A. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 99. Last revision date 9/98. Written by G. Shervey

PERFORMANCE-BASED EFFLUENT LIMITS FOR CHROMIUM

USE EXCEL TO PERFORM THE LOGNORMAL TRANSFORMATION
AND CALCULATE THE TRANSFORMED MEAN AND VARIANCE

LOGNORMAL TRANSFORMED MEAN =	2.0190
LOGNORMAL TRANSFORMED VARIANCE =	0.4029
NUMBER OF SAMPLES/MONTH FOR COMPLIANCE MONITORING =	4
AUTOCORRELATION FACTOR(ne)(USE 0 IF UNKNOWN) =	0
E(X) =	9.2115
V(X) =	42.100
VARn	0.1169
MEANn=	2.1620
VAR(Xn)=	10.525
MAXIMUM DAILY EFFLUENT LIMIT =	32.964
AVERAGE MONTHLY EFFLUENT LIMIT =	15.249

15.24865 14.54862

PERFORMANCE-BASED EFFLUENT LIMITS FOR IRON

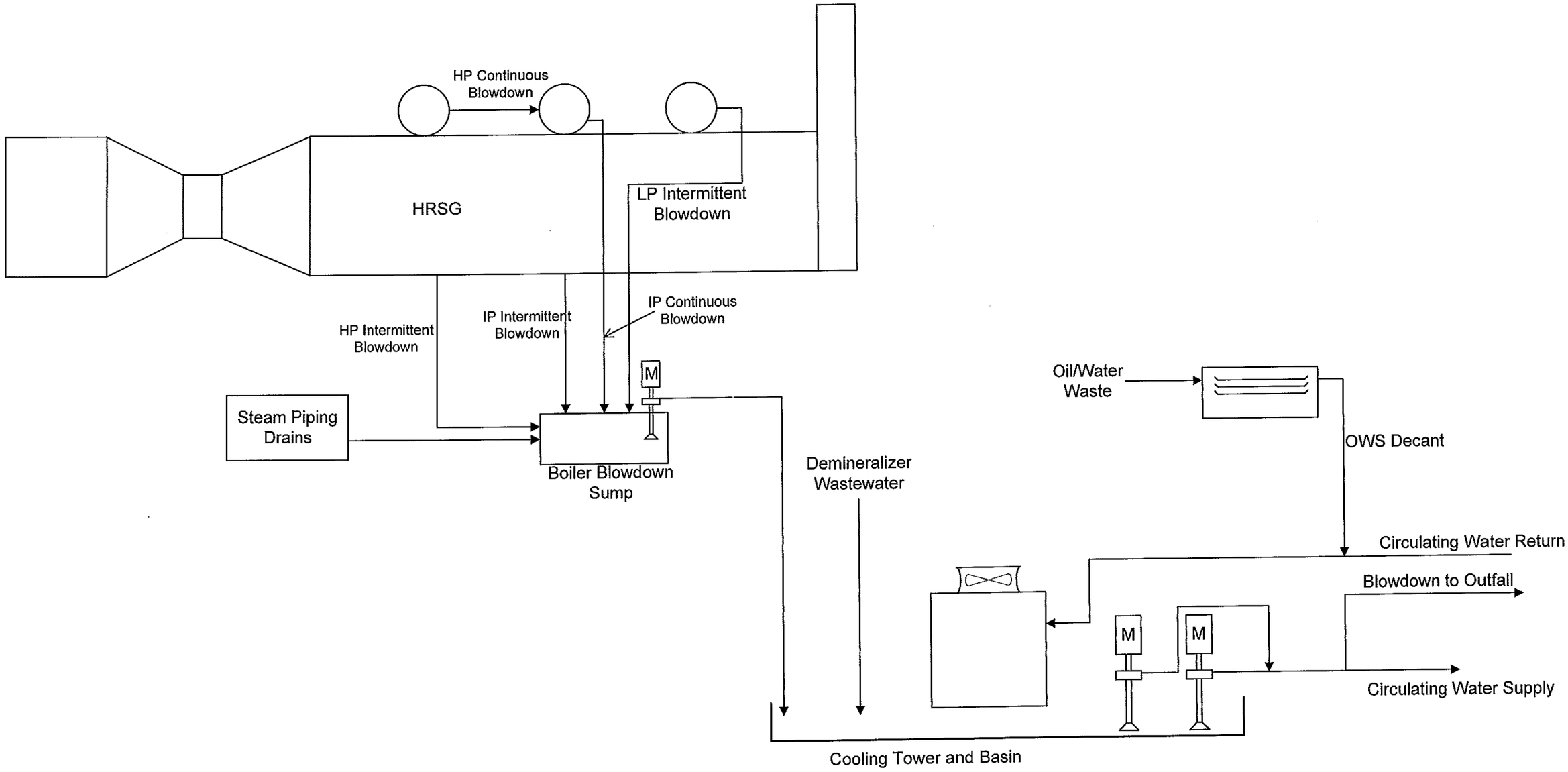
USE EXCEL TO PERFORM THE LOGNORMAL TRANSFORMATION
AND CALCULATE THE TRANSFORMED MEAN AND VARIANCE

LOGNORMAL TRANSFORMED MEAN =	-0.0134
LOGNORMAL TRANSFORMED VARIANCE =	1.4226
NUMBER OF SAMPLES/MONTH FOR COMPLIANCE MONITORING =	4
AUTOCORRELATION FACTOR(ne)(USE 0 IF UNKNOWN) =	0
E(X) =	2.0094
V(X) =	12.711
VARn	0.5805
MEANn=	0.4076
VAR(Xn)=	3.178
MAXIMUM DAILY EFFLUENT LIMIT =	15.813
AVERAGE MONTHLY EFFLUENT LIMIT =	5.264

5.264351 4.941825

Appendix D

Flow Diagram of Process Wastewater System



Wastewater Flow Diagram
Sketch 010509A
KW

STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL
PO Box 43172 • Olympia, Washington 98504-3172

FACT SHEET
SATSOP COMBUSTION TURBINE PROJECT
NPDES PERMIT WA-002496-1

SUMMARY

The Energy Facility Site Evaluation Council (Council) has made a tentative determination to reissue a National Pollutant Discharge Elimination System (NPDES) permit to Grays Harbor Energy LLC for discharge to the Chehalis River, of wastewaters associated with combustion turbine 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.

EFSEC issued site certifications for the WPPSS Nuclear Power Projects WNP-3 and WNP-5, of which Satsop CT is located on a portion, on October 27, 1976. Construction on WNP-5 and WNP-3 was halted prior to completion in 1983. An Amended Site Certification Agreement (SCA) authorizing the construction of the 490-MW Satsop CT Project and associated 48-mile natural gas pipeline was issued May 21, 1996.

In September of 2002, Duke Energy North America suspended construction of the Satsop CT Project until its sale to Invenergy LLC in March 2005.

In April 2005 the Site Certificate was amended to reflect the sale of the project from Duke Energy to Grays Harbor Energy LLC (a subsidiary of Invenergy Inc.) Construction was restarted in February 2007 with completion in spring of 2008.

As a new facility, the application for the permit contained little or no empirical discharge data to evaluate. Setting permit limitations under these circumstances was inherently problematic. Consequently, the proposed permit contains interim permit limits/monitoring and a Schedule of Compliance.

The Schedule of Compliance requires the Permittee to:

- Determine whether "all known, available and reasonable methods of prevention, control and treatment" (AKART) have been applied to its discharges, by developing an engineering report in accordance with WAC 173-240-130 and -160 that the Permittee shall submit to the Council for review and approval.
- Assess pollutants in the discharge for compliance with the applicable surface water quality standards.
- Calculate revised water quality-based limits.

The goal of the Schedule of Compliance is to verify compliance with the state's Surface Water Quality Standards (Chapter 173-201A WAC), Sediment Management Standards (Chapter 173-204 WAC), Ground Water Quality Standards (173-200 WAC), the human health criteria contained in the National Toxics Rule, and demonstrate AKART.

The proposed permit contains interim effluent limits to allow the Permittee the opportunity to assess compliance of its discharges with the applicable water quality standards.

The Council will revise effluent limitations and monitoring schedules based on the findings of the approved engineering report and other studies. Changes to the permit will be incorporated through a permit modification in accordance with the requirements of WAC 463-76-041, WAC 463-76-042, and WAC 463-76-043.

Definitions

Bonneville Power Administration (BPA) – Operators of the northwest U.S. electric power grid including transmission lines to the Satsop CT Project site.

Duke Energy Grays Harbor LLC (Duke Energy) – A subsidiary of Duke Energy North America. Duke Energy was the previous owner of the Satsop CT Project site and began construction of the Satsop CT Project.

Energy Facility Site Evaluation Council (EFSEC or Council) – The Council coordinates all of the evaluation and licensing steps for siting major energy facilities in Washington. If a project is approved, EFSEC specifies the conditions of construction and operation, issues permits in lieu of any other individual state or local agency authority, and manages an environmental and safety oversight program of facility and site operations.

Energy Northwest – Energy Northwest was to operate the Satsop CT Project prior to the sale of the project. Energy Northwest was known as Washington Public Power Supply System (WPPSS) until November 19, 1998, when the WPPSS executive board voted to change the name. WPPSS is the original Site Certification Agreement holder and site owner for the Satsop Nuclear Power Projects No. 3 (WNP-3) and 5 (WNP-5).

Grays Harbor Energy LLC - Grays Harbor Energy LLC is the current owner of the Satsop CT Project having purchased the project from Duke Energy North America in March of 2005. Construction of the project resumed in February of 2007 and is scheduled to be complete in Spring of 2008.

Grays Harbor Public Development Authority (PDA) – A public corporation composed of Grays Harbor County, Public Utilities District No. 1 of Grays Harbor County, and the Port of Grays Harbor that was established to oversee the Satsop Development Park.

INTRODUCTION

The Federal Clean Water Act (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 (NPDES) of 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 80.50 RCW and Chapter 90.48 RCW define 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 463-38 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 water can be discharged into waters of the state. The regulations also establish the basis for effluent limitations and other requirements that are to be included in the permit. One of the requirements (WAC 463-38-033 and 034) for issuing a permit under the NPDES permit program is the preparation of a tentative determination or draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least 30 days before the permit is issued (WAC 463-38-034). The fact sheet and draft permit are available for review (see Appendix A, Public Involvement, for more detail on the public notice procedures). General information about this project is listed in Table 1. A glossary of terms used in this fact sheet is included in Appendix B.

Table 1: General Information

Applicant	Grays Harbor Energy LLC
Facility Name and Address	Satsop Combustion Turbine (CT) Project P.O. Box 26 Satsop, WA 98583
Type of Facility	Electrical Energy Generation
SIC Code	4911
Discharge Location Outfall 001	Chehalis River (River Mile 19.7) Latitude: 46° 58' 19" N Longitude: 123° 29' 18" W
Water Body ID Number	WA-22-4040
Discharge Location Outfall 002B	Satsop Public Development Authority pond, immediately west of Keys Road, ultimately discharges either to ground or the Chehalis River.

The applicant has reviewed the fact sheet and draft permit. Errors and omissions identified during 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 respond 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 resulting changes to the permit will be summarized in Appendix D, Response to Comments.

BACKGROUND INFORMATION

History

Site Location and Description

The Satsop Combustion Turbine Project is located on 22 acres within an existing construction staging area on the former Satsop Nuclear Power Plant Site. Grays Harbor Energy LLC owns the project and will operate the project. The Grays Harbor PDA now owns and administers most of the surrounding land. Construction of the Satsop CT Project, which began in September 2001, is complete. The existing NPDES permit authorizes discharge of wastewater to the Chehalis River at Outfall 001 located at river mile 19.7.

Stormwater is discharged to a detention pond (C-1) adjacent to the CT Project site. This pond is located on property owned by the PDA and ultimately discharges to the Chehalis River at river mile 21.8.

Site History

EFSEC issued site certifications for the WPPSS Nuclear Power Projects WNP-3 and WNP-5, of which Satsop CT is located on a portion, on October 27, 1976. Construction was initiated on both WNP-3 and WNP-5 in 1977. Construction on WNP-5 was halted prior to completion in 1982. Construction on WNP-3 was halted in 1983.

A Final EIS was published in November 1995 for a gas Combustion Turbine (CT) Project. An Amended Site Certification Agreement (SCA) authorizing the construction of the 490-MW Satsop CT Project and associated 48-mile natural gas pipeline was issued May 21, 1996. On August 12, 1999, the terms and conditions for WNP-3 and WNP-5 were removed from the SCA. On February 12, 2001, the Council approved by resolution (No. 297) the addition of Duke Energy as a co-agreement holder with Energy Northwest. On April 13, 2001, the Council approved by resolution (No. 298) a change in turbine model from Westinghouse to General Electric, which will increase power output from 490 MW to 650 MW.

In September of 2002, Duke Energy North America suspended construction of the Satsop CT Project until its sale to Invenergy LLC in March 2005.

In April 2005 the Site Certificate was amended to reflect the sale of the project from Duke Energy to Grays Harbor Energy LLC (a subsidiary of Invenergy Inc.) Construction was restarted in February 2007 and completed in spring of 2008.

Permit History

The Thermal Power Plant Site Evaluation Council (precursor to EFSEC) approved an NPDES permit (issued April 12, 1976) for WNP-3 and WNP-5 as part of the nuclear electric generating facility SCA executed on October 27, 1976. However, WNP-3 and WNP-5 were never completed.

In 1995 the project changed from a nuclear power plant to a gas-fired combustion turbine. The 1996 permit, and subsequent permits, reflects this fundamental change in the project.

Industrial Process

Overview of the Existing Facility

The primary activity at the site will be the production of commercial electrical power from a natural gas-fired combined-cycle electric generation facility. Its design includes two GE 7FA gas combustion turbine generators (CTG) that each produce approximately 175 MW, two heat recovery steam generators that use the high temperature exhaust from the CTGs to create steam, and one steam turbine generator with a gross capacity of approximately 300 MW (yielding a combined gross generating capacity of 650 MW).

Process Wastewater

Two separate water streams will enter the discharge conveyance to surface water at Outfall 001:

Cooling tower blowdown (industrial wastewater)
Oil/water separator discharge (industrial wastewater)

Process water from the cooling tower system that cools the condenser and associated machinery (circulated at approximately 175,000 gallons per minute) is cooled, in turn, by an evaporative process in 9 mechanical draft-cooling towers and recycled.

Cooling tower evaporation and "drift" losses average 3,200-3,300 gallons per minute (gpm) at full load. Even with replenishing these losses with new water, the evaporation concentrates the dissolved solids in the circulating water to the point that they would cause excessive deposition in the system, impeding efficiency. To limit the buildup of mineral salts, a small portion of the water is released to the river as "blowdown." Chemicals also are added to retard deposition of solids and to limit corrosion and biological growth in the system. The almost continuous blowdown discharge, expected to be less than 700 gpm, would contain heat, residuals from any treatment additives, constituents present in the supply water (concentrated by evaporation), and products used to prevent system corrosion.

The second wastewater stream is generated from the plant equipment that has passed through the oil/water separator. This process is almost continuous and is expected to be about 25 gpm.

Water Pollution Control Measures

<u>Cooling Tower Blowdown</u>

The cooling water system will use a circulating cooling tower consisting of 9 cells that are cooled by water withdrawn from the Ranney Wells. Sodium hypochlorite will be added to the system to prevent microbiological growth. If chlorine is detectable, sodium bisulfite will be added to the cooling tower blowdown to neutralize the residual chlorine. The treated blowdown

will be discharged so that the daily maximum free available chlorine will be less than 0.5 mg/L, and the monthly average will be less than 0.2 mg/L.

The circulating cooling water in the main condenser will be adjusted for pH to ensure that blowdown discharges are within effluent limits. This would involve the addition of sulfuric acid to depress pH, which would be higher than the effluent limit.

Oil/Water Separator

An oil/water separator will collect water from waste streams that may potentially contain oily water, such as the steam turbine purification system and equipment and floor drains. The oil/water separator will be designed to produce an effluent of less than 15 parts per million (ppm) of oil. Water from the oil/water separator will be mixed with the cooling tower blowdown water before entering the blowdown line. A reservoir connected to the oil/water separator will collect the waste oil for offsite recycling.

Chemical Additives

Chemicals are added to the main condenser cooling water to maintain cooling efficiency and protect the system components from corrosion. Chemicals proposed for use in the cooling tower are summarized in Table 2.

Table 2: Chemical Additives used in Cooling Water System (per Unit)

Chemical	**Description and Use**
Nalco – Dynacool – 3DT195 or equivalent	Liquid polymeric dispersant used in circulating water treatment system
Nalco – Dynacool – 3DT285 or equivalent (corrosion inhibitor: phosphonate, phosphonocarboxylate, tolytriazole)	Liquid phosphate-based corrosion inhibitor used in circulating water treatment system
Dispersant	Occasional treatment to release scale
Biodispersant	Occasional treatment to release biological growth
Sodium hypochlorite	Liquid treatment chemical for the cooling tower
Sulfuric acid	Liquid water treatment chemical used in demineralizer and neutralization tank

Sanitary Waste

Sanitary sewage for the Satsop CT Project will be treated in a septic tank system and discharged to a drainfield at the project site. The sanitary waste stream flow to the onsite system is less than 3,500 gallons per day, which is regulated by the Grays Harbor County Health Department. On June 13, 2002, Grays Harbor County approved the sanitary waste facility design for the CT Project.

Discharge Outfalls

Outfall 001

Outfall 001 enters the Chehalis River at river mile 19.7, downstream of the confluence with the Satsop River. The conveyance pipe to the outfall consists of a combination of 21-inch-diameter reinforced concrete pipe, 20-inch-diameter carbon steel pipe, and 18-inch-diameter carbon steel pipe that extends north and below the Chehalis River to the diffuser structure. The diffuser structure was replaced in late 2002 with 2 12-inch Tideflex "duckbill" type diffusers attached to the existing 18-inch discharge pipe.

Other than initial testing of the water systems in the early 1980s, there have been no discharges through Outfall 001.

The outfall in the Chehalis river was improved and was last inspected May 24, 2007.

Discharge to Ground - Outfall 002B

Stormwater from the permittee's site is collected in a storm sewer system and conveyed through a pipe beneath Keys Road and discharged to a small pond. This pond is designated the Keys Road pond. The point at which the permittee's storm sewer enters manhole 12 (MH-12) near the facility's main entrance is the designated sample location for the facility's stormwater discharge, at least initially. This sample location was chosen because both the Keys Road and C-1 ponds receive stormwater discharges from surrounding properties that are not under the control of the permittee. This sample location may change after the engineering report is approved.

Wastewater Characterization

There is no wastewater characterization data available for permittee's newly-completed facility.

PROPOSED PERMIT LIMITATIONS

Federal and state regulations require that effluent limitations set forth in a NPDES permit must be evaluated on a technology or water quality basis. Technology-based limitations use available treatment methods to reduce 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 must comply with the surface water quality standards (Chapter 173-201A WAC), groundwater standards (Chapter 173-200 WAC), sediment quality standards (Chapter 173-204 WAC), or the National Toxics Rule (40 CFR 131.36). The more stringent of technology-based or water quality-based limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

Schedule of Compliance

On October 18, 2001, Duke Energy, the previous permit holder, submitted a draft engineering report to Ecology for review as part of the application for renewal of the existing permit. In a letter dated November 29, 2001, Ecology rejected the engineering report. The primary deficiency cited in the letter was the absence of an AKART analysis. EFSEC's file contains references to a meeting with Duke Energy, Ecology, and EFSEC held on January 8, 2002, at which the issue was discussed.

The permit was issued in 2002 and rather than explicitly requiring submittal of an engineering report, Special Condition S10 required the permittee to conduct an evaluation of the process wastewater discharge to determine if treatment of pollutants in the discharge "is required." The permit did not require submittal of an engineering report, developed in accordance with Chapter 173-240 WAC, and the fact sheet did not explain why an engineering report was not required.

In June, 2007, the permittee submitted an engineering report containing an analysis of the process wastewater discharge, a mixing zone analysis, and an AKART analysis with its application for permit renewal (*Engineering Report, 2007*). The engineering report does not meet the standard required in Chapter 173-240 WAC (Submission of plans and reports for construction of wastewater facilities).

The engineering report assumed the federal technology standards would fulfill the state's AKART requirement. The report concluded that compliance with the federal treatment standards constituted compliance with the AKART requirement and dilution in the mixing zones constituted compliance with the water quality standards. The engineering report was inadequate to comply with state requirements.

RCW 90.52.040 and WAC 463-76-053(1) require that all known, available and reasonable methods of prevention, control and treatment (AKART) be applied to discharges to waters of the state. For industrial dischargers, AKART is determined in an engineering report, subject to review and approval by the Council. At this time (March 2008), an approved wastewater treatment engineering report for this facility does not exist.

An engineering report is required to determine AKART because the state has not developed AKART for this type of industrial activity and the effluent limitation guidelines in 40 CFR Part 423 are approximately 25 years old. Ecology's generally considers federal effluent limitation guidelines more than 10 years old to be outdated (Permit Writers Manual, p. IV-6).

At this time (March 2008) construction of the facility is complete and commercial operation is anticipated by July 1, 2008. The permittee does not have sufficient time to develop and submit a wastewater treatment engineering report to demonstrate compliance with AKART before commercial operation begins. The Council has determined that the most effective way to address this situation is to incorporate a schedule of compliance into the proposed permit that requires submittal to the Council of an engineering report for review and approval. The engineering report must comply with the rigorous requirements of Chapter 173-240 WAC. The schedule of compliance also requires demonstration of compliance with applicable water quality standards, using approved effluent mixing models and whole effluent toxicity testing. The

permittee's discharges must comply with all applicable narrative and numeric water quality standards, including the state's antidegradation policy, in accordance with WAC 463-76-053(1)(b). The permittee is required to assess all pollutants in the discharge, including temperature, nutrients, suspended solids, chemical additives. The engineering report is required to address all process wastewater and stormwater discharges from the facility.

The Council's rationale for the schedule of compliance is that the permittee was never explicitly required to conduct a rigorous engineering evaluation, but has indicated the willingness to comply with all regulatory requirements. The schedule of compliance allows the permittee an opportunity to demonstrate compliance with AKART and the water quality standards using actual discharge data.

Any proposed revisions to the permit that result from the schedule of compliance will be incorporated into the permit after the appropriate public notice requirements have been fulfilled.

Interim Effluent Limits

Interim limits were determined using Technology based guidelines from EPA; and water quality-based limits, developed with a reasonable potential spreadsheet, using estimated pollutant discharge levels and dilution factors from an EFSEC approved mixing zone analysis. (See spreadsheets in Appendix C).

Technology-Based Effluent Limitations

EPA has established technology-based effluent limit guidelines for certain categories of industries. Steam-generated electric power is one such industry, with limitations codified in 40 CFR Part 423. These will be applied to the pertinent discharges from this site.

Cooling Water Blowdown Discharge – Outfall 001

Table 3 lists the EPA guidelines for recirculated cooling water limits:

Table 3: EPA Limit Guidelines for Recirculated Cooling Water

Parameter	Daily Maximum	Monthly Average
pH	Within 6.0 and 9.0	Within 6.0 and 9.0
Free available chlorine	0.5 mg/L (Note 1)	0.2 mg/L
Appendix A (40 CFR 423) priority pollutants except chromium and zinc	Note 2	Note 2
Chromium, total	0.2 mg/L	0.2 mg/L
Total suspended solids	50.0 mg/L	30.0 mg/L
PCBs	Note 2	Note 2

1 Discharge is limited to two hours in any one day, and not more than one unit in any plant may discharge at any one time unless facility can demonstrate to Council that facility cannot operate at or below this level of chlorination.
2 No detectable amount.

Oil/Water Separator Discharges – Outfall 001

Table 4 lists the EPA limit guidelines for low volume waste sources and chemical metal cleaning wastes included in the oil/water separator discharge:

Table 4: EPA Limit Guidelines for Low Volume Waste Sources and Chemical Metal Cleaning Wastes

Parameter	Daily Maximum	Monthly Average
Total suspended solids	100.0 mg/L	30.0 mg/L
Copper	1.0 mg/L	1.0 mg/L
Oil and grease	20.0 mg/L	15.0 mg/L
Iron, total	1.0 mg/L	1.0 mg/L

For this permit, four separate waste streams for the existing Outfall 001 are reduced to two proposed waste streams. The existing low volume waste sources and chemical metal cleaning waste streams are proposed to be included in the oil/water separator discharge to Outfall 001. The existing industrial wastewater and cooling water blowdown discharges are proposed to be included in the cooling water blowdown discharge. The existing once-through cooling water waste stream no longer exists and is not included in the cooling water blowdown discharge.

Surface Water Quality-Based Effluent Limits

The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) were designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet established surface water quality standards (WAC 173-201A-060). The Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily loading study (TMDL).

Numerical Criteria for the Protection of Aquatic Life and Recreation--

"Numerical" water quality criteria are numerical values published 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 to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria 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 limits, the permit must include the water quality-based limits.

Numerical Criteria for the Protection of Human Health--

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (EPA 1992). These criteria are designed to protect humans from cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The Water Quality Standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria--

Narrative water quality criteria (e.g., WAC 173-201A-260(2); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-600, and WAC 173-201A-602; 2006) and of all marine waters (WAC 173-201A-610, 612; 2006) in the State of Washington.

Antidegradation--

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities that are likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three Tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

This facility must meet Tier I requirements.

- Existing and designated uses must be maintained and protected. No degradation may be allowed that would interfere with, or become injurious to, existing or designated uses, except as provided for in this chapter.

At this time, EFSEC does not know whether the permittee's discharge complies with the state's Anti-degradation policy because the facility is not operational. Special Condition S.5 requires the permittee to assess compliance with water quality standards within the engineering report.

Critical Conditions

Surface water quality-based limits are derived for the water body's critical condition, which 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.

Designated Uses and Surface Water Quality Criteria

The facility discharges to the Chehalis River. Other nearby point-source discharge includes the Elma Sewage Treatment Plant. Significant nearby non-point sources of pollutants include agricultural activities.

> Aquatic life uses are designated for the Lower Chehalis River receiving waters. All indigenous fish and nonfish aquatic species must be protected in waters of the state. The receiving water supports salmonid migration and rearing; and other fish migration, rearing, and spawning. Other uses include primary contact recreational use, all water supply uses, wildlife habitat, harvesting, navigation/boating, and aesthetic uses.

The Chehalis River near Outfall 001 is on the 303(d) list because of excursions of fecal coliform and temperature beyond water quality criteria (see Table 10). High temperatures in the Chehalis River typically occur during the summer months of July and August.

Surface Water Quality Criteria

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, EPA has established human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized in Table 6.

Table 6: Washington State and EPA Water Quality Criteria

Parameter	Criterion
Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	17.5°C maximum
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTU above background
Toxics	No toxics in toxic amounts (see spreadsheets in Appendix C for numeric criteria for toxics of concern for this discharge)

Consideration of Surface Water Quality-Based Limits for Numeric Criteria

The critical condition for the Chehalis River is the seven-day average low river flow with a recurrence interval of 10 years (7Q10). Outfall 001 discharges to the Chehalis River downstream

of its confluence with the Satsop River. River flow is measured on the Chehalis River at Porter (U.S. Geological Survey Station 12035000). For the Chehalis River at Porter, 7Q10 flow is 216 cfs, and on the Satsop River 7Q10 flow is 221 cfs (1992 data based on CT Project application for site certification).

Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) - BOD and COD can affect dissolved oxygen (DO) in receiving waters. Although not identified as a concern for the Chehalis River near Outfall 001, the Upper Chehalis River is documented as having low DO. The Engineering Report will assess the oxygen demand pollutants in the discharge for compliance with the water quality standards.

Temperature – The federal Clean Water Act (Section 303[d]) and federal actions (40 CFR 130.7) require Washington State to develop a list of "impaired waters" (the 303[d] list) every two years. Water bodies must meet two criteria to be placed on the list: (1) water quality does not meet state water quality standards, and (2) technology-based controls are not sufficient to achieve water quality standards. In May 1994, Water Body Segment No. WA-22-4040, the Chehalis River from the Wynoochee River to Porter Creek, was placed on the 303(d) list because of excursions of fecal coliform and temperature beyond water quality criteria.

Because the upper Chehalis river is on the 303(d) list for temperature, the current regulation 40 CFR 122.4(i) stipulates that no new permit be issued, in that stretch of the river, for a new source or new discharges if it will cause or contribute to a violation of water quality standards. The lower Chehalis is currently not listed as an impaired water. The Department of Ecology has revised the existing temperature criteria. The new criteria is based on current scientific understanding of the effects of temperature on aquatic species. The criteria applies to the following key species groupings: char (bull trout and Dolly Varden), salmon and coastal trout, eastern redband trout, and warm water fish.

EFSEC Resolution 309 removed the use of quench water from the SCA. A heat exchanger will use raw water to cool the blowdown to less than 16C.

Under critical conditions, the temperature criterion for the receiving water could be exceeded. Although a temperature effluent limit of 18°C normally protects the temperature criterion, a temperature effluent limit of 16°C was imposed because it was found to be the threshold at which risk to Chinook salmon from disease, reduced oxygen, and abnormalities in alevins increases substantially.

The Engineering Report will assess the temperature in the discharge for compliance with the water quality standards.

Toxic Pollutants - Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. A reasonable potential analysis occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempt from the water quality standards for surface waters or from surface water quality-based effluent limits.

The following toxic pollutants are expected to be present in the discharge: ammonia, chlorine and metals.

Federal Guidelines require that no priority pollutants be detected in the discharge. Thus the receiving water will be protected for all priority pollutants, including metals. Other metals predicted to be present in the effluent showed no reasonable potential to affect water quality. At critical conditions there was a reasonable potential to exceed water quality standards for chloride and ammonia and, as such, limits for these pollutants have been place in the permit.

The permittee is required to assess the discharge's compliance with the surface water quality standards as part of the engineering report. Final limits that comply with all numeric water quality criteria will be determined in the Engineering Report and be incorporated into the permit through permit modification.

The applicant may provide data that clearly demonstrate 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.

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

Mixing Zone

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the diluting wastewater doesn't interfere with designated uses of the receiving water body (e.g., recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow EFSEC to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control and treatment (AKART). EFSEC uses modeling to estimate the amount of mixing within the mixing zone. Through modeling EFSEC determines the potential for violating the water quality standards at the edge of the mixing zone and to derive any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. EFSEC chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's Permit Writer's Manual). Each critical condition parameter (by itself) has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water comprises 90% of the total volume at the boundary of the mixing zone. We use dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life **acute** criterion is based on the assumption that organisms are not exposed to that concentration for more than one-hour and more often than one exposure in three years. Each aquatic life **chronic** criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400; 2006). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. EFSEC must specify both the allowed size and location in a permit.
This permit specifies the size and location of the allowed mixing zone.

2. The facility must fully apply "all known available and reasonable methods of prevention, control and treatment" (AKART) to its discharge.
EFSEC has determined that the treatment provided and the pollution prevention activities practiced by the permittee meet the requirements of AKART (see "Technology based Limits").

3. EFSEC must consider critical discharge conditions.
Surface water quality-based limits are derived for the water body's critical condition, (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated water body uses). The critical discharge condition is often pollutant-specific or water body-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the

summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology uses the water depth at mean lower low water (MLLW) for marine waters. Ecology's Permit Writer's Manual describes additional guidance on criteria/design conditions for determining dilution factors. The Manual can be obtained from Ecology's website at: http://www.ecy.wa.gov/biblio/92109.html.

4. Supporting information must clearly indicate 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**
- **Adversely affect public health**

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms, and set the criteria to generally protect 95% of the species tested and to fully protect all commercially and recreationally important species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for 1-hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for 4 days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of being discharged.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. EFSEC has additionally determined that the effluent will not exceed 33 degrees C for more than 2 seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

EFSEC evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing. See Ecology's Permit Writer's Manual for details. http://www.ecy.wa.gov/biblio/92109.html

EFSEC reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics, and the discharge location. Based on this review we conclude that the 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. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

EFSEC conducted a reasonable potential analysis, using procedures established by the EPA and by EFSEC, for each pollutant. We concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone.

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

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. Because tidal currents change direction, the plume orientation within the mixing zone changes. The plume rises through the water column as it mixes therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. EFSEC determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

EFSEC minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed the discharge and the receiving water is more completely mixed in a shorter time period. EFSEC also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, EFSEC uses 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 to perform the reasonable potential analysis.

The facility continues to conduct pollution prevention activities and has completed pollution prevention projects. These activities also minimize the concentrations of pollutants in the discharge.

Because of the above reasons, EFSEC has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. Maximum size of mixing zone.
The authorized mixing zone does not exceed the maximum size restriction.

8. Acute Mixing Zone.

- **The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable**
  We determined the acute criteria will be met at 10% of the distance of the chronic mixing zone.

- **The pollutant concentration, 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.**
  As described above the toxicity of any pollutant depends upon the exposure, the pollutant concentration and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water,

assuring that the rising effluent will not cause translocation of indigenous organism near the point of discharge (below the rising effluent).

- **Comply with size restrictions.**
  The mixing zone authorized for this discharge complies with the size restrictions published in Chapter 173-201A WAC.

9. Overlap of Mixing Zones.
This mixing zone does not overlap another mixing zone.

The permittee submitted an effluent mixing study that was reviewed and approved by EFSEC/Ecology, with some revisions. The interim effluent limits are based on these approved dilution factors.

Studies required by the compliance schedule will propose AKART for the permittee's facility and, if necessary, will propose mixing zones that comply with the requirements of WAC 173-201A-400, Mixing Zones.

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 directly measured 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. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent on organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

In accordance with WAC 173-205-040, the applicant's effluent has been determined to potentially contain toxic chemicals. Proposed permit conditions S10 and S11 contain requirements for WET testing as authorized by RCW 90.48.520 and 40 CFR 122.44 and in accordance with procedures in Chapter 173-205 WAC. The proposed permit requires the applicant to conduct toxicity testing for one year to characterize both the acute and chronic toxicity of the effluent.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC_{50}, EC_{50}, IC_{25}, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication No. WQ-R-95-80, *Laboratory*

Guidance and Whole Effluent Toxicity Test Review Criteria, which is referenced in the permit. Any applicant interested in receiving a copy of this publication may call the Ecology Publications Distribution Center 360-407-7472 for a copy. The Council recommends that applicants send a copy of the acute or chronic toxicity sections of their permits to their laboratory of choice.

If the applicant makes process or material changes that, in the Council's opinion, results in an increased potential for effluent toxicity, then the Council may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, whole effluent toxicity performance standard. The applicant may demonstrate to the Council that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

The acute toxicity limit is set relative to the zone of acute criteria exceedance (acute mixing zone) established in accordance with WAC 173-201A-100. The acute critical effluent concentration (ACEC) is the concentration of effluent existing at the boundary of the acute mixing zone during critical conditions. Because no acute mixing zone has been authorized, the ACEC equals 100% effluent.

The chronic toxicity limit is set relative to the mixing zone established in accordance with WAC 173-201A-100. The chronic critical effluent concentration (CCEC) is the concentration of effluent existing at the boundary of the mixing zone during critical conditions. If no mixing zone has been authorized, the CCEC equals 100% effluent.

Condition S5.A.1.b requires the permittee to assess compliance with the state's water quality standards for WET as early in the permit cycle as possible. If the AKART analysis and preliminary characterization of the permittee's discharge and receiving water indicate no additional wastewater treatment is necessary, the permittee is required to conduct an initial WET characterization of effluent to determine if the discharge contains any unpredicted toxicity before the engineering report is finalized. The initial characterization is required to consist of analyzing one sample each for acute and chronic toxicity.

In the event the engineering report concludes additional treatment of the discharge is required, the permittee should implement the EFSEC-approved improvements before commencing the full WET characterization required by conditions S10 and S11.

Human Health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the effluent may contain chemicals of concern posing a risk to human health. Ecology determined this because the volume of wastewater flow to the receiving water, and data or process information indicate regulated chemicals occur in the discharge.

Ecology conducted a determination of the discharge's potential to cause an exceedance of the water quality standards as required by 40 CFR 122.44(d). We followed the procedures published in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and Ecology's Permit Writer's Manual (Ecology Publication 92-109, July, 1994) to make this reasonable potential determination. Our evaluation showed that the discharge has no reasonable potential to cause a violation of water quality Human Health standards thus effluent limits are not warranted. Ambient measurements of Arsenic have exceeded water quality Human Health standards.

Arsenic

In 1992 the USEPA adopted risk-based arsenic criteria for the protection of human health for the State of Washington. The criterion for marine waters is 0.14 μg/L inorganic arsenic, and is based on exposure from fish and shellfish tissue ingestion. The freshwater criterion is 0.018 μg/L, and is based on exposure from fish and shellfish tissue and water ingestion. These criteria have caused confusion in implementation because they differ from the drinking water maximum contaminant level (MCL) of 10 μg/L, which is not risk-based, and because the human health criteria are sometimes exceeded by natural background concentrations of arsenic in surface water and ground water.

In Washington, when a natural background concentration exceeds the criterion, the natural background concentration becomes the criterion, and no dilution zone is allowed. This could result in a situation where natural groundwater or surface water used as a municipal or industrial source-water would need additional treatment to meet numeric effluent limits even though no arsenic was added as waste. Although this is not the case for all dischargers, we do not have data at this time to quantify the extent of the problem.

A regulatory mechanism to deal with the issues associated with natural background concentrations of arsenic in groundwater-derived drinking waters is currently lacking. Consequently, the Water Quality Program, at this time, has decided to use a three-pronged strategy to address the issues associated with the arsenic criteria. The three strategy elements are:

1. Pursue, at the national level, a solution to the regulatory issue of groundwater sources with high arsenic concentrations causing municipal treatment plant effluent to exceed criteria. The revision of the MCL for arsenic offered a national opportunity to discuss how drinking water sources can affect NPDES wastewater dischargers, however Ecology was unsuccessful in focusing the discussion on developing a national policy for arsenic regulation that acknowledges the risks and costs associated with management of the public exposure to natural background concentrations of arsenic through water sources. The current arsenic MCL of 10 ug/L could also result in municipal treatment plants being unable to meet criteria-based effluent limits. Ecology will continue to pursue this issue as opportunities arise.

2. Additional and more focused data collection. The Water Quality Program will in some cases require additional and more focused arsenic data collection, will encourage or require dischargers to test for source water arsenic concentrations, and will pursue development of a proposal to have Ecology's Environmental Assessment Program conduct drinking water source monitoring as well as some additional ambient monitoring data. At this time, Washington

NPDES permits will contain numeric effluent limits for arsenic based only on treatment technology and aquatic life protection as appropriate.

3. Data sharing. Ecology will share data with USEPA as they work to develop new risk-based criteria for arsenic and as they develop a strategy to regulate arsenic.

Ecology must evaluate whether or not the discharge has reasonable potential to violate human health criteria at the edge of the chronic zone. To thoroughly evaluate human health criteria the permit requires the permittee to re-characterize the effluent by sampling for the 91 human health criteria listed pollutants (priority pollutants), excluding PCB's, PBB's, asbestos, and all pesticides except any listed pesticide that is used on the refinery site. The effluent shall be sampled and analyzed annually during the life of the permit.

The permittee is required to asses the discharges compliance with Human Health Criteria standards as part of the engineering report. Final limits that comply with all numeric Human Health criteria will be determined in the Engineering Report and be incorporated into the permit through permit modification.

Sediment Quality

The Department of Ecology has established aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Council may require applicants to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The permittee is required to assess the process wastewater and stormwater discharges' compliance with Sediment Quality standards as part of the engineering report. Final limits that comply with all Sediment Quality standards will be proposed in the Engineering Report and be incorporated into the permit through permit modification.

Groundwater Quality Limitations

The Department of Ecology has established groundwater quality standards (Chapter 173-200 WAC) to protect beneficial uses of groundwater. Permits issued by the Council shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100). Stormwater testing for discharge to the ground is not always required if the applicant follows the current guidelines in Volume V, Runoff Treatment BMPs, in Ecology's *Stormwater Management Manual for Western Washington* (August 2001).

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.

Monitoring for priority pollutant metals is being required to further characterize the effluent. These pollutants could have a significant impact on the quality of the surface water.

The monitoring schedule is detailed in the proposed permit under condition S2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, significance of pollutants, and cost of monitoring.

Initial/interim monitoring will continue until data is collected from the completed/approved Engineering Report and a final monitoring schedule is established by EFSEC.

Lab Accreditation

All monitoring data required by the Council shall be prepared by a laboratory registered or accredited under the provisions of Accreditation of Environmental Laboratories, Chapter 173-50 WAC. Flow, temperature, settleable solids, conductivity, pH, and internal process control parameters are exempt from this requirement. Conductivity and pH shall be accredited if the laboratory must otherwise be registered or accredited.

REPORTING AND RECORDKEEPING

The requirements of 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).

Non-Routine and Unanticipated Discharges

Occasionally, this facility may generate wastewater that is not characterized in the permit application because it is not a routine discharge and was not anticipated at the time of application. These typically are waters used to pressure test storage tanks or fire water systems or leaks from drinking water systems. These are typically clean wastewaters, but may be contaminated with pollutants. The permit contains an authorization for non-routine and unanticipated discharges. The permit requires a characterization of these wastewaters for pollutants and examination of the opportunities for reuse. Depending on the nature and extent of pollutants in this wastewater and opportunities for reuse, the Council may authorize a direct discharge via the process wastewater outfall or through a stormwater outfall for clean water, require the wastewater to be placed through the facilities wastewater treatment process, or require that the water be reused.

OPERATIONS AND MAINTENANCE PLAN

Proposed permit condition S4 requires that the applicant properly operate and maintain all facilities or systems of treatment and control (and related appurtenances) that are installed to achieve compliance with the terms and conditions of the permit. The applicant is also required to develop and update, at least annually, an operations and maintenance manual in accordance with WAC 173-240-150.

SOLID WASTE DISPOSAL

The project has the potential to pollute state waters from leachate of solid waste and from the onsite sewage (septic) system.

Under authority of RCW 90.48.080, proposed permit condition S5 requires that the applicant develop a solid waste plan to prevent solid waste from polluting waters of the state. The plan must be submitted to the local permitting agency for approval, if necessary, and to the Council. The permittee submitted an approved draft plan with its application but must revise and resubmit a final plan to EFSEC.

This proposed permit also requires that the applicant comply with current state regulatory standards in Chapter 248-90 WAC or Chapter 173-216 WAC and the conditions issued by Grays Harbor County in its June 13, 2002 approval of the sanitary waste facility design, WAC 246-272 (onsite sewage systems) for the design, permitting, and approval of the septic system. The plan must be coordinated with the local permitting agency and Grays Harbor County, and submitted to the Council for review and approval. In addition, the Council must receive a pending wastewater discharge permit from the PDA for potential inclusion of sanitary waste discharge from the CT site into the PDA's sanitary waste system. If sanitary waste from the CT facilities eventually falls under the PDA's discharge permit and after thorough review by the Council, the sanitary waste disposal provision for this permit may be deleted.

SPILL PLAN

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

The Satsop Spill Prevention, Control, and Countermeasure (SPCC) Plan and Hazardous Waste Management plan were last updated in 12/07 and 1/08 respectively. Proposed permit condition S6 requires the applicant to update the plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs consistent with long-term operations and submit it to the Council.

OUTFALL EVALUATION

Ecology requires the permittee to conduct annual outfall inspections and submit a report detailing the findings of each inspection. (Special Condition S9). The facility must inspect its discharge pipe and diffusers to determine their physical condition. The permittee is also required to provide photo/video documentation of sediment accumulations in the vicinity of the outfall with each outfall evaluation report.

PERMIT REOPENER

Proposed permit condition S12 indicates that the Council may reevaluate the permit and modify permit conditions on the basis of monitoring results or other causes consistent with state and federal regulations.

GENERAL CONDITIONS

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

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 groundwater, 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 and protect human health, aquatic life, and beneficial uses of waters of the state of Washington. The Council proposes that this permit be issued for five years.

REFERENCES

Environmental Protection Agency (EPA). 1992. *National Toxics Rule*. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

Environmental Protection Agency (EPA). 1991. *Technical Support Document for Water Quality-based Toxics Control.* EPA/505/2-90-001.

Environmental Protection Agency (EPA). 1988. *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling*. EPA Office of Water, Washington, D.C.

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

Environmental Protection Agency (EPA). 1983. *Water Quality Standards Handbook.* EPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace. 1972. *Characterization of Stream Reaeration Capacity*. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington Department of Ecology. August 2001. Stormwater Management Manual for Western Washington, Publication Numbers 99-11 through 99-15 (replaces Publication Number 91-75).

Washington Department of Ecology. December 1998. Criteria for Sewage Works Design, Publication Number 98-37.

Washington Department of Ecology. April 1998. Guidance Manual for Developing a Stormwater Pollution Prevention Plan for Industrial Facilities, Publication Number WQ-R-93-015.

Washington Department of Ecology. 1994. Revised January 2001. *Permit Writer's Manual.* Publication Number 92-109

Washington Department of Ecology. Permit and Wastewater Related Information. URL: http://www.ecy.gov/programs/wq/wastewater/index.html.

Washington Department of Ecology. Laws and Regulations. URL: http://www.ecy.gov/laws-rules/laws-etc.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 tentatively plans 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.

The Council published a Public Notice of Draft (PNOD) on March 27, 2008 in the Aberdeen Daily World, Montesano Vidette, and the Olympian to inform the public that a draft permit and fact sheet are available for review. Interested parties were mailed the notice on March 27, 2008 and are invited to submit written comments regarding the draft permit. The draft permit and fact sheet are available for viewing at the EFSEC website: http://www.efsec.wa.gov/satsop.shtml. The draft permit, fact sheet, and related documents are also available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at EFSEC's office listed below, and at the W.H. Abel Memorial Library, 125 Main Street South, Montesano, WA 98563-3794. Written comments should be mailed to:

Jim La Spina
Energy Facility Site Evaluation Council
PO Box 43172
Olympia, Washington 98504-3172

Any interested party may comment on the draft permit within the 30-day comment period to the address above. The Council will hold a hearing beginning at 7 pm at:

Montesano City Hall
112 North Main Street
Montesano, Washington

Comments should reference specific text followed by proposed modifications 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 by 5 pm on April 28, 2008 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 at (360) 956-2124, at the EFSEC web site at www.efsec.wa.gov, 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 prevention, control and 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.

BOD_5--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 BOD_5 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.

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.

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.

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 applicant. 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.

APPENDIX C: CALCULATIONS

Appendix C contains the spreadsheets used to calculate the interim effluent limits in the draft permit.

CALCULATION OF THE FRESHWATER AMMONIA CRITERIA BASED ON CHAPTER 173-201A WAC

Spreadsheet revised November 2006

INPUT	
1. Temperature (deg C):	18.0
2. pH:	7.40
3. Is salmonid habitat an existing or designated use?	Yes
4. Are non-salmonid early life stages present or absent?	Absent

OUTPUT	
1. Unionized ammonia NH3 criteria (mgNH3/L)	
Acute:	0.159
Chronic:	0.018
2. Total ammonia nitrogen criteria (mgN/L):	
Acute:	15.341
Chronic:	1.709

CALCULATION OF REASONABLE POTENTIAL TO EXCEED THE WATER QUALITY STANDARDS

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 Technical Support Document for Water Quality-based Toxics Control, 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

				State Water Quality Standard		Max concentration at edge of...												
Parameter	Metal Criteria Translator as decimal Acute	Metal Criteria Translator as decimal Chronic	Ambient Concentration (metals as dissolved) ug/L	Acute ug/L	Chronic ug/L	Acute Mixing Zone ug/L	Chronic Mixing Zone ug/L	LIMIT REQ'D?	Effluent percentile value	Pn	Max effluent conc. measured (metals as total recoverable) ug/L	Coeff Variation CV	s	# of samples n	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Ammonia (as N)			45.2400	15341	1709	274537	31717	YES	0.95	0.050	930000.00	0.60	0.55	1	6.20	21	182
Arsenic	1.00	1.00	0.8500	360.00	190.00	1.58	0.93	NO	0.95	0.050	2.60	0.60	0.55	1	6.20	21	182
Mercury	0.85		0.0089	2.10	0.01	0.01	0.01	NO	0.95	0.050	0.0048	0.60	0.55	1	6.20	21	182
Chlorine (tot resid)				19.00	11.00	0.15	0.02	NO	0.95	0.050	0.50	0.60	0.55	1	6.20	21	182
Cadmium	0.99	0.96	0.0720	1.00	0.42	0.21	0.09	NO	0.95	0.050	0.47	0.60	0.55	1	6.20	21	182
Copper	0.996	0.996	1.5800	5.47	4.06	4.86	1.96	NO	0.95	0.050	11.40	0.60	0.55	1	6.20	21	182
Iron				NA	1000.00	0.28	0.03	NO	0.95	0.050	0.95	0.60	0.55	1	6.20	21	182
Lead	0.970	0.970	0.1910	17.04	0.66	0.71	0.25	NO	0.95	0.050	1.86	0.60	0.55	1	6.20	21	182
Zinc	0.996	0.996	2.7660	41.26	37.68	31.44	6.07	NO	0.95	0.050	98.00	0.60	0.55	1	6.20	21	182
Chloride (dissolv)				860.00	230.00	12219.40	1409.93	YES	0.95	0.050	41400.00	0.60	0.55	1	6.20	21	182
Nitrate				NA	NA	10182.84	1174.94	NO	0.95	0.050	34500.00	0.60	0.55	1	6.20	21	182
Nickel	0.998	0.997	4.0000	511.12	56.76	5.37	4.16	NO	0.95	0.050	5.30	0.60	0.55	1	6.20	21	182
Silver	0.850	0.850	0.0500	0.43	NA	0.12	0.06	NO	0.95	0.050	0.30	0.60	0.55	1	6.20	21	182

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 Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, and 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)

CALCULATION OF WATER QUALITY-BASED EFFLUENT LIMITS

	Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone							Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations							Statistical variables for permit limit calculation				
	Acute Dil'n Factor	Chronic Dil'n Factor	Ambient Concentration	Water Quality Standard Acute	Water Quality Standard Chronic	Average Monthly Limit (AML)	Max Daily Limit (MDL)	WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	LTA Coeff. Var. (CV)	LTA Prob'y Basis	Limiting LTA	Coeff. Var. (CV)	AML Prob'y Basis	MDL Prob'y Basis	# of Samples per Month	
PARAMETER			*ug/L*	*ug/L*	*ug/L*	ug/L	ug/L	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*decimal*	*decimal*	*ug/L*	*decimal*	*decimal*	*decimal*	*n*	
ammonia (as N)	21.0	182.00	45.2400	15341	1709	**160132.6**	**321256.2**	321256	302849.56	103150.0	159733.0	0.60	0.99	103150.0	0.60	0.95	0.99	4.0	1.0
chloride	21.0	182.00		860.00	230.00	**9002.1**	**18060.0**	18060	41860.00	5798.8	22078.4	0.60	0.99	5798.8	0.60	0.95	0.99	4.00	1.00

This spreadsheet calculates water quality based permit limits based on the two value steady state model using the State Water Quality standards contained in WAC 173-201A. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, and March, 1991 (EPA/505/2-90-001) on page 99. Last revision date 9/98.