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

FACT SHEET
BP CHERRY POINT COGENERATION PROJECT
STATE WASTE DISCHARGE PERMIT WA-ST-7441

November 7, 2003

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INTRODUCTION

GENERAL INFORMATION	
Applicant	BP West Coast Products, LLC
Facility Name and Address	BP Cherry Point Cogeneration Facility 4519 Grandview Road Blaine, WA 98230
Type of Facility:	Cogeneration – Steam and Electricity Production
SIC Code	4911
Process Wastewater Discharge Location Outfall 001	Waterbody name: Strait of Georgia Latitude: 48° 51' 39" N Longitude: 122° 45' 26" W.
Water Body ID Number (001)	WA-01-0010
Stormwater Discharge Location	Waterbody name: Discharges into Terrell Creek a tributary to the Strait of Georgia

The BP Cherry Point Cogeneration Project is a proposed 720-megawatt (MW) cogeneration power and steam facility. BP West Coast Products, LLC, the Applicant, is proposing to build and operate a power plant and associated facilities for electrical power and steam production. The proposed project will be designed to provide electric energy to meet existing and future needs at the BP Cherry Point Refinery and in the Pacific Northwest as well as other areas where electrical energy is needed. The proposed project will also provide steam to the refinery, which is used in the production of a variety of petroleum products. The project site is located in the northwestern portion of Whatcom County, Washington, approximately fifteen (15) miles north of the City of Bellingham and seven (7) miles south of the City of Blaine, Washington. The project site and major facilities are depicted in Exhibits 1 and 2.

An Application for Site Certification (ASC) was submitted to the Energy Facility Site Evaluation Council (EFSEC or Council) on June 3, 2002. On July 18, 2002, an independent consultant to the Council determined that this project required some additional information for the wastewater and stormwater discharges in order to make a complete review of the ASC.

On July 30, 2002, the Council notified the Applicant of what additional information was needed, including a State Waste Discharge Permit Application. The additional information was received on September 11, 2002 and supplemented the information contained in the ASC.

On April 15, 2003, the Applicant submitted revisions to the ASC to reflect changes to the project to use water rather than air for cooling.

The purpose of this review is to ascertain the proposal's compliance with Federal and State requirements for discharges to surface waters and wetlands/groundwater and to recommend to the Council conditions in the Site Certification Agreement (SCA) through a state waste discharge permit that would assure compliance with the appropriate regulations should the Council recommend approval of the siting to the Governor. The scope of draft State Waste Discharge Permit No. WA-ST-7441 covers the discharge of pollutants in the BP Cherry Point Cogeneration Project's process wastewater, stormwater, and sanitary wastewater. The three wastewater discharges are as follows:

1. Discharge of process wastewater to the BP Cherry Point Refinery's wastewater treatment system.
2. Discharge of stormwater to wetlands and groundwater.
3. Discharge of sanitary wastewater to a POTW via the BP Cherry Point Refinery's sanitary wastewater system.

The State of Washington regulates such discharges in accordance with the procedures for issuing state waste discharge permits (Chapter 173-216 Washington Administrative Code [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 (or authorization) be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit (authorization to discharge).

Although the Council has established permitting procedures for National Pollutant Discharge Elimination System (NPDES) permits (Chapter 463-38 WAC), this permit procedure does not include discharges such as proposed by the Applicant. The Applicant would be subject to the effluent limitations and other requirements of Chapters 173-216, -201A, -200, and -204, if the proposed facility is approved by the Governor of the State of Washington, therefore the draft State Waste Discharge Permit contains the recommendations for conditions to the Site Certification Agreement that would ensure wastewater, stormwater, and sanitary sewer discharges from the BP Cherry Point Cogeneration Project meet state requirements and standards.

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

PROJECT SITE

The proposed BP Cherry Point Cogeneration Project site is situated near Puget Sound in the northwestern portion of Whatcom County and within the Terrell Creek drainage basin. More specifically, the site is located approximately fifteen (15) miles north of the City of Bellingham and seven (7) miles south of the City of Blaine, Washington. (Exhibits 1 and 2)

The area of the project site and construction laydown areas is approximately 69 acres of land adjacent to and owned by the BP Cherry Point Refinery. This area represents less than 3 % of the approximately 2500 acre block owned by the refinery. Of the 69 acres, 33 acres are proposed to be used for power plant structures and related facilities. The project site is designated Heavy Impact Industrial. See Exhibit 3.

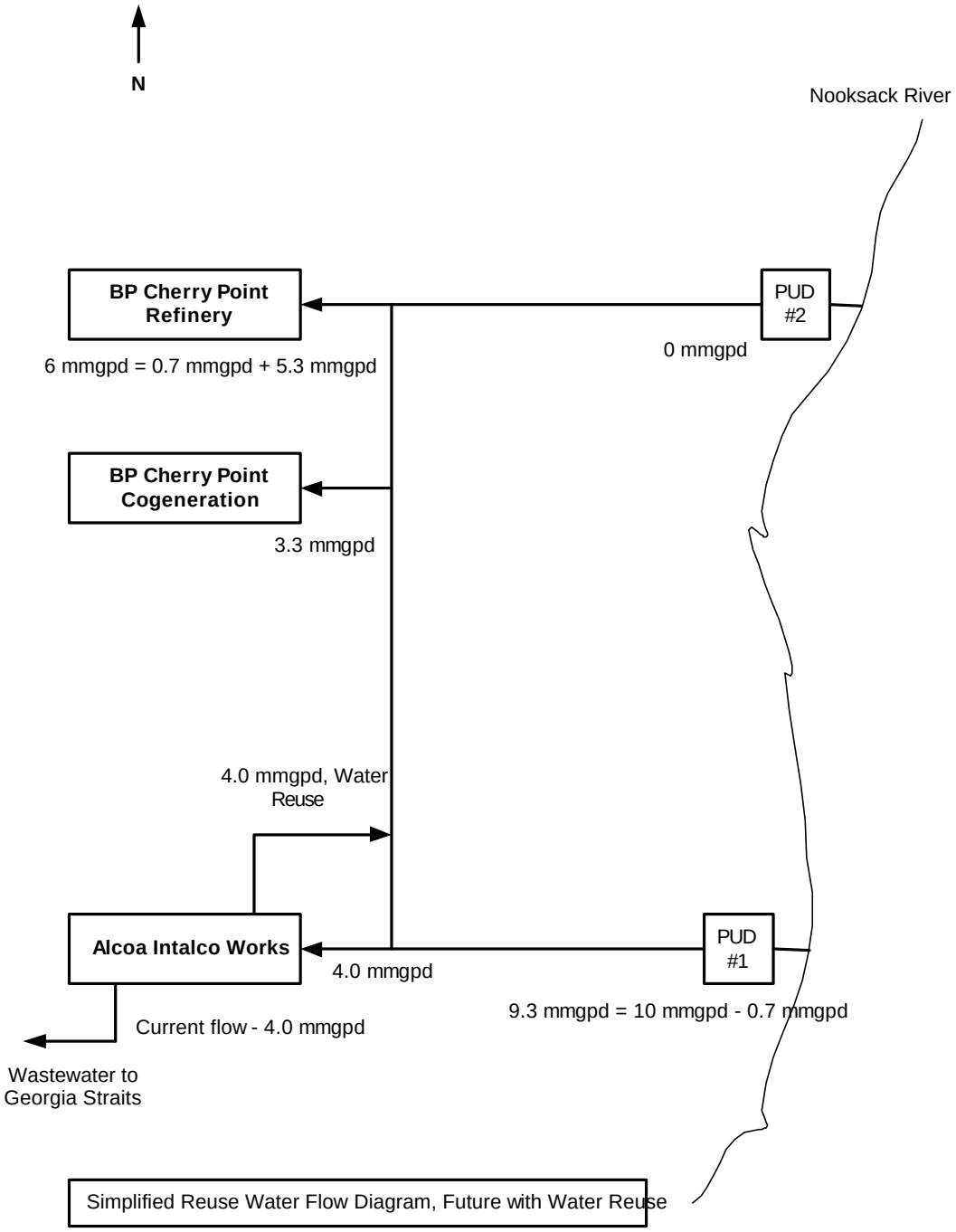
INDUSTRIAL PROCESS

The proposed power plant will be a 720 MW combined-cycle (steam and electricity) cogeneration facility consisting of three (3) natural gas-fired combustion turbines (CGTs), each driving one electric generator. Each of the gas turbines will be equipped with a heat recovery steam generator (HSRG) with supplemental duct-firing capability. Steam produced from the steam generators will be combined and sent to a single steam turbine electric generator (STG) with steam extraction and condensing capability. Exhaust steam exiting the steam turbine electric generator will be directed via pipe to the adjacent refinery for use in processing crude oil into petroleum products. The cogeneration facility will supply steam and electricity to the BP refinery, which will in turn recycle condensate back to the cogeneration project.

The power plant will employ an evaporative cooling system using recycled non-contact, once-through cooling water from the nearby Alcoa aluminum smelter when the smelter is in operation. The power plant will use a portion of Alcoa's contract water while the aluminum smelter is not in operation. The Whatcom County Public Utility District No. 1 (PUD) owns the water rights for water in this area and Alcoa and the refinery contract for the water through the PUD. The PUD withdraws water from the Nooksack River. The refinery currently uses approximately 6 mgd of PUD supplied water.

The PUD, BP, and Alcoa recently entered into a letter of agreement to develop a water reuse project. With the current agreement, Alcoa will assign its contract water right of about 4.0 mgd to the BP cogeneration facility. Alcoa will have the ability to start operations at any time and divert the non-contact, once-through cooling water to the cogeneration facility. The non-contact cooling water exiting the aluminum smelter is of the same quality as the PUD water entering the smelter, only slightly warmer (+ 5 ^{o}F).

The power plant will require an average of 2,244 to 2,316 gallons per minute (gpm) or about 3.3 mgd. The PUD is expected to provide an average of 2,780 gpm of recycled cooling water from Alcoa. The 484 to 556 gpm of recycled water in excess of the cogeneration project requirements would be used at the refinery to reduce the water needed from the Nooksack River. The refinery's water use will also be reduced by 20 gpm as a result of steam provided by the cogeneration facility. The total water consumed by the refinery and the cogeneration project will average 6,414 to 6,486 gpm.



The natural gas supply will be piped to the facility from an existing pipeline on the refinery property. No backup fuel will be used for the combustion turbines, however diesel will be used to power an emergency generator and fire water pump to ensure the operation of

critical emergency and safety systems during sudden total electrical power outage to the plant.

Hydrostatic testing wastewater generated during construction will be characterized to determine if it can be properly disposed of in the refinery wastewater treatment system. If there are no problems, this water will be discharged to the refinery wastewater treatment system.

Chemicals used during operation and maintenance will also be stored on site. The chemicals that will be stored on site include:

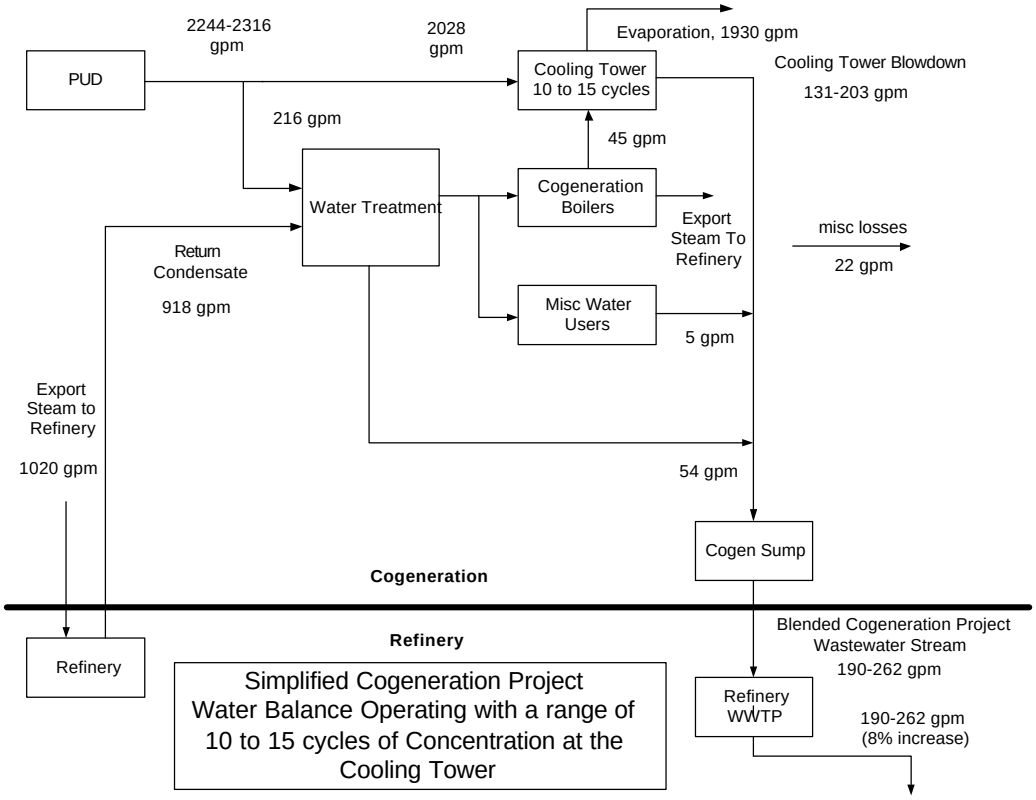
- Anhydrous ammonia - 2,000 to 6,000 gallons in tank on site,
- caustic – 8,000 gallons in tanks on site,
- sulfuric acid – 16,000 gallons in tanks on site,
- diesel fuel – in storage tanks with 1,960 gallon capacity,
- lubricating oil – in equipment or storage lockers,
- control oil – in STG equipment with 400 gallon capacity,
- bottled hydrogen gas - 605,000 square feet capacity,
- bottled carbon dioxide gas - 32,500 square feet capacity,
- transformer oil – in transformers with 76,500 gallon capacity,
- SCR catalyst – in HRSG with 4,800 cubic feet capacity,
- CO catalyst - in HRSG with 990 cubic feet capacity,
- propylene glycol – in closed loop cooling water system with 22,800 gallon capacity,
- corrosion inhibitors - 550 gallons in tanks on site,
- oxygen scavenger - 500 gallons in tanks on site,
- scale control agent - 200 pounds in tank or bags on site,
- cation resin - 950 cubic feet in tank or warehouse on site,
- anion resin - 900 cubic feet in tank or warehouse on site,
- powdered cellulose and activated carbon – 2000 lb in bags or drums on site,
- sodium hypochlorite – 16,000 in tanks on site,
- zinc and phosphanate solution – 800 gallons in tanks on site, and
- polymer - 800 gallons in tank on site.

Each of the storage tanks and pieces of equipment will have adequate containment. The chemicals are stored in tanks or areas with a concrete curbed impoundment, which can be drained to the process wastewater collection system and allow for treatment or recovery in the event of a spill. The impoundment will be sized to contain the volume of the largest tank within the contained area plus an allowance for rainfall. All containment and impoundment structures will have an isolation feature to allow evaluation of the wastewater before direct discharge to the process wastewater stream. This will help prevent an upset in the refinery wastewater treatment system due to a chemical spill.

When operational, the power plant will employ an estimated 30 people and operate 24 hours per day, seven days per week.

PROPOSED PROCESS WATER MANAGEMENT

The majority of the water required for the generation of steam in the power plant at a average rate of 2,244 to 2,316 gpm will be filtered and used in the power generation cycle. The excess and residual steam will then be piped to the refinery for the processing of crude oil into petroleum products. Water used in the power generation cycle will be used as boiler feed water, steam cycle makeup water, for auxiliary cooling, and for filter cleaning. Some water will be used as potable water for drinking, personal washing, and sanitation. Most of the water used at the power plant will be evaporated at the cooling tower.



The cogeneration facility will produce 190 gpm on average (assuming 15 cycles of concentration in the cooling tower) of non-recyclable process wastewater which will be sent to the BP refinery's wastewater treatment system.

This non-recyclable process wastewater is a combination of filtered raw water backwash solids and dissolved solids from the circulating water in the STG lines which reach a level that the mineral salts would cause deposition and corrosion in the system and adversely impact the system's equipment, operation, and efficiency. A schematic diagram of the power plant's process water system is shown in Exhibit 4.

Other wastewater streams that could be produced and introduced into the process wastewater include equipment water leaks and wash down waters, water from the compressor wash system, process area stormwater, and water from containment areas.

BP REFINERY WASTEWATER TREATMENT SYSTEM

Process water from the BP Cherry Point refinery receives primary and secondary treatment in a wastewater treatment system consisting of parallel oil/water separators, an equalization tank, an activated sludge unit, a secondary clarifier, and two clarification ponds. The discharge from the wastewater treatment system is pumped into the Strait of Georgia. An NPDES permit was issued to BP by the Department of Ecology on October 1, 1999. The following are limitations on the treated process wastewater discharged from the refinery, as outlined in the NPDES permit:

EFFLUENT LIMITATIONS
(Pounds per day, except where noted)

PARAMETERS	**Monthly Average**	**Daily Maximum**
Biochemical Oxygen Demand (5-day)	1240	2260
Chemical Oxygen Demand	8540	16610
Total Suspended Solids	990	1570
Oil and Grease	360	680
Oil and Grease	Concentration shall at no time exceed 15 mg/l and shall not exceed 10 mg/l more than three days per month.	
Phenolic Compounds	8.1	16.7
Ammonia as N	870	1910
Sulfide	6.7	14.7
Total Chromium	12.5	27.5
Hexavalent Chromium	0.9	2.0
pH	Within the range of 6.0 to 9.0	

In a report dated May 28, 2002, BP documented the results of a study conducted in 2000-2001 to determine the treatment and removal efficiencies of their wastewater treatment

system. This report also includes an engineering analysis of the wastewater treatment system's design capacity. The refinery currently uses approximately 50% of the organic and hydraulic capacity of the wastewater treatment system.

PROPOSED STORMWATER MANAGEMENT

Stormwater is proposed to be collected, routed through oil/water separators, directed to detention ponds, and discharged to wetlands in the Terrell Creek drainage. The stormwater detention ponds will be lined to protect groundwater contamination from poor quality stormwater. The flow will be variable depending on rainfall. The stormwater detention ponds are shown in Exhibits 5A and 5B.

PROPOSED SANITARY WASTE MANAGEMENT

Sanitary wastewater is proposed to be collected and directed to the refinery's sanitary wastewater system which is piped to the Birch Bay Water and Sewer District's treatment plant. The sanitary wastewater flow from the cogeneration facility will be approximately 2 gpm or approximately 2,880 gallons per day. The sanitary wastewater will be composed of personal wastewater only (i.e., toilets, hand washing, drinking fountains, showers, kitchen wastewater). No chemicals, paint, solvents, oils or other wastes shall be disposed in the sanitary wastewater system.

PROCESS WASTEWATER AND SOLIDS CHARACTERIZATION

Projected flows and chemical composition for each of the three wastewater streams from the cogeneration project are shown in Exhibit 6.

The Applicant provided an analysis estimating the composition of the process wastewater discharge to the refinery's wastewater treatment system. The results are shown in Exhibit 7.

The following table summarizes the potential increase in the existing refinery wastewater discharged to the Strait of Georgia due to the addition of the cogeneration process wastewater stream. The impact to the refinery discharge is presented for the combined flow after treatment in the refinery's wastewater treatment system:

Parameter	Cogen Process Wastewater [a]	Refinery Process Wastewater after treatment [a]	Percent Increase Due to Cogen Contribution (after treatment by refinery) [a,b]
Discharge Flow (gpm)	190	2,338	8.1 %
Biochemical Oxygen Demand (BOD) lbs/day	132	275	1 %
Chemical Oxygen Demand (COD) lbs/day	323	2,235	0.6 %
Total Suspended Solids (TSS) lbs/day	98	427	14.9 %
Oil and Grease (lbs/day)	3	115	0.1%
Total Chromium (lbs/day)	0.32 (1.45)	0	[c]
Temperature ^{o} F	93.8	82.7	Negligible
pH	6.5 – 9.5	8.0 - 8.6	Negligible

a From the BP Cherry Point Cogeneration Project, Application for Site Certification, June 2002. Effluent information is based upon a three-month average.

b Based upon treatment efficiencies documented in the BP Cherry Point Treatment Efficiency Study and Engineering Report, May 2002.

c Not estimated – the Treatment Efficiency Study report does show that metal concentrations are reduced through the refinery wastewater treatment system.

PROPOSED WATER POLLUTION CONTROL MEASURES

PROCESS WASTEWATER DISCHARGE

Inputs to the cogeneration's process wastewater will be isolated in a sump and evaluated before discharging to prevent an upset to the refinery's wastewater treatment system from chemical spills.

STORMWATER DISCHARGE

Stormwater that has the potential to collect process chemicals and lube oils will be routed to the process wastewater system. Stormwater that has a very low potential to be contaminated with oil or chemicals and that can be checked prior to discharge (such as secondary containment around electrical breakers) will be routed to the stormwater system.

Oil/water separators will be used to treat the stormwater runoff from the cogeneration facility that potentially may contain oil. The oil/water separators will be designed to produce an average effluent of less than 10 mg/l of oil and grease and a maximum effluent of 15 mg/l

of oil and grease. Oil is not expected to be present in the stormwater discharge. The oil/water separators have been included in the proposal to make it easier to isolate any inadvertent contamination that could occur.

Any oil retained in the separators will be collected with spill pads or sucked out with a vacuum truck and taken to the refinery or another location for disposal.

The stormwater detention ponds will be lined for protection of groundwater quality.

POLLUTION PREVENTION MEASURES

Secondary Containment: Chemical storage tanks and equipment will have secondary containment to prevent spills to the stormwater system.

Spill Prevention, Control and Countermeasures Plan: A spill prevention, control and countermeasures plan (SPCCP) for fuel, oil products, and hazardous chemicals or substances stored and used at the site will be developed and implemented in accordance with the requirements of Sections 311 and 402 of the Clean Water Act and the attendant regulation, 40 CFR 112.

The draft State Waste Discharge Permit requires the Certificate Holder to develop and implement a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs per section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

Stormwater Pollution Prevention Plan: Prior to beginning site preparation and initiating commercial operation of the BP Cherry Point Cogeneration Project, the Certificate Holder should develop, implement, and comply with construction and operations Stormwater Pollution Prevention Plans (SWPPP). The draft State Waste Discharge Permit will require the Certificate Holder to implement all elements of the SWPPPs including operational, treatment, and source control best management practices (BMPs), as well as erosion and sediment control BMPs as necessary. Specific BMPs have been proposed for the stormwater retention ponds and oil/water separators.

COMPLIANCE WITH STATE REGULATORY REQUIREMENTS AND RECOMMENDED DRAFT STATE WASTE DISCHARGE CONDITIONS

Proposed effluent limits and other conditions are based, in part, on the information received in the ASC and supplemental information received from the Applicant. The proposed discharges were evaluated on both a technology basis and water quality basis. Effluent limits and/or discharge conditions necessary to meet the rules and regulations of the State of Washington were determined and are reflected in the following recommended conditions for the Site Certification Agreement, should the Council recommend approval to the Governor. The draft State Waste Discharge Permit will not be final until the Governor approves the project.

State regulations require that effluent limitations, if applied, must be either water quality- or technology-based, whichever limit is more stringent. Water quality-based limitations are

based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Quality Standards (Chapter 173-200 WAC), and Sediment Management Standards (Chapter 173-204 WAC).

The regulations adopted by the State and administered by the Department of Ecology include procedures for issuing a State Waste Discharge Permit (Chapter 173-216 WAC), issuing an NPDES permit (Chapter 173-220 WAC), water quality criteria for surface and ground waters (Chapters 173-200 and -201A WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is authorized. The regulations also establish the basis for effluent limitations and other requirements which would be applicable. The draft State Waste Discharge Permit is available for review (see Appendix A, Public Involvement, for more detail on the public notice procedures). A glossary of terms used in this fact sheet is included in Appendix B.

Process wastewater from the cogeneration project will be sent to the BP refinery for treatment and regulated by the refinery's NPDES permit subject to state and federal water quality standards for surface waters and state sediment management standards. Stormwater will be discharged to mitigated wetlands in the Terrell Creek drainage. If a wastewater stream is discharged to a non-navigable water body, that waste stream would be regulated under state waste discharge permit requirements and be subject to state water quality standards for surface and ground waters.

The Washington Administrative Code (Chapters 173-216 and –220, and 463-38 WAC) implement the discharge permit requirements of RCW 90.48, establishing conditions on which a permit may be authorized. These include application of "all known available and reasonable methods of prevention, control and treatment" (AKART) and "any conditions necessary to meet applicable water quality standards for surface waters or to preserve or protect beneficial uses for ground waters".

WAC 173-201A establishes water quality standards for state surface waters. Discharge of pollutants are not allowed to cause or contribute to violations of these standards. The Water Quality Standards consist of three parts. The first part of the standards is a categorization system of water bodies based on the expected beneficial uses of those water bodies. Washington's highest classification is Class AA (extraordinary) and the lowest is Class C. The second part of the standards is the water quality criteria deemed necessary to support the uses described for each class. The criteria within a classification are numerical values or narrative statements. The third part of the Water Quality Standards is the anti-degradation policy statement.

The Washington Administrative Code (Chapter 173-200 WAC) establishes water quality standards for state ground waters. Discharge of pollutants are not allowed to cause or contribute to violations of these standards. The standards are the same for all state ground waters. Any facility which is determined to have a potential to contaminate ground water must take preventative measures to protect ground water quality. A facility is determined to

have a potential to contaminate if a regulated substance is discharged and stored in an impoundment (whether lined or unlined).

Limits or conditions for all pollutants that may have been reported in the ASC by the Applicant as being present in the discharge are not necessarily developed for a proposed discharge. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulations, or do not have a reasonable potential to cause a water quality violation**.**

Effluent limits or conditions were not developed for pollutants that may be in the discharge but were not known and/or reported in the ASC by the Applicant. It is therefore recommended that the draft State Waste Discharge Permit not authorize the discharge of non-reported pollutants.

The effluent which is ultimately discharged may be different from that reported or anticipated in the ASC. If other constituents or pollutants are introduced or found, or significant changes occur in the effluent from that known or anticipated at this time, the Certificate Holder should be required to notify both the Council and the appropriate Department of Ecology staff providing compliance monitoring for the Council. The Certificate Holder may be in violation of the SCA until the draft State Waste Discharge Permit is modified to reflect the discharge of such constituents or pollutants.

TECHNOLOGY BASED LIMITS

PROCESS WASTEWATER DISCHARGE

A conservative analysis of the cogeneration process wastewater characteristics and flow was conducted by the Applicant to evaluate potential impacts on the existing refinery discharge to the Strait of Georgia. This analysis included a review of the refinery wastewater treatment design capacity and projected changes to the amount of capacity available at the time that the cogeneration facility begins operation. Changes to organic and hydraulic loading to the refinery's wastewater treatment system as a result of increases in the refinery's crude throughput, the addition of other new process wastewater streams, and the addition of the cogeneration process wastewater were evaluated. The treatment efficiencies and other information collected in the refinery treatment system efficiency study were used in this evaluation. It appears that with these projected increases in loading, that the approximately 60-65% of the organic and hydraulic capacity of the wastewater treatment system will be utilized, an increase of 10-15% over the existing condition and well within acceptable standards.

It was determined from this analysis that there will be no adverse effects on the refinery's wastewater treatment system and the cogeneration's process wastewater will not cause the refinery to exceed any of the refinery's NPDES permit limitations.

The discharge to the refinery's wastewater treatment system will not require technology-based conditions except that the cogeneration facility must use "all known available and

reasonable methods (AKART) of treatment, prevention, and control" of the discharge of pollutants into the process wastewater.

After startup and steady state operation of the cogeneration facility, an initial characterization of the process wastewater will be required. Regular process wastewater monitoring will then be required to ensure that there are no significant changes in the characteristics of the discharge (quality and quantity).

OIL/WATER SEPARATOR DISCHARGE

The discharge from the stormwater system's oil/water separators must comply with current technology-based limits for oil and grease. These limits are reflected in the draft State Waste Discharge Permit.

WATER QUALITY BASED LIMITS

HYDROSTATIC TESTING WASTEWATER DISCHARGE

Hydrostatic testing wastewater generated during construction of the facility should be characterized to determine if it can be properly disposed of in the refinery wastewater treatment system.

PROCESS WASTEWATER DISCHARGE

An analysis was conducted to evaluate the projected metal concentrations in the blended cogeneration wastewater stream to be discharged to the refinery. The metal concentrations in the cogeneration process wastewater were compared to state water quality standards at different stages: prior to combining with refinery process wastewater, when mixed with refinery process wastewater influent, and following treatment of the combined flows. Removal percentages calculated from data collected in the refinery treatment system efficiency study were applied to the metal concentrations to determine approximate removal through the refinery wastewater treatment system. Dilution factors authorized in the refinery's NPDES permit were also applied. It was determined that the metal concentrations in the combined discharge were well within state acute and chronic marine water quality standards.

Ground Water Quality Standards (Chapter 173-200 WAC) exist in the State of Washington to protect beneficial uses of groundwater. This requirement does not apply to the cogeneration facility since the process area will be covered with an impervious surface and the stormwater detention ponds will be lined.

STORMWATER DISCHARGE

The stormwater discharge to the Terrell Creek drainage wetlands must meet Class AA Surface Water Quality Standards (SWQS) for fresh water and Ground Water Quality Standards (GWQS) before discharge to the wetlands. Stormwater not meeting Class AA SWQS or GWQS must be treated to meet the standards or sent to the refinery's wastewater treatment system. It is anticipated that the stormwater discharge will contain oil and grease, suspended solids, dissolved solids, and possibly copper, iron and zinc (from the metal

buildings and parking area). The stormwater discharge should be required to be monitored for oil and grease, TSS, and priority pollutant metals. Recommended limits are reflected in the draft State Waste Discharge Permit.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (Chapter 173-216-110 and -125 WAC and 40 CFR 122.41) to verify the treatment process is functioning correctly and the effluent limitations are being achieved. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. A proposed monitoring schedule is outlined in the draft State Waste Discharge Permit.

LAB ACCREDITATION

With the exception of certain parameters, the Site Certification Agreement should require all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* Flow, temperature, settleable solids, and internal process control parameters are exempt from this requirement.

NON-ROUTINE AND UNANTICIPATED DISCHARGES

Occasionally, this facility may generate wastewater which has not been characterized 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 usually clean waste waters but may be contaminated with pollutants. The draft State Waste Discharge Permit contains an authorization for non-routine and unanticipated discharges. This will require a characterization of these waste waters 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 to the refinery wastewater treatment system or to the stormwater ponds for clean water or require the water to be reused.

REPORTING AND RECORDKEEPING

The draft State Waste Discharge Permit conditions are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (Chapter 173-216-110 WAC).

SOLID WASTE CONTROL PLAN

The Certificate Holder should be required to have a Solid Waste Control Plan. This plan should address all solid wastes with the exception of those solid wastes regulated by Chapter 173-303 WAC (Dangerous Wastes). The plan should also include a general description and the composition, source, generation rate and frequency, and disposal methods of these solid wastes. This plan must be consistent with Chapters 173-304 and 173-350 WAC and any approved local solid waste management plan.

It is recommended that the Certificate Holder develop and submit a Solid Waste Control Plan for review and approval by the Council two months prior to operation. The Certificate Holder should also be required to submit an update of the Solid Waste Control Plan with the application for renewal of the draft State Waste Discharge Permit.

OPERATIONS AND MAINTENANCE MANUAL

An operation and maintenance manual for the wastewater and stormwater treatment system should be required. It should be prepared and implemented in accordance with Chapters 173-216-110 WAC and 173-240-150 WAC. The Certificate Holder should, at all times, properly operate and maintain all facilities or systems of treatment and control (and related appurtenances) which are installed to achieve compliance with these terms and conditions. Proper operation and maintenance should also include adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed only when the operation is necessary to achieve compliance with the conditions.

A wastewater and stormwater treatment system Operations and Maintenance (O&M) Manual is recommended to be prepared in accordance with Chapter 173-240-150 WAC and is recommended be submitted to the Council for review and approval two months prior to operation. The O&M Manual should be reviewed and updated by the Certificate Holder at least annually. As part of this update, the list of chemical additives being used in the cooling water along with MSDS sheets should be provided. This annual review and update should be confirmed by letter to the Council. All substantial changes or updates to the O&M Manual should be submitted to the Council whenever they are incorporated into the manual.

The approved O&M Manual should be kept available at the facility and all operators should be trained to follow the instructions and procedures of this manual.

ISSUANCE PROCEDURES

MODIFICATIONS

The Council should retain authority to modify these conditions and impose numerical or other limitations or requirements to meet or protect Water Quality Standards based on new information obtained from sources such as inspections, effluent monitoring, effluent or hydrogeologic studies, or other analyses or studies. The Council should also retain authority to modify these conditions as a result of new or amended state or federal regulations.

GENERAL CONDITIONS

General conditions are recommended based directly on state and federal law and regulations that have been standardized for all individual industrial discharge conditions normally issued by the Department of Ecology for similar industries.

FACILITY OPERATION

Condition G1. outlines the signatory requirements for submittals to the Council. Condition G2. would require the Certificate Holder to allow the Council to access the treatment

system, production facility, and records related to the Site Certification Agreement. Condition G3. would require the Certificate Holder to control its production in order to maintain compliance with the conditions. Condition G4. states that removed substances shall not be resuspended or reintroduced into the final effluent stream.

SITE CERTIFICATION AGREEMENT CHANGES

Condition G5. would specify conditions for modifying, suspending or terminating the state waste discharge conditions. Condition G6. would require the Certificate Holder to report to the Council any activity that has or could occur which would affect the characteristics of the facility effluent. Condition G7. would require the Certificate Holder to construct, modify and operate the wastewater and stormwater treatment and control facilities in accordance with approved engineering documents.

OTHER REGULATORY REQUIREMENTS

Condition G8. would prohibit the Certificate Holder from using the State Waste Discharge Permit as a basis for violating any laws, statutes or regulations.

RECOMMENDATIONS FOR PERIODIC REVIEW OF WASTEWATER CONDITIONS

The proposed conditions outlined in the draft State Waste Discharge Permit meet all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. It is recommended that the Council subject these wastewater discharge conditions to a periodic review period of 5 years from the date of the Governor's approval of the project. At least 180 days prior to the end of the initial 5-year period, the Certificate Holder should submit information concerning their wastewater treatment and discharge. This information should follow the format of the informational requirements of the Washington State Department of Ecology's State Waste Discharge Application, or an equivalent format.

This periodic review and renewal of the State Waste Discharge Permit associated with wastewater, stormwater, and sanitary sewer discharges should not require a modification of the Site Certification (SCA) triggering Governor approval. (Condition G9)

REFERENCES

BP Cherry Point Cogeneration Project, Application for Site Certification, Volumes 1, 2 and 3, June 2002.

BP Cherry Point Cogeneration Project, Draft Application for a State Waste Discharge Permit, September 11, 2002.

Water Quality Program Permit Writer's Manual, Department of Ecology, (Publication 92-109), January 2001.

Laws and Regulations, Department of Ecology, (http://www.ecy.gov/laws-rules/laws-etc.html).

Permit and Wastewater Related Information, Department of Ecology, (www.ecy.gov/programs/wq/wastewater/index.html).

Stormwater Management Manual for Western Washington (Publication Numbers 99-11 through 99-15), August 2001.

The Industrial Stormwater General Permit, Draft, Department of Ecology, August 22, 2002 (Issuance Date).

Fact Sheet for Industrial Stormwater General Permit, Final Draft, Department of Ecology.

BP Cherry Point Refinery NPDES Permit and Fact Sheet, WA-002290-0, Department of Ecology, October 1, 1999 (Issuance Date)

BP Cherry Point Refinery Treatment Efficiency Study and Engineering Report, May 2002.

Effect of Future Refinery Projects on Cherry Point's Wastewater Treatment Plant, June 2003.

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EXHIBIT 1

APPLICATION FOR SITE CERTIFICATION, APPENDIX D, FIGURE 1.0-1

CHERRY POINT COGENERATION PROJECT LOCATION MAP

{Insert Figure 1.0-1}

EXHIBIT 2

APPLICATION FOR SITE CERTIFICATION, APPENDIX D, FIGURE 1.0-3

COMPREHENSIVE PLANNING LANDUSE MAP OF WESTERN WHATCOM COUNTY

{Insert Figure 1.0-3}

EXHIBIT 3

APPLICATION FOR SITE CERTIFICATION, APPENDIX D, FIGURE 1.0-4

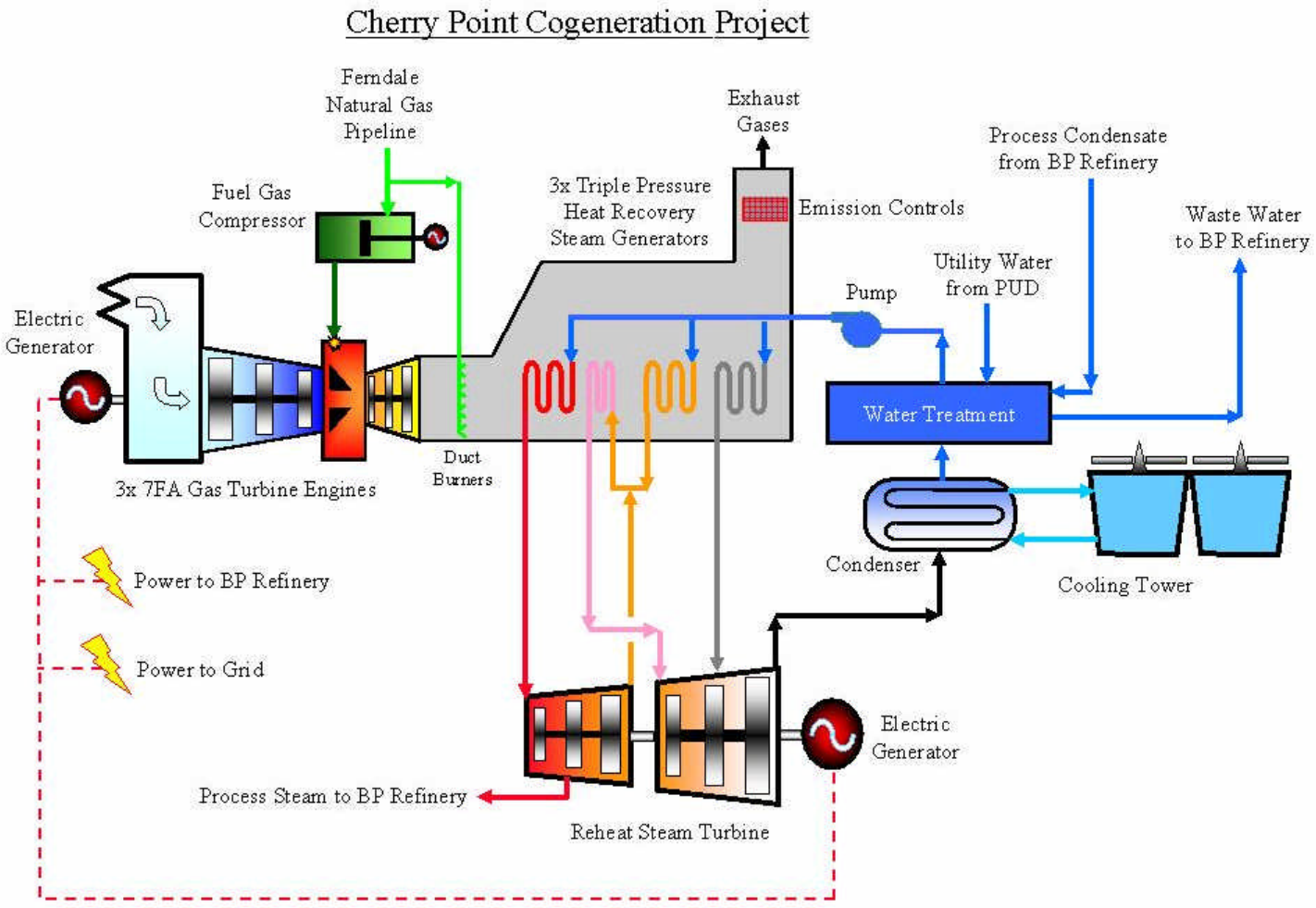
ZONING MAP

{Insert Figure 1.0-4}

EXHIBIT 4

APPLICATION FOR SITE CERTIFICATION, APPENDIX D, FIGURE 2.3-1

PROCESS DIAGRAM



Process diagram, applies to : Part II: Figure 2.1-8; D: Figure 2.3-1; H:Figure 3A

Figure 2.3-1

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EXHIBIT 5A

APPLICATION FOR SITE CERTIFICATION, APPENDIX F, ATTACHMENT A FIGURE 1-A

CONSTRUCTION STORMWATER CONTROL SYSTEM

EXHIBIT 5B

APPLICATION FOR SITE CERTIFICATION, APPENDIX F, ATTACHMENT A FIGURE 1-B

OPERATIONAL STORMWATER CONTROL SYSTEM

EXHIBIT 6
APPLICATION FOR SITE CERTIFICATION, APPENDIX D, TABLE 7.1-1

WASTEWATER FLOWS AND CHEMICAL COMPOSITION

Table 7.1-1 (REVISED, March 2003)

Wastewater Flows and Chemical Composition

	Demin Plant Regeneration Water (Includes Filter Backwash)	Equipment Drain and Washdown Oily Wastewater	Cogeneration Cooling Tower Blowdown
Average Flow (gpm)	54	5	131 - *Note 10*
Peak Flow	300 gpm	50 gpm	400 gpm
Duration	1 hr / day	30 min / day	8 hrs / day
General Parameters			
pH (pH units)	6.5 – 8.5	7.0 – 7.5	8.0 – 9.5 *Note 13*
Dissolved Oxygen (mg/L)	8	8	8
COD	*8 – Note 1*	*65 – Note 1*	*200 Note 12*
BOD	*4 – Note 1*	*33 – Note 1*	*81 Note 12*
Oil & Grease (mg/L)	2	20	0.3
TDS (mg/L)	5000	62	2200
TSS (mg/L)	28	20	50
Temperature (°F)	< 80	< 80	< 100
Major Cation Conc. (mg/L)			
Ca	54	14	207
Mg	20	5	77
Na	1688	11	165
K	3.6	1	14
Major Anions Conc. (mg/L)			
HCO_3	62	67	200
CO_3	0	0	0
Cl	12	3.2	287 – *Note 9*
SO_4	2950	14	1024 – *Note 9*
Trace Metals Conc. (mg/L)			
Ag (Note 2a)	0.004	0.001	0.015
Al (Note 2)	3.0	0.75	11.25
As (Note 2a)	0.004	0.001	0.24 (0.512) – *Note 7*
Ba (Note 2)	0.072	0.018	0.27

Source: Bechtel, Edge Analytical Test (Reference # 01-4184, 08/29/2001)

Table 7.1-1 Wastewater Flows and Chemical Composition, continued

	Demin Plant Regeneration Water (Includes Filter Backwash)	Equipment Drain and Washdown Oily Wastewater	Cogeneration Cooling Tower Blowdown
Trace Metals Conc. (mg/L)			
Be (Note 2a)	0.004	0.001	0.015
Cd (Note 2a)	0.004	0.001	0.015
Cr (Note 2)	0.008	0.002	0.20 (0.918) – *Note 7*
Co (Note 2a)	0.02	0.005	0.075
Cu (Note 2a)	0.02	0.005	0.23 (0.291) – *Note 7*
Fe (Note 2)	0.308	0.077	1.16
Hg (Note 2a)	0.002	0.0005	0.0075
Mn (Note 2)	0.588	0.147	2.205
Ni (Note 2a)	0.004	0.001	0.015
Pb (Note 2a)	0.004	0.001	0.015
Sb (Note 2a)	0.004	0.001	0.015
Se (Note 2a)	0.004	0.001	0.015
Sn (Note 2a)	0.16	0.04	0.6
Tl (Note 2a)	0.004	0.001	0.015
V (Note 2)	0.036	0.009	0.135
Zn (Note 2)	0.04	0.01	2.0 – *Note 9*
Other Anions Conc (mg/L)			
SiO_3	40	10	150
PO_4	2.0	0.5	10 – *Note 9*
F (Note 2a)	2.0	0.5	7.5
NO_3/NO_2	4.0	1.0	15
NH_3/NH_4	*Note 3*	*Note 3*	*Note 3*
Br (Note 2a)	0.02	0.005	0.075
Organics Conc. (mg/L)			
Dissolved Organic Carbon	*Note 4*	*Note 4*	*Note 4*
Polymers (polyquarternaryamine)	19 – *Note 5*	0	0
Polymers (polyacrylamide)	0	0	10 – *Note 8*
Total Organic Carbon	*48 – Note 6*	*12*	*50 - Note 11*

Source: Bechtel, Edge Analytical test report (Reference # 01-4184, 08/29/2001)

Notes for Table 7.1-1: Wastewater Flows and Chemical Composition

Note 1: Based on typical ratio between oil and grease, COD and BOD in industrial wastewaters.

Note 2: Trace metal data reported, except Aluminum (Al), are based on a single test report by Edge Analytical (Ref 01-4184, 08/29/2001). Actual quantities will be related to background concentrations as follows:

For **Denim Plant Regeneration Water (Includes Filter Backwash)**, the actual concentration will be approximately 4 times the background concentration in the Whatcom PUD water.

For **Equipment Drain and Washdown Oily Wastewater**, the actual concentration will be the background concentration in the Whatcom PUD water.

For **Cogeneration Cooling Tower Blowdown**, the actual concentration will be approximately 15 times the background concentration in the Whatcom PUD water.

Values for Aluminum are based on historical average values as supplied by Whatcom County PUD and concentrated on the same basis as the rest of the trace metals.

Note 2a: The Edge Analytical test showed no detectable quantity of this component. The quantities shown are based on the detection limit for the analytical test and are concentrated by 1, 4, or 15 times as described in Note 2.

Note 3: Not detected in site samples; not normally present in surface waters at detectable levels.

Note 4: Included with Total Organic Carbon concentration value.

Note 5: This type of polymer may be used to treat makeup water, which is filtered prior to demineralization.

Note 6: This is an assumed value and is based on (4) times the value typical for surface waters subject to elevated TOC due to seasonal runoff.

Note 7: This is an estimated value, and is 15 times the value obtained in a test performed by Edge Analytical (Reference # 01-4184) plus the highest anticipated leachate rate from CCA-C wood used in cooling tower construction. This highest concentration occurs initially upon cooling tower startup. Over a period of about one year, this initial concentration would decrease about 40–80%. The number in parenthesis is the highest initial concentration; the other number in the cell is the longer-term concentration.

Note 8: This type of polymer may be used as a dispersant in the cooling tower recirculating water.

Note 9: This value reflects addition of this substance to the cooling tower recirculating water to control pH and limit biofouling and corrosion.

Note 10: This value could increase to 203 GPM if the cooling tower is operated at 10 cycles of concentration as opposed to 15. Concentrations of chemical species relating to the cooling tower would then be reduced in inverse proportion. Total mass flow of species

listed would remain constant. Since 10-cycle operation requires 72 gpm more make-up water on an average basis than 15-cycle operation, fresh water requirements for the Cogeneration Project in this ASC are given for 10-cycle operation.

Note 11: This value is based on a typical average surface water TOC concentration of 3 to 4 mg/L, with the cooling tower operating at 15 cycles of concentration.

Note 12: Based on typical ratios between TOC, COD, and BOD in municipal waste waters; which represent these relationships when the TOC, COD, and BOD are not derived from petrochemical wastes.

Note 13: Normal control range: 8.2 to 8.8 pH

EXHIBIT 7

APPLICATION FOR SITE CERTIFICATION, APPENDIX D, TABLE 8.2-1

POTENTIAL IMPACT OF PROPOSED COGENERATION PROJECT ON THE EXISTING REFINERY WASTEWATER DISCHARGE TO OUTFALL 001 TO THE STRAIT OF GEORGIA

TABLE 8.2-1 (REVISED, March 2003)

Potential Impact of Proposed Cogeneration Project On The Existing Refinery Wastewater Discharge To Outfall 001 To The Strait Of Georgia

Parameter	Cogen Project contribution (averages, converted to unit of measure used in NPDES limit)	Percent increase due to Cogen contribution	Combined Flow, Percent of NPDES Limit
Discharged Flow (gpm)	190	8.1%	NL
Discharged Flow (mgd)	0.27	8.1%	NL
Production (bbls/day)	---	---	NL
Temperature (°F, max.)	---	---	a
Biochemical Oxygen Demand (lbs/day)	132	1.0%	22%
Chemical Oxygen Demand (lbs/day)	323	0.6%	26%
Total Suspended Solids (lbs/day)	98	14.9%	50%
Oil & Grease (lbs/day)	3.0	0.1%	32%
Phenolic compounds (lbs/day)	0.0	0.0%	27%
Ammonia as N (lbs/day)	0.0	0.0%	13%
Sulfide (lbs/day)	0.0	0.0%	10%
Total Chromium (lbs/day)	1.45	b	12%
Hexavalent Chromium (lbs/day)	0.0	0.0%	0%
Fecal Coliform (organisms/100mls)	0.0%	0.0%	0%
pH (maximum)	6.5-9.5	-1.0%	c

(a) No Change
(b) Not calculated because denominator equals zero
(c) Not calculated because pH is a logarithmic scale

APPENDIX A: PUBLIC INVOLVEMENT INFORMATION

The Department of Ecology, as a contractor to EFSEC, has prepared this recommendation for a State Waste Discharge Permit for the Application listed on page 1 of this fact sheet. This draft State Waste Discharge Permit contains conditions and effluent limitations which would ensure that all applicable state and federal discharge requirements are met should the Council recommend approval of this proposal to the Governor, and should the Governor approve this project.

On November 7, 2003 the Council made this draft permit and associated fact sheet available to the public for comment. Interested persons are invited to submit written comments regarding this draft State Waste Discharge Permit.

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 State Waste Discharge Permit.

To be considered, comments must be postmarked no later than December 12, 2003. Public comments on this document will also be taken during the public witness testimony session to be held during the adjudicative hearings, scheduled as follows:

Tuesday December 9, 2003 – Starting at 7:00 PM
Blaine Performing Arts Center
975 H Street, Blaine, Washington, 98230

Written comments should be mailed to: Allen Fiksdal, EFSEC Manager, PO Box 43172, Olympia, Washington 98504-3172, or by e-mail to efsec@ep.cted.wa.gov.

Additional information about this proposal (the application and the draft environmental impact statement) is available for public reference at the following locations:

Washington State Library Joel M. Pritchard Library Point Plaza East 6880 Capitol Blvd Tumwater, WA, 98504-2460 (360) 704-5200 Energy Facility Site Evaluation Council 925 Plum Street SE, Building 4 Olympia, WA, 98504-3172 (360) 956-2121	Whatcom County Library 610 Third Street Blaine, WA 98230 Whatcom County Library P.O. Box 1209 Ferndale, WA 98248 Bellingham Library 210 Central Avenue Bellingham, WA 98225-4421	Semiahmoo Library #200 1815 152 Street, Surrey, BC V4A 9Y9 Canada White Rock Public Library 15342 Buena Vista Avenue White Rock, BC V4B 1Y6 Canada

APPENDIX B: GLOSSARY

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

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

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

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

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

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

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.

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

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.

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.

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).

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.

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.