FACT SHEET

Public Comment Period Start Date: February 6, 2009
Public Comment Expiration Date: March 9, 2009

The United States Environmental Protection Agency (EPA)
Plans To Reissue A National Pollutant Discharge Elimination System (NPDES) Permit
And
Notice of State Certification

CH2M HILL PLATEAU REMEDIATION COMPANY, LLC (CHPRC)
DEPARTMENT OF ENERGY
HANFORD NUCLEAR RESERVATION
BENTON COUNTY, WASHINGTON 99352

Technical Contact:
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EPA Proposes To Reissue NPDES Permit

EPA proposes to reissue the NPDES permit to the facility referenced above. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility.

This Fact Sheet includes:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations, and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the permit

401 Certification for Facilities that Discharge to State Waters

EPA is requesting that the Washington State Department of Ecology (Ecology) certify the NPDES permit for this facility, under section 401 of the Clean Water Act. This Notice also serves as Public Notice of the intent of the State of Washington to consider certifying that the subject discharge will comply with the applicable provisions of Sections 208(e), 301, 302, 303, 306, and 307 of the Clean Water Act. The NPDES permit will not be issued until the

certification requirements of Section 401 have been met.

Public Comment

Persons wishing to comment on, or request a Public Hearing for the draft permit for this facility may do so in writing by the expiration date of the Public Comment period. A request for a Public Hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for Public Hearings must be in writing and should be submitted to EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, EPA's Regional Director for the Office of Water and Watersheds will make a final decision regarding permit reissuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If comments are received, EPA will address the comments and issue the permit. The permit will become effective 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days.

Documents are Available for Review.

The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday (see address below). The draft permit, fact sheet, and other information can also be found by visiting the Region 10 website at "www.epa.gov/r10earth/water.htm."

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, Suite 900, OWW-130
Seattle, Washington 98101
(206) 553-2108 or
1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permit are also available at:

EPA Washington Operations Office
300 Desmond Drive SE
Lacey, Washington 98503
(360)-407-7564 or (800) 917-0043

TABLE OF CONTENTS

ACRONYMS

7Q10	7 day, 10 year low flow
AML	Average Monthly Limit
BAT	Best Available Treatment Technology Economically Achievable
BPT	Best Practicable Control Technology Currently Available
BOD_5	Biochemical oxygen demand, five-day
BE	Biological evaluation
^oC	Degrees Celsius
cfs	Cubic feet per second
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
I/I	Inflow and Infiltration
lbs/day	Pounds per day
LTA	Long Term Average
mg/L	Milligrams per liter
ml	Milliliters
ML	Minimum Level
µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit
MPN	Most Probable Number
N	Nitrogen
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
OW	Office of Water
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
s.u.	Standard Units
TMDL	Total Maximum Daily Load
TRE	Toxicity Reduction Evaluation
TSD	Technical Support document (EPA, 1991)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Services
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WWTP	Wastewater treatment plant

I. APPLICANT

This fact sheet provides information on the draft NPDES permit for the following entity:

CH2M HILL Plateau Remediation Company
Department of Energy
NPDES Permit Number: WA-0002591-7

Mailing Address:
P.O. Box 1600.
Richland, Washington 99352

Facility Contact:
Sonya Moore, Environmental Specialist 509-372-3320

II. FACILITY INFORMATION

Hanford discharges at two locations. Area 300 discharges through Outfall 001 at 46° 23' 3.5" N, 119° 16' 22.7" W, River Mile (R.M.) 345.5. Area 100 is about 45 miles to the north and discharges through Outfall 004 at 46° 39' 16" N, 119° 36.2" W, River Mile (R.M.) 381. A location map is shown in Appendix A.

Area 300

The 300 Area Treated Effluent Disposal Facility (TEDF) receives wastewater from laboratory facilities, office buildings, maintenance shops and other support facilities in the 300 Area. Wastewater is generated from heating, ventilation, air conditioning systems, drains, sinks, stormwater, process equipment and other laboratory and maintenance activities. Some wastewater generated by other areas on the Hanford reservation by similar facilities and processes are treated at the TEDF. A list is shown in Appendix A. The TEDF subsurface outfall is located in the west channel of the Columbia River where Johnson Island splits the river flow.

Pollutants are treated by an advanced treatment system comprised of chemical precipitation, coagulation, flocculation, sedimentation, multimedia filtration, neutralization, ion exchange and ultraviolet oxidation.

Many of the discharges have been eliminated and the remaining sources are of low volume and concentration.

1. As a research and development laboratory, a wide variety of waste streams are generated, but they are of low volume and primarily water. Hazardous and radioactive wastes are prohibited from discharge to the Hanford sewer system.

2. Heating, air conditioning and ventilation wastewater discharges, which include condensates, will be reduced or eliminated during the permit cycle. Planning is underway to send the waste stream to the City of West Richland sanitary sewer system which is covered by Ecology issued permit NPDES WA-005106-3.

3. All maintenance shop discharges to the process sewers have been eliminated as part of the 300 Area cleanup. Maintenance shop discharges from the 350 and 329 buildings currently discharge to the City of West Richland sanitary sewer.

4. There are no production facilities in the 300 Area.

Area 100

Area 100 is comprised of potable service water used for buildings and fire suppression in the 100 area discharging through Outfall 004. The 100K water system includes a pump house, raw water storage basin, filtration plant, Clearwell (water storage, two potable water treatment plants (185KE and 183KE) and Outfall 004. Water is pumped from the Columbia River through the 181KE pump station intake structure. From the 181KE intake structure, the water is pumped to the above ground storage basin for sedimentation. After sedimentation, the water is filtered and stored in a below ground clearwell. The 185 KE potable water plant takes water from the sedimentation basin and filters it for immediate use, or storage in the clearwell. Filter backwash from the 185KE water treatment plant is discharged to the 183KE number six basin for discharge to the Columbia River through Outfall 004. The discharges consist of filter backwash water from Basin #6 and chlorine contact tank flushing that discharges approximately 24 times a year and quench water to remove the thermal load from Outfall 004. The seven foot diameter outfall discharges at a depth of 36 feet. Fire suppression wastewater, leaks and line breaks are unintentional and non-routine discharges that do not need authorization under the reissued NPDES permit. Hanford has never had a fire, line breaks or leaks that resulted in a discharge. These include raw return water to the Columbia River from Basins No. 2, 3, 4, 5 and 7 and Clear Wells KW and KE. These rarely discharge. A flow diagram is shown in Appendix A.

Discharge 003 is Columbia River water that was used to wash the intake structure for the 100 Area water treatment plant and this backwash was discharged to the Columbia River. There has been no discharge for the last five years. A tanker truck is now used to collect the screen backwash and transport it to a basin in the water treatment system. No future discharges are planned. Outfall 003 is eliminated in the reissued permit.

The previous NPDES Permit for this facility became effective on May 5, 1999 and expired on May 5, 2004. Flour Hanford submitted a permit application package on November 5, 2003 and submitted an update to the application on May 25, 2007.

The application from the permittee for the expired but extended permit requested authorization to route additional waste streams to the TEDF which the permittee believed were amenable to treatment and discharge. These wastes were managed pursuant to the State of Washington Dangerous Waste Regulations, WAC 173-303. That application estimated TEDF influent and effluent concentrations after addition of these wastes. Hazardous waste discharges are authorized under the existing permit as designation "Outfall 001 after routing of wastes designated as 'dangerous' to TEDF pursuant to WAC 173-303-071(3)9b)".

However, during the last ten years Hanford did not discharge hazardous waste. A supplement to the application dated December 12, 2008 clarified authorization of hazardous waste discharges is no longer needed. Conditions and requirements from the previous permit have been administratively extended until the NPDES permit is reissued.

The permit was transferred to CH2M HILL Plateau Remediation Company, LLC (CHPRC) on October 1, 2008.

EPA last inspected the facility on July 15, 2008.

The previous permit included the following effluent limits and monitoring requirements:

Table 1: Effluent Limitations and Monitoring Requirements from the Previous Permit
Area 300 TEDF Outfall 001

Parameter	Monthly Avg. µg/l	Daily Max µg/l	Sampling Frequency	Type of Sampling
Flow - MGD	---	---	Continuous	Recording
Bis(2-ethylhexyl)phthalate	10	20	Twice per month	Grab
Dichlorobromomethane	2.2	4	Twice per month	Grab
Methylene Chloride	5	10	Twice per month	Grab
Toluene	6	9	Twice per month	Grab
1,1,1 Trichloroethane	5	9	Twice per month	Grab
Trichloroethylene	1.9	3	Twice per month	Grab
Chloroform	15	26	Twice per month	Grab
1,1-Dichloroethane	4.7	7	Twice per month	Grab
Tetrachloroethylene	5	9	Twice per month	Grab
Aluminum (Al)	215	372	Twice per month	Grab
Arsenic (As)	5	9	Twice per month	Grab
Beryllium (Be)	2	4	Twice per month	Grab
Cadmium (Cd)	2	4	Twice per month	Grab
Copper (Cu)	10	15	Twice per month	Grab
Cyanide (Cn)	6	10	Twice per month	Grab
Iron (Fe)	846	1460	Twice per month	Grab
Lead (Pb)	4	8	Twice per month	Grab
Manganese (Mn)	10	17	Twice per month	Grab
Mercury (Hg)	0.9	1.5	Twice per month	Grab
Nickel (Ni)	35	60	Twice per month	Grab
Nitrite (NO_2^-)	60	104	Twice per month	Grab
Selenium (Se)	5	7	Twice per month	Grab
Silver (Ag)	6	10	Twice per month	Grab
Zinc (Zn)	25	43	Twice per month	Grab
Radium, Total pCi/l	0.2	0.4	Twice per month	Grab
Suspended Solids (TSS)	3000	9000	Twice per month	Grab
Temperature°F (°C)	95 (35)	105 (40.6)	Continuous	Recording
Total Ammonia (as N)	---	---	Twice per month	Grab
Gross Alpha (pCi/l)	---	---	Twice per month	Grab
Gross Beta (pCi/l)	---	---	Twice per month	Grab
pH	6.0-9.0		Continuous	Recording

Table 2: Effluent Limitations and Monitoring Requirements from the Previous Permit
Area 300 TEDF Outfall 001
After Routing of Wastes Designated as "Dangerous"

Parameter	Monthly Avg. µg/l	Daily max µg/l	Sampling Frequency	Type of Sampling
Flow - MGD	---	---	Continuous	Recording
Bis(2-ethylhexyl)phthalate	50	100	Twice per month	Grab
Dichlorobromomethane	3	5	Twice per month	Grab
Methylene Chloride	50	100	None	
Toluene	50	9	Twice per month	Grab
Methyl Ethyl Ketone	50	100	None	
1,1,1 Trichloroethane	5	10	Twice per month	Grab
Trichloroethylene	3	5	Twice per month	Grab
Chloroform	15	26	Twice per month	Grab
1,1-Dichloroethane	5	10	Twice per month	Grab
Tetrachloroethylene	5	10	Twice per month	Grab
Aluminum (Al)	550	1000	Twice per month	Grab
Arsenic (As)	5	9	Twice per month	Grab
Beryllium (Be)	5	7	Twice per month	Grab
Cadmium (Cd)	8	17	Twice per month	Grab
Copper (Cu)	49	88	Twice per month	Grab
Cyanide (Cn)	7	14	Twice per month	Grab
Iron (Fe)	846	1460	Twice per month	Grab
Lead (Pb)	9	16	Twice per month	Grab
Manganese (Mn)	10	17	Twice per month	Grab
Mercury (Hg)	1	3	Twice per month	Grab
Nickel (Ni)	35	60	Twice per month	Grab
Nitrite (NO_2^-)	60	104	Twice per month	Grab
Selenium (Se)	6	9	Twice per month	Grab
Silver (Ag)	6	9	Twice per month	Grab
Zinc (Zn)	42	70	Twice per month	Grab
Radium, Total pCi/l	0.2	0.4	Twice per month	Grab
Suspended Solids (TSS)	3000	9000	Twice per month	Grab
Temperature°F (°C)	95 (35)	105 (40.6)	Continuous	Recording
Total Ammonia (as N)	---	---	Twice per month	Grab
Gross Alpha (pCi/l)	---	---	Twice per month	Grab
Gross Beta (pCi/l)	---	---	Twice per month	Grab
pH	6.0-9.0		Continuous	Recording

Table 3: Effluent Limitations and Monitoring from the Previous Permit
Area 100 Water Supply System - Outfall 004

Parameter	Monthly Avg.	Daily Max	Sampling Frequency	Type of Sampling
Flow - MGD	2.0	4.9	Continuous	Recording
Temperature°F	---	80	Continuous	Recording
Free Available Chlorine mg/L	0.08	0.1	weekly	Grab
pH	6.0-9.0		Continuous	Recording

Table 4: Effluent Limitations and Monitoring from the Previous Permit Filter Plant Backwash Water - Outfall 004B				
Parameter	**Monthly Avg.**	**Daily Max.**	**Sampling Frequency**	**Type of Sampling**
Flow - MGD	0.6	0.6	Each Discharge	Total
Total Suspended Solids mg/L	30	45	Weekly	Grab

Monitoring data from January 2002 through June 2007, were reviewed to determine the facility's compliance with the previous effluent limits. Review of these data found no violations of its effluent limits within the past five years.

III. RECEIVING WATER

A. Water Quality Standards

Section 301(b)(1)(c) of the CWA requires the development of limitations in permits necessary to meet water quality standards. Federal regulations in 40 CFR 122.4(d) prohibits the issuance of an NPDES permit which does not ensure compliance with the water quality standards of all affected States.

A State's water quality standards are composed of use classifications, numeric and narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses (such as cold water biota, contact recreation, etc.) that each water body is expected to achieve. The numeric and narrative water quality criteria are the criteria deemed necessary, by the State, to support the beneficial uses as well as to maintain and protect various levels of water quality and uses.

WAC 173-201A-602, Table 602, establishes the following designated uses for the Columbia River in the area of discharges.

Aquatic Life Uses:	Spawning and Rearing
Recreation Uses:	Primary Contact
Water Supply Uses:	Domestic Water Industrial Water Agricultural Water
Miscellaneous Uses:	Wildlife Habitat Harvesting Commerce Navigation Boating Aesthetics

The temperature standard between the Washington-Oregon border (river mile 309.3) to Priest Rapids Dam (river mile 397.1) is specified as a special criteria as shown in the table below.

Table 5 Temperature and Aesthetic Standards		
Pollutant	**Basis**	**Criteria**
Temperature	WAC 173-201A-602 Table 602 for the Columbia River, Footnote 2	Temperature shall not exceed a 1-DMax of 20.0°C due to human activities. When natural conditions exceed a 1-DMax of 20.0°C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C; nor shall such temperature increases, at any time, exceed $t = 34/(T + 9)$ where T represents the background temperature
Aesthetics	WAC 173-201A-200(2) for protection of Recreational, Water Supply, and Miscellaneous Fresh Water Uses	Aesthetic values shall not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste.

The Water Quality Standards for the other parameters as required in "Surface Waters of the State of Washington Chapter 173-201A WAC Amended November 20, 2006" are listed in the spreadsheet Reasonable Potential Calculation for Aquatic Life and Reasonable Potential Calculation for Human Health in Appendix B.

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 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).

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.

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.

Not only is Hanford not planning new or expanded actions it is reducing discharges by routing them to the City of West Richland POTW.

Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

This facility must meet Tier I requirements.

EPA's analysis described in this fact sheet demonstrates that the existing and designated uses of the receiving water will be protected under the conditions of the proposed permit. The advanced treatment system, high dilution ratio and no reasonable potential to violate water quality standards with the existing discharges insures no degradation of the existing water quality of the Columbia River.

IV. EFFLUENT LIMITATIONS

A. Basis for Permit Effluent Limits

In general, the CWA requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality based effluent limit is designed to ensure that the water quality standards of a waterbody are being met and they may be more stringent than technology-based effluent limits. The basis for the proposed effluent limits in the draft permit are provided in Appendix B.

B. Proposed Effluent Limitations

Table 6 presents the proposed average monthly and maximum daily effluent limitations for the Area 300 TEDF, Outfall 001.

Table 6: Effluent Limitations and Monitoring Requirements
Area 300 TEDF Outfall 001

Parameter	Monthly Avg. µg/l	Daily Max µg/l	Sampling Frequency	Type of Sampling
Flow - MGD	---	---	Continuous	Recording
Dichlorobromomethane	2.2	4	Once per quarter	Grab
Methylene Chloride	5	10	Once per quarter	Grab
Chloroform	15	26	Twice per month	Grab
1,1-Dichloroethane	4.7	7	Twice per month	Grab
Aluminum (Al)	215	372	Once per quarter	Grab
Arsenic (As)	5	9	Once per quarter	Grab
Iron (Fe)	846	1460	Once per quarter	Grab
Lead (Pb)	4	8	Once per quarter	Grab

Table 6: Effluent Limitations and Monitoring Requirements Area 300 TEDF Outfall 001				
Parameter	**Monthly Avg. µg/l**	**Daily Max µg/l**	**Sampling Frequency**	**Type of Sampling**
Manganese (Mn)	10	17	Once per quarter	Grab
Mercury (Hg)	0.9	1.5	Once per quarter	Grab
Nickel (Ni)	35	60	Once per quarter	Grab
Nitrite (NO_2^-)	60	104	Once per quarter	Grab
Selenium (Se)	5	7	Once per quarter	Grab
Zinc (Zn)	25	43	Once per quarter	Grab
Radium, Total pCi/l	0.2	0.4	Twice per month	Grab
Temperature °F (°C)	95 (35)	105 (40.6)	Continuous	Recording
Total Ammonia (as N)	---	---	Twice per month	Grab
Gross Alpha (pCi/l)	---	---	Twice per month	Grab
Gross Beta (pCi/l)	---	---	Twice per month	Grab
pH	6.0-9.0		Continuous	Recording

Outfall 004

Discharges through outfall 004 are from various sources associated with water supply for the 100 area are routed to the 004 discharge. It is noted that some solar heating of the water in the supply system occurs in the 100 area basins and discharge structure. The average flow is less than 20 gallons per minute.

However, complete or near complete mixing of effluent and receiving water is accomplished within the seven foot diameter outfall pipe and there appears to be no reasonable potential for temperature criteria to be exceeded in the river from this discharge.

Table 7: Effluent Limitations and Monitoring Requirements Area 100 Water Treatment Plant Outfall 004				
Parameter	**Monthly Avg.**	**Daily Max**	**Sampling Frequency**	**Type of Sampling**
Flow - MGD	---	---	continuous	recording
Temperature	---	80	continuous	recording
Total Residual Chlorine mg/L	0.08	0.1	once per quarter	grab
pH	6.0-9.0		continuous	recording
Acute WET Limit	The acute toxicity limit shall be no statistically significant difference in test organism response between the acute critical toxicity concentration (ACEC), 1.6 % of the effluent, and the control.			
Footnotes: 1 - These parameters must be analyzed and reported as total recoverable. 2 - Mercury must be analyzed and reported as total. 3 - Reporting is required within 24 hours of a maximum daily limit violation for all parameters. See Part III.G. 4 - See Part I.B. for whole effluent toxicity testing requirements.				

Table 8: Limitations and Monitoring Requirements Area 100 Filter Plant Backwash Water Outfall 004B				
Parameter	**Monthly Avg. µg/l**	**Daily Max µg/l**	**Sampling Frequency**	**Type of Sampling**
Flow - MGD	---	---	each discharge	
Total Suspended Solids	30	45	weekly	

Control of Radioactivity and Radionuclides

This proposed permit does not cover any radioactivity and radionuclide parameters except radium which are considered to be a source, byproduct, or special nuclear materials that are controlled by the Department of Energy (DOE) under the Atomic Energy Act (AEA) in accordance with provisions of DOE Order 5400.5, "Radiation Protection of the Public and the Environment". The DOE, Richland Field Office will regulate and monitor the release of radionuclides to the environment pursuant to the AEA.

C Best Management Practices

In accordance with NPDES regulations at 40 CFR 122.44 (k), best management practices (BMPs) can be used to control or abate the discharge of pollutants in several circumstances, including, when numeric effluent limitations are infeasible. BMPs are defined at 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. The inclusion of BMPs as requirements in discharge permits is authorized by CWA Section 304 (e).

Section II.B. of the permit requires the permittee, within 180 days of the effective date of the permit, to develop and implement a BMP Plan to minimize the generation and the potential for the release of pollutants from the facility to the waters of the United States through normal and ancillary activities.

V. MONITORING REQUIREMENTS

A. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on the discharge monitoring reports (DMRs) to EPA.

B. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples can be used for averaging if they are conducted using EPA approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits (MDLs) are less than the effluent limits.

None of the parameters measured from either Area 100 or Area 300 during the last permit cycle had a reasonable potential to violate the Washington State surface water quality standards for the Columbia River. The reasonable potential analysis using Ecology spreadsheets are shown in Appendix B. According to the Manual, "Federal regulations require the permit manager to determine whether a discharge has a reasonable potential to violate water quality standards and if so to place a water quality-based effluent limit in the permit (40CFR 122.44)."

The Manual on Page XIII-13 lists exclusions to monitoring reductions such as interrupted or discontinuous data reporting, a parameter that exceeds a one percent noncompliance during the past two years or criminal violations. Hanford does not meet the criteria for exclusions and is eligible for monitoring reductions.

The following parameters are eliminated in the reissued permit for the reasons listed. They have no reasonable potential to violate water quality standards for the Columbia River and have not been detected or detected once at low concentrations due to elimination of the sources of pollution and the most recent analysis of reasonable potential.

The anti-backsliding provisions are established in the CWA Section 402(o) and 40 CFR 122.44 (l)(1). Anti-backsliding is a prohibition on the renewal, re-issuance, or modification of NPDES permits with effluent limits, permit conditions, or standards less stringent than those established in the previous permit. Exceptions include material and substantial alterations to the permitted facility and information available which was not available at the time of permits issuance and which would have justified the application of a less stringent effluent limitation. The elimination of limits is based on a new reasonable potential analyses not available at permit issuance and the alterations consist of eliminating sources of toxics. The parameters provide no useful information for impacts to the Columbia River or the performance of the treatment system. Effluent limits and monitoring will not be required in the reissued permit for the following parameters.

Cadmium was not detected in the last three years.

Cyanide was not detected in the last three years.

Bis(2-ethylhexyl) phthalate was not detected in the last three years.

Beryllium was detected once in three years at 0.000107 percent of the effluent acute limitation and 0.00008 percent of the chronic effluent limit. Beryllium is not

listed as a toxic substance in the state water quality standards.

Silver was detected once in the last three years at a concentration of 0.98 µg/l or 10 percent of the effluent limitation and 1.3 percent of the criteria at the edge of the mixing zone.

Total Suspended Solids was detected once in the last three years at 1 mg/l or 0.01 percent of the acute effluent limitation and 0.2 percent of the chronic limit. TSS is not a criteria for the Columbia River, is not listed as a categorical standard for laboratories or the other processes listed for Area 300 in Appendix A.

Toluene was detected once in the last three years and measured at 0.0002 percent of the human health criteria at the point of discharge.

Tetrachloroethylene was detected once in three years at 0.96 µg/l or 19 percent of the effluent limitation and 0.0026 µg/l at the edge of the mixing zone or 0.325 percent of the criteria for the Columbia River.

1,1,1-Trichlorethane was detected once in the last three years at a concentration of 3.3 µg/l or 1.7 percent of the water quality standard at the point of discharge and 0.0051 percent of the criteria at the edge of the mixing zone.

Trichloroethylene was detected once in three years at 2 µg/l or 72 percent of the effluent concentration and 0.0066 µg/l or 0.244 percent of the criteria at the edge of the mixing zone.

Monitoring frequency can be reduced for demonstrated good performance. This process is generally applied at the time of permit renewal and the monitoring frequency is reduced from some baseline frequency. Guidance in Washington's Permit Writer's Manual is adopted from EPA guidance (EPA memorandum from Robert Perciasepe and Steven A. Herman to Regional Administrators, April, 1996).

Using methods in Ecology's Permit Writers Manual, page XIII-15 under Monitoring the monitoring frequency may be reduced based on the ratio of long term effluent average (LTA) to the average monthly limit (AML). If the LTA is less than 25 percent of the AML monitoring at Hanford can be reduced from twice per month to once per quarter. The reissued permit reduces monitoring to once per quarter for the following parameters.

Table 9 Reduction in Monitoring

Parameter	AML	LTA	Ratio (%)	Criteria (%)
Aluminum (Al)	215	8.1	3.77	25
Arsenic (As)	5	0.25	5.00	25
Iron (Fe)	846	3.3	0.39	25
Lead (Pb)	4	0.23	5.75	25
Manganese (Mn)	10	0.19	1.9	25

Table 9 Reduction in Monitoring				
Parameter	**AML**	**LTA**	**Ratio (%)**	**Criteria (%)**
Mercury (Hg)	0.9	0.022	2.4	25
Nickel (Ni)	35	0.64	1.8	25
Nitrite (NO2	60	13	22	25
Selenium (Se)	5	0.4	8.0	25
Zinc (Zn)	25	1.16	4.6	25
Dichlorobromomethane	2.2	0.27	12.3	25
Methylene Chloride	5	0.31	6.20	25

The sampling location must be after the last treatment unit and prior to discharge to the receiving water except for the monitoring specific to filter backwash water discharging from Basin No. 6 which is monitored before commingling with other discharges. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

Monitoring frequencies are shown in Table 6.

Ecology required monitoring of gross alpha (pCi/l) and gross beta (pCi/l) under the 401 Certification for the existing permit. This monitoring will be continued in the reissued permit.

C. Whole Effluent Toxicity Testing Requirements

Federal regulations at 40 CFR §122.44(d)(1) require that permits contain limits on whole effluent toxicity when a discharge has reasonable potential to cause or contribute to an exceedance of a water quality standard for toxicity.

Whole effluent toxicity (WET) tests are laboratory tests that measure total toxic effect of an effluent on living organisms. Whole effluent toxicity tests use small vertebrate and invertebrate species or plants to measure the aggregate toxicity of an effluent. There are two different types of toxicity test: acute and chronic. Acute toxicity tests measure survival over a short-term exposure (48- or 96-hour exposure, depending on the species). Chronic tests measure reductions in survival, growth, and reproduction over a 7-day exposure.

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 # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria,* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call Randall Marshall at (360) 407-6445 for a copy.

The previous permit required Hanford to conduct two rounds of toxicity testing of the final effluent from the TEDF – one during the summer and one during the winter. Hanford was required to conduct acute and chronic whole effluent toxicity

tests with *Ceriodaphnia dubia* (the water flea) and *Pimpehales promelas* (the fathead minnow). Hanford submitted the first round of WET testing data in September, 2003 and the second round in February, 2004. The acute and chronic compliance results are the same for both rounds of tests.

The acute *Ceriodaphnia dubia* results showed no statistically significant reduction in survival when compared to the control at the acute criteria exceedance concentration (ACEC) of 1.6 percent effluent concentration. The tests resulted in 0 percent survival in the 100 percent effluent. The ACEC is the maximum of effluent during critical conditions at the boundary of the zone of acute criteria exceedance.

The fathead minnow test results showed no statistically significant reduction in survival when compared to the control at any effluent concentration tested including the ACEC of 1.6 percent effluent concentration. The test resulted in 100 percent survival in the 100 percent effluent.

The chronic *Ceriodaphnia dubia* results showed no statistically significant reduction in survival or reproduction at any of the effluent concentrations tested. This includes the chronic critical effluent concentration (CCEC) of 0.17 percent effluent concentration and 100 percent effluent concentration.

The chronic fathead minnow results showed no statistically significant reduction in survival or reproduction at any of the effluent concentrations tested. This includes the CCEC and 100 percent effluent concentration.

WAC173-205-050(2) states:

"Effluent characterization shall be used to establish:

(a) Whether a reasonable potential under 40 CFR 122.44(d)(v) for acute or chronic toxicity exists which would require a whole effluent toxicity limit.

(i) If at the end of effluent characterization the median survival in one hundred percent effluent is less than eighty percent, or if any individual test result shows less than sixty five percent survival in one hundred percent effluent, then a reasonable potential for acute conditions in the receiving water has been demonstrated, and the whole effluent acute toxicity limit described in WAC 173-205-070 shall be applied to the discharge."

The effluent characterization at Hanford resulted in zero percent survival in 100 percent effluent for both the September, 2003 and February, 2004 acute WET tests. Since this is less than the sixty five percent survival criteria Hanford has a reasonable potential to violate the acute toxicity standard for the State of Washington.

EPA is establishing an ACEC limit of 1.6% of the effluent in the reissued permit.

WAC 173-205-070 Monitoring for compliance with whole effluent toxicity limits.

(1) A discharge is in compliance with the narrative water quality standard for acute toxicity when the most recent acute toxicity test has shown no statistically significant difference in response between the acute critical effluent concentration and a control.

WAC 173-205-050(b) requires sampling frequency for toxicity during effluent characterization and compliance monitoring to be at least twice per year and sampling shall be timed to cover the seasonal extremes of the year such as wet-dry or cold-hot.

The permit will require Hanford to conduct two rounds of toxicity testing of the final effluent from the TEDF each year– one during the extreme hot of summer and one during the extreme cold of winter.

VI. SLUDGE (BIOSOLIDS) REQUIREMENTS

EPA Region 10 separates wastewater and sludge permitting. Under the CWA, EPA has the authority to issue separate sludge-only permits for the purposes of regulating biosolids. EPA may issue a sludge-only permit to the facility at a later date, as appropriate.

Until future issuance of a sludge-only permit, sludge management and disposal activities at the facility continue to be subject to the national sewage sludge standards at 40 CFR Part 503 and any requirements of the State's biosolids program. The Part 503 regulations are self-implementing, which means that permittees must comply with them whether or not a permit has been issued.

VII. OTHER PERMIT CONDITIONS

A. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The permittee is required to develop and implement a Quality Assurance Plan within 180 days of the effective date of the final permit. The Quality Assurance Plan shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan shall be retained on site and made available to EPA upon request.

B. Operation and Maintenance Plan

The permit requires the Permittee to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The Permittee is required to develop and implement an operation and maintenance plan for their facility within 180 days of the effective

date of the final permit. The plan shall be retained on site and made available to EPA upon request.

C. Additional Permit Provisions

Sections III, IV and V of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because they are regulations, they cannot be challenged in the context of an NPDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

VIII. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS), if their actions could beneficially or adversely affect any threatened or endangered species.

On July 3, 2008, EPA wrote to NOAA Fisheries and the USFWS to obtain a list of species that are endangered or threatened at the vicinity of the discharge subject to this NPDES permit. On July 23, 2008 (in verbal communication with Matt Longenbaugh) NOAA-Fisheries excluded Coho and Chum salmon from consideration at this location; however, Puget Sound Steelhead are threatened species which may be present in this location. The United States Department of the Interior (U.S. Fish and Wildlife Service) lists Bull Trout as threatened and present in the vicinity of the discharge.

Based on the following considerations, EPA concludes that this permit is not likely to adversely affect endangered or threatened species.

1. This permit requires compliance with the State of Washington Surface Water Quality Standards, November, 2006 that protect aquatic life including threaten and endangered species

2. Intermittent discharges

3. Low concentration discharges

4. Utilization of an outfall diffuser

5. High dilution rates in the high volume Columbia River receiving water

6. An advanced treatment system comprised of chemical precipitation, coagulation, flocculation, sedimentation, multimedia filtration, neutralization, ion exchange and ultraviolet oxidation.

B. Essential Fish Habitat

Essential fish habitat (EFH) includes the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. The EFH regulations define an adverse effect as any impact which reduces quality or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. In a verbal communication from NOAA-Fisheries (Matt Longenbaugh, July 23, 2008), NOAA Fisheries described Columbia River in the vicinity of the Hanford reservation as essential fish habitat (EFH) for Chinook and Coho salmon.

EPA determines no likely adverse effect in the vicinity of the discharge to designated EFH with issuance of this NPDES permit for the same reasons that protect endangered species. This decision was based on consultation with NOAA-Fisheries (verbal communication from Matt Longenbaugh, July 23, 2008). EPA has provided NOAA Fisheries with copies of the draft permit and fact sheet during the public notice period. Any comments received from NOAA Fisheries regarding EFH will be considered prior to reissuance of this permit.

C. State Certification

Section 401 of the CWA requires EPA to seek State certification before issuing a final permit. As a result of the certification, the State may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards.

D. Permit Expiration

The permit will expire five years from the effective date of the permit.

IX. REFERENCES

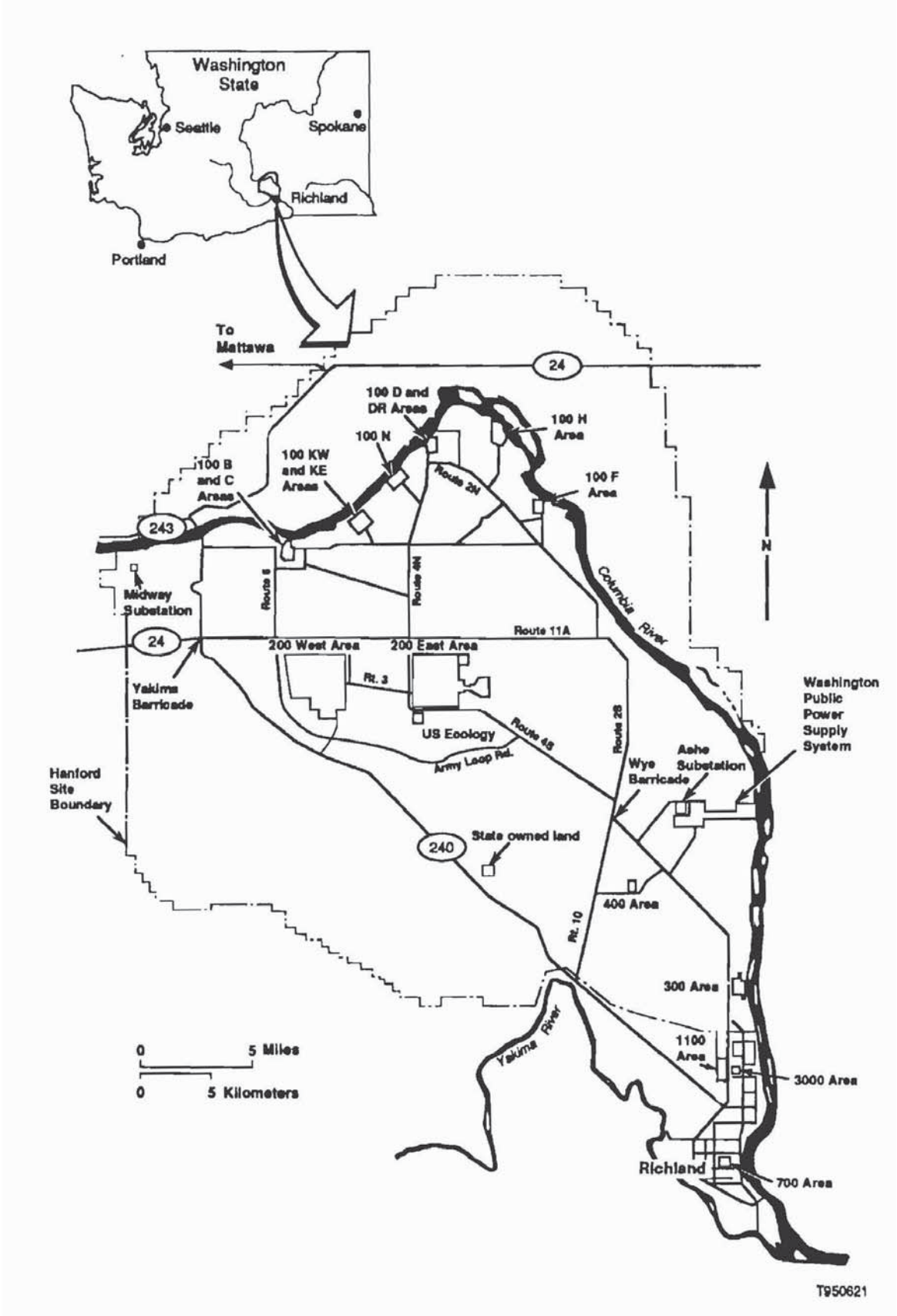
1. Washington Department of Ecology, 2006. Chapter 173-201A WAC, Water Quality Standards for Surface Waters of the State of Washington, Publication Number 06-10-091.
2. 2006. *Permit Writer's Manual.* Publication Number 92-109
3. U.S. EPA, 1991. Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001).

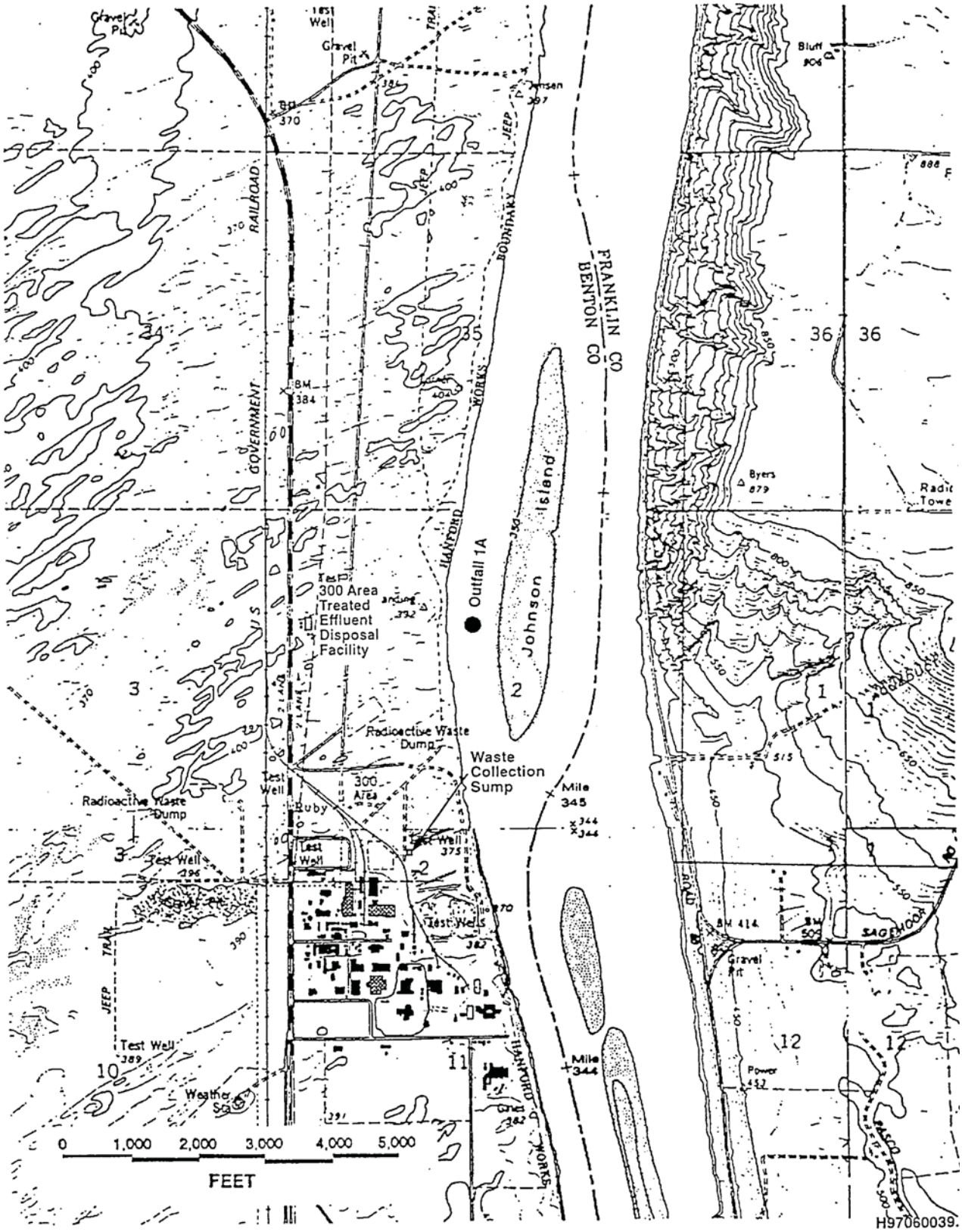
Appendix A - Facility Information

FACILITIES CONNECTED TO 300 AREA PROCESS SEWER			
Building	Building Name	Room	Title
318	Radiological Calibrations Lab (PNNL)	382, B	Pumphouses
320	Physical Science Lab (PNNL)	382, C, D	Water Storage Tanks
324	Waste Technology Engineering Lab (RPS/PS)	3730	Gamma Irradiation Facility
325	Applied Chemistry Lab (RPS) (PNNL)	Bldg. # BA	Boiler Annexes (JCI) (Bldgs. 318, 320, 324, 325, 326, 327, 331)
326	Material Science Lab (RPS/PS) (PNNL)		Boiler Annexes (JCI) (222-S, 275E, 272W, 283-E, 283-W, 234-5Z) (Via Manholde PS-38)
327	Post Irradiation Test Lab (RPS/PS)		
329	Chemical Science Lab (RPS/PS)(PNNL)		
331	Life Science Lab 1 (PNNL)		
331C	Waste Handling Facility (PNNL)		
331D	Biomagnetic Lab (PNNL)		
331G	Interim Tissue Repository (PNNL)		
331H	Aerosol Wind Tunnel Research Facility (PNNL)		
336	High Bay Testing Facility (PNNL)		
340	Waste Handling Facility		

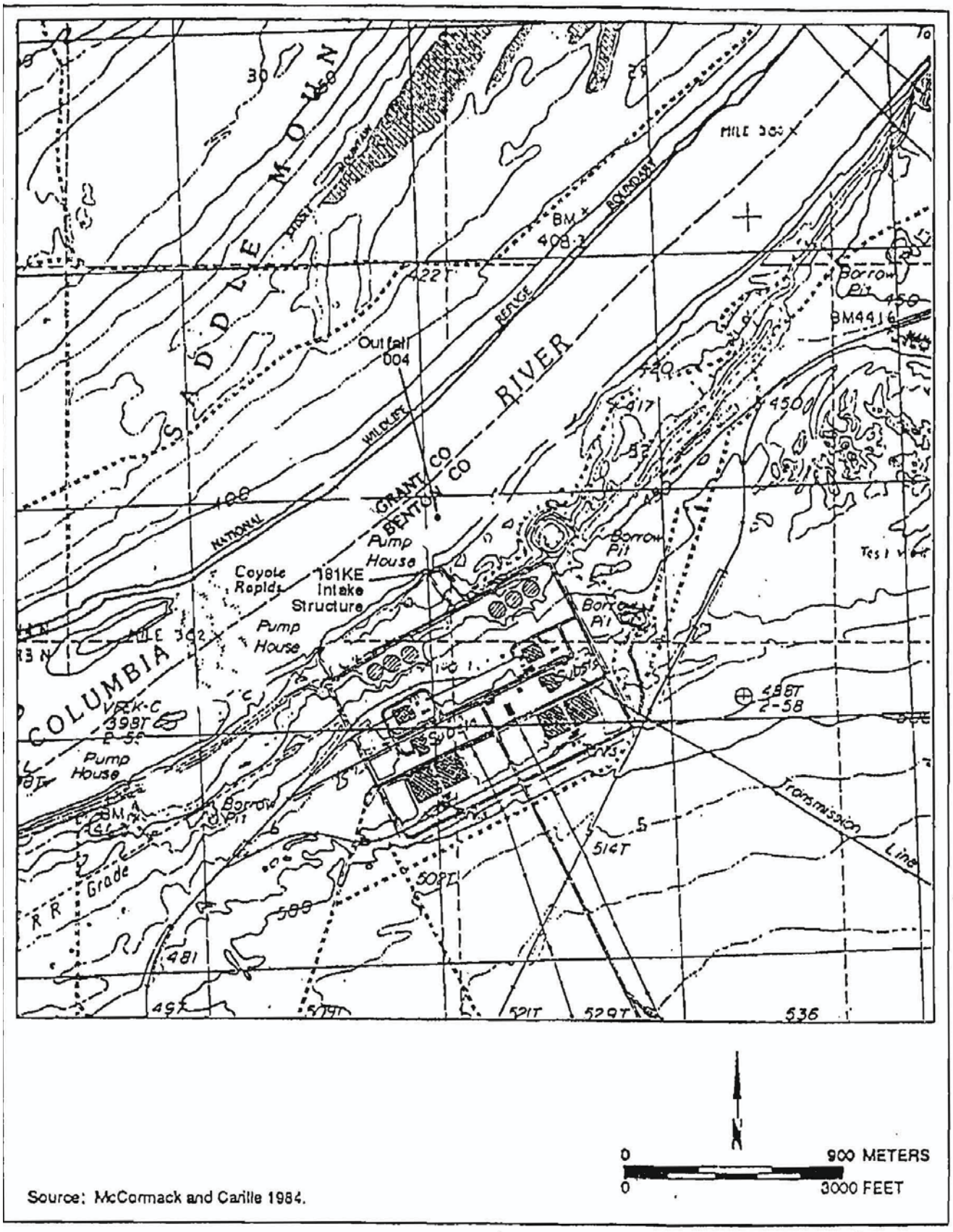
OTHER CUSTOMERS	
Routine:	**Infrequent/Out-Time:**
AMH (2719WB), Film Processing	100K, Compressor Condensate
Tank Farms Waste Operations – 616, Compressor Condensate	186 N, Lab Wastewater
WTP, Vehicle Waste, Stormwater	HAMMER, Practice Decon
GW-6269, Equipment Wash	FLTF (200W), Lysimeter Test Leachate
SW Landfill, Leachate	2711E Garage, Stormwater
EMSL, Lab	242-S, Decon Wastewater

Largest Contributors:	**Known Storm Collection Boxes By Nearest Building:**
331 Complex 320 Building 318 Boilers (Seasonal)	331 331E 324 340 (2) 329 (2) 321 3701U (4)


Washington State
Seattle
Spokane
Richland
Portland
To Mattawa
24
100 D and DR Areas
100 H Area
100 N
100 KW and KE Areas
100 B and C Areas
100 F Area
Route 2W
243
N
Midway Substation
Route 6
Route 4N
Columbia River
Route 11A
24
200 West Area
200 East Area
Rt. 3
Yakima Barricade
US Ecology
Route 4S
Army Loop Rd.
Route 2S
Wye Barricade
Ashe Subetation
Washington Public Power Supply System
Hanford Site Boundary
240
State owned land
400 Area
Rt. 10
300 Area
1100 Area
Yakima River
3000 Area
Richland
700 Area
0 5 Miles
0 5 Kilometers
T950621

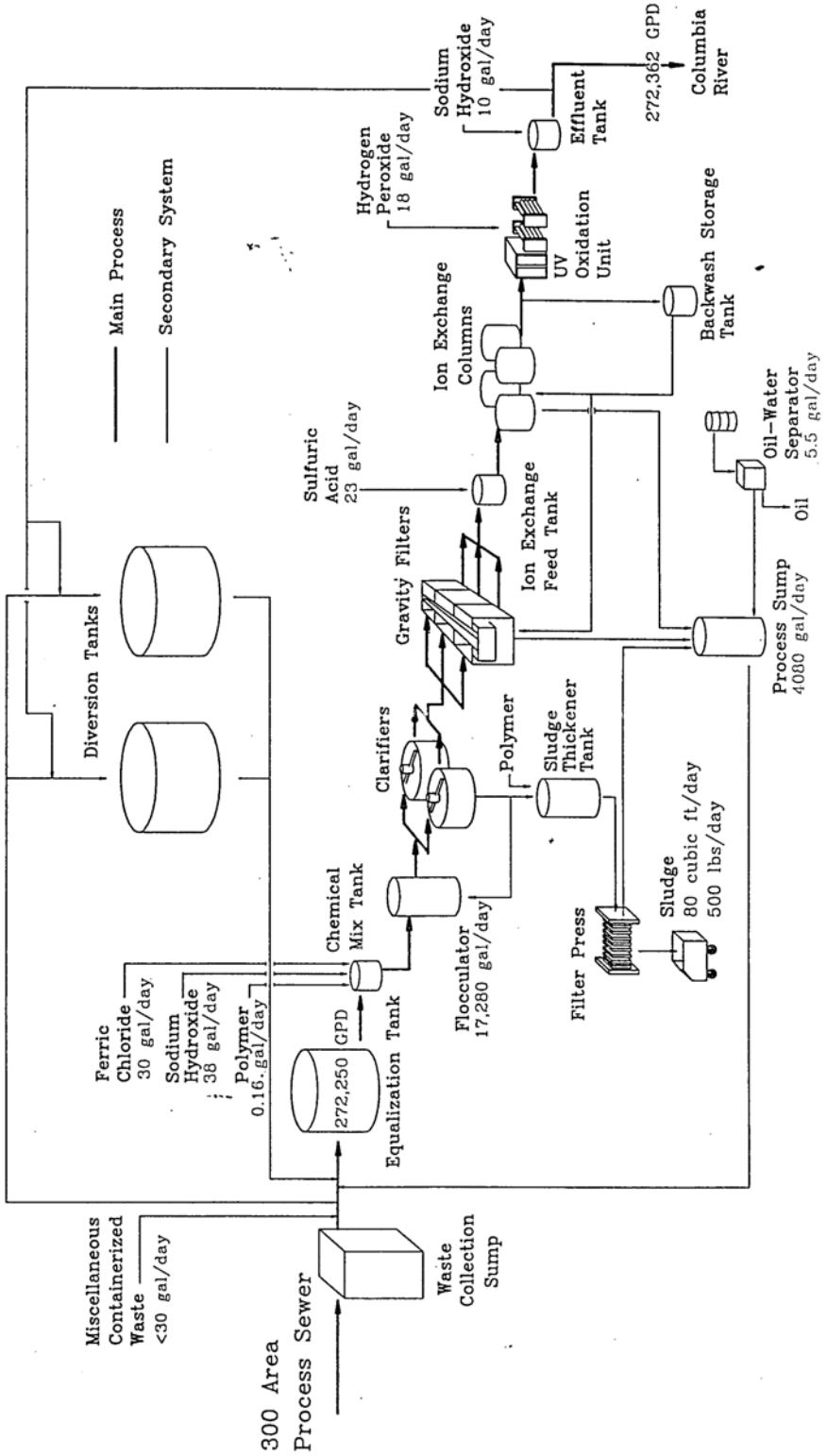


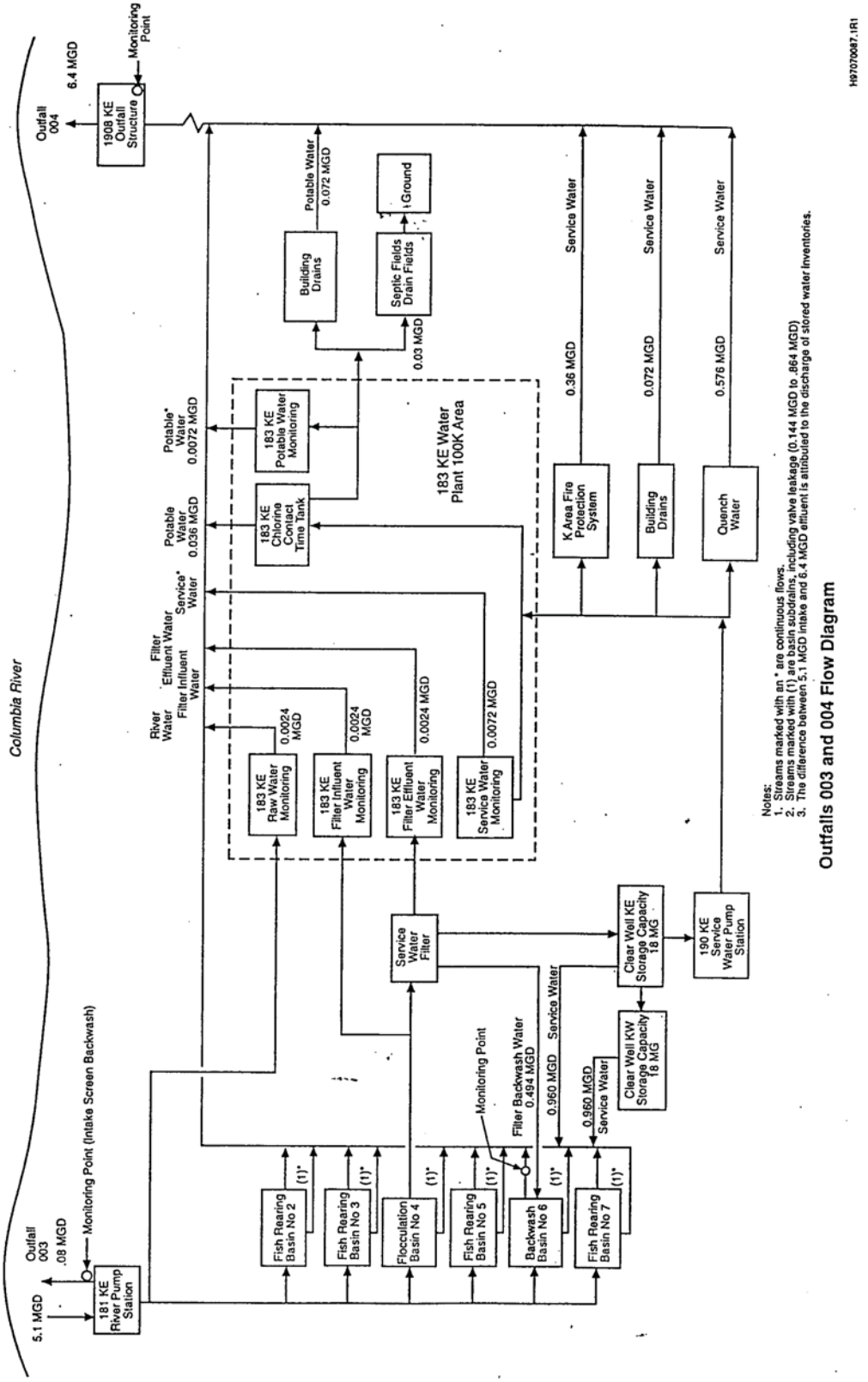
300 Area Treated Effluent Disposal Facility Site Map



Source: McCormack and Carille 1984.

300 Area TEDF Schematic




Columbia River
Outfall 004
6.4 MGD
Monitoring Point
1908 KE Outfall Structure
Outfall 003
.08 MGD
Monitoring Point (Intake Screen Backwash)
5.1 MGD
181 KE River Pump Station
Fish Rearing Basin No 2
Fish Rearing Basin No 3
Flocculation Basin No 4
Fish Rearing Basin No 5
Backwash Basin No 6
Fish Rearing Basin No 7
(1)*
Monitoring Point
Filter Backwash Water 0.494 MGD
0.960 MGD Service Water
0.960 MGD Service Water
Clear Well KW Storage Capacity 18 MG
Service Water Filter
Clear Well KE Storage Capacity 18 MG
190 KE Service Water Pump Station
River Water
Filter Influent Water
Filter Effluent Water
Service* Water
0.0024 MGD
0.0024 MGD
0.0024 MGD
0.0072 MGD
183 KE Raw Water Monitoring
183 KE Filter Influent Water Monitoring
183 KE Filter Effluent Water Monitoring
183 KE Service Water Monitoring
183 KE Water Plant 100K Area
Potable* Water 0.0072 MGD
Potable Water 0.036 MGD
183 KE Potable Water Monitoring
183 KE Chlorine Contact Time Tank
Potable Water 0.072 MGD
Building Drains
Septic Fields Drain Fields
Ground
0.03 MGD
0.36 MGD
0.072 MGD
0.576 MGD
Service Water
K Area Fire Protection System
Building Drains
Quench Water
Notes:
1. Streams marked with an * are continuous flows.
2. Streams marked with (1) are basin subdrains, including valve leakage (0.144 MGD to .864 MGD)
3. The difference between 5.1 MGD intake and 6.4 MGD effluent is attributed to the discharge of stored water inventories.
Outfalls 003 and 004 Flow Diagram
H970700B7.1R1

Appendix B - Basis for Effluent Limitations

The following discussion explains in more detail the statutory and regulatory basis for the technology and water quality-based effluent limits in the draft permit. Part A discusses technology-based effluent limits, Part B discusses water quality-based effluent limits in general, and Part C discusses facility specific water quality-based effluent limits.

A. Technology-Based Effluent Limits

There are no EPA promulgated effluent guidelines applicable to the TEDF. The existing effluent limitations for the TEDF have been achieved and are determined to be best available treatment technology economically achievable (BAT).

EPA commissioned Science Applications International Corporation (SAIC) to draft a model permit for the water supply industry. Although the draft has not been implemented, SAIC released its findings in a document entitled "Model Permit Package - Water Supply Industry, January 30, 1987". In this document SAIC conducted BPT and BCT analyses which addressed "conventional" pollutants. BAT requirements, which address "toxic" pollutants, were not developed since Water Treatment Plants (WTP) process effluent is characterized as principally containing conventional pollutants, with insufficient evidence of toxic pollutants for development of across-the-board limits. SAIC proposed the following limits based on their "Best Professional Judgment" after considering existing permits and WTP monitoring data and achievable WTP wastewater treatment levels:

Monthly Average TSS: 30 mg/l
Daily Maximum TSS: 45 mg/l

These suspended solids limitations are consistent with the Water Treatment Plant limitations in the existing permit. This level of control has been achieved over the last two permit cycles and is determined to be BCT and BPT for the filter plant. Monitoring is prior to comingling with other waste water discharges to be representative of the discharge and to insure compliance with this technology base limit for the treatment plant. It will remain designated as Outfall 004B.

The state water quality standards for total residual chlorine for the Columbia River are a one hour average concentration not to exceed 19 ug/l and a four day average not to exceed 11 μg/l. The current permit limits are for free available chlorine.

Total residual chlorine is the total of free available residual chlorine and combined (bound) residual chlorine. It is the amount of measurable chlorine remaining after treating water with chlorine i.e. amount of chlorine left in water after the chlorine demand has been satisfied.

Free available chlorine is that portion of the total available residual chlorine composed of dissolved chlorine gas (Cl_2), hypochlorous acid, and hypochlorite ion remaining in water after chlorination. This does not include chlorine that has combined with ammonia, nitrogen, or other compounds.

The reissued permit revises the chlorine limit and monitoring to total residual chlorine for consistency with the state water quality standard. A review of the last three years of monitoring demonstrates a limit of total residual chlorine discharged from the 100 Area can achieve the

existing limits for free chlorine. The highest monthly average of free chlorine was 0.025 mg/L or 31 percent of the proposed monthly average limit of 0.08 mg/L. The highest daily maximum was 0.06 mg/L or 60 percent of the proposed 0.1 mg/L limit.

There must be no discharge of any floating solids, visible foam in other than trace amounts, or oily wastes that produce a sheen on the surface of the receiving water.

B. Water Quality-Based Effluent Limits

The following discussion is divided into four sections. Section 1 discusses the statutory basis for including water quality based effluent limits in NPDES permits, Section 2 discusses the procedures used to determine if water quality based effluent limits are needed in an NPDES permit, Section 3 discusses the procedures used to develop water quality based effluent limits, and Section 4 discusses the specific water quality based limits.

1. Statutory Basis for Water Quality-Based Limits

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to state/tribal waters must also comply with limitations imposed by the state/tribe as part of its certification of NPDES permits under section 401 of the CWA.

The NPDES regulation (40 CFR 122.44(d)(1)) implementing section 301 (b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state/tribal water quality standard, including state/tribal narrative criteria for water quality.

The regulations require that this evaluation be made using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation.

2. Reasonable Potential Analysis

When evaluating the effluent to determine if water quality-based effluent limits are needed based on chemical specific numeric criteria, a projection of the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern is made. The chemical specific concentration of the effluent and receiving water and, if appropriate, the dilution available from the receiving water are factors used to project the receiving water concentration. If the projected concentration of the receiving water exceeds the numeric criterion for a specific chemical, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard, and a water quality-based effluent limit is required.

Sometimes it is appropriate to allow a small area of receiving water to provide dilution of the effluent, these areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body, and decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and the receiving water is below the chemical specific numeric criterion necessary to protect the designated uses of the water body. Mixing zones must be authorized by the Washington Department of Ecology.

3. Procedure for Deriving Water Quality-Based Effluent Limits

The first step in developing a water quality based permit limit is to develop a wasteload allocation (WLA) for the pollutant. A wasteload allocation is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water.

Mixing Zone

No changes in quantity and quality of the discharge occurred during the last permit cycle except for the decreases in pollutant loading as described in Facility Information. The dilution factors utilized from the mixing zone in the existing certified permit produced an acute dilution factor of 62:1 at the edge for the 30 foot mixing zone and a chronic dilution factor of 590:1 at the edge of the 300 foot chronic mixing zone.

The water quality-based effluent limits in the draft permit utilize the same mixing zones as in the current permit certified by Ecology as meeting water quality standards.

In the last permit dilution of the effluent in the receiving water for human health criteria was based upon the long term harmonic mean flow of the river and the average monthly discharge flow from the TEDF. The estimated harmonic mean flow in the west channel of the Columbia River in the vicinity of the outfall is 90,100 cfs. The long term average monthly flow from TEDF is 0.216 mgd. The edge of the authorized chronic mixing zone is 300 feet downstream from the point of discharge. The corresponding mixing of river water to effluent at this point is results in a dilution factor of 386:1.

4. Specific Water Quality-Based Effluent Limits

(a) Temperature

In WAC 173-201A-602 Table 602 for the Columbia River, footnote 2 the Washington water quality standards limit ambient water temperature to 20.0 degrees C. Temperature shall not exceed a 1-DMax of 20.0°C due to human activities. When natural conditions exceed a 1-DMax of 20.0°C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C; nor shall such temperature increases, at

any time, exceed t = 34/(T + 9) where T represents the background temperature.

The TEDF in Area 300 discharges through Outfall 001 located in the west channel of the Columbia River where Johnson Island splits river flow. The 7Q10 flow is 50,400 cfs. This is equivalent to 32,300 million gallons per day (MGD). The highest daily maximum flow from Area 300 measured over the last three years is 0.313 MGD. This yields a minimum dilution ratio of 1 part effluent to 103,000 parts river water (1:103,000).

The highest daily maximum flow from the Water Treatment Plant in Area 100 discharging through Outfall 004 was 4.22 MGD. This yields a minimum dilution ratio of 1 part effluent to 11,900 parts river water (1:11,900). It is noted that some solar heating of the water in the supply system occurs in the 100 area basins and discharge structure. However, complete or near complete mixing of effluent and receiving water is accomplished within the seven foot diameter outfall pipe.

There is no reasonable potential for temperature criteria to be exceeded in the Columbia River from either Outfall 001 or 004.

(b) Ammonia

Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature, pH, and salinity of the receiving marine water. To evaluate ammonia toxicity, EPA used the available receiving water information for ambient station Columbia River near Vernita 36A070 and Ecology spreadsheet tools.

The Washington State Permit Writer's Manual recommends the 90^{th} percentile values for pH and the 90^{th} percentile temperature over the last three years. This results in criteria expressed as a total ammonia concentration of 2.86 mg/L acute and 0.428 mg/L chronic. Based on this criteria Hanford does not have a reasonable potential to violate water quality standards in the Columbia River.

Reasonable Potential Calculation for Aquatic Life

				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*			
Outfall 001																	
Aluminum	1.00	1.00	17.9000	750	N/A	18.82	18.00	**NO**	0.99	0.886	60.00	0.60	0.55	38	1.28	64	591
Selenium	1.00	1.00		40	18	0.12	0.01	**NO**	0.99	0.886	5.79	0.60	0.55	38	1.28	64	591
Beryllium	1.00	1.00		18610	12500	0.00	0.00	**NO**	0.99	0.886	0.02	0.60	0.55	38	1.28	64	591
Ammonia - N	1.00	1.00		2860	428	7.18	0.78	**NO**	0.99	0.886	360	0.60	0.55	38	1.28	64	591
Arsenic	1.00	1.00		360	190	0.10	0.01	**NO**	0.99	0.886	4.77	0.60	0.55	38	1.28	64	591
Nickel	0.998	0.997		861	96	0.03	0.00	**NO**	0.99	0.886	1.64	0.60	0.55	38	1.28	64	591
Silver	0.85			1.27	N/A	0.017	0.00	**NO**	0.99	0.886	0.98	0.60	0.55	38	1.28	64	591
Iron	1.00	1.00	27.0000	N/A	1000	27.77	27.08	**NO**	0.99	0.886	60.00	0.60	0.55	38	1.28	64	591
Zinc	0.996	0.996	10.0000	70.2	63.9	10.11	10.01	**NO**	0.99	0.886	13.40	0.60	0.55	38	1.28	64	591
Cadmium	0.94	0.94		1.97	0.67			**NO**	0.99	0.886	0.00	0.60	0.55	38	1.28	64	591
Lead	0.47	0.47		34.20	1.33	0.05	0.01	**NO**	0.99	0.886	5.82	0.60	0.55	38	1.28	64	591
Copper	0.996	0.996	0.7900	9.85	6.92	1.19	0.83	**NO**	0.99	0.886	20.90	0.60	0.55	38	1.28	64	591
Diclorobromo methane	1.00	1.00		0.27	0.27	0.01	0.00	**NO**	0.99	0.886	0.28	0.60	0.55	38	1.28	64	591
Mercury	1.00	1.00		2.10	0.012	0.0100	0.0011	**NO**	0.99	0.886	0.50	0.60	0.55	38	1.28	64	591
Cyanide	1.00	1.00		22	5.20	0.00	0.00	**NO**	0.99	0.886	0.00	0.60	0.55	38	1.28	64	591
Outfall 004																	
Chlorine (free)	1.00	1.00		19	11	0.00	0.00	**NO**	0.99	0.886	0.06	0.60	0.55	38	1.28	64	591

Reasonable Potential Calculation for Human Health

	Water Quality Criteria for Protection of Human Health	Max concentration at edge of chronic mixing zone.	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT	MAXIMUM DAILY EFFLUENT LIMIT	Estimated Percentile at 95% Confidence		Max effluent conc. measured	Coeff Variation		# of samples from which # in col. K was taken	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor
Parameter	*ug/L*	*ug/L*			*ug/L*	*ug/L*		*Pn*	*ug/L*	*CV*	**S**	*n*			
Outfall 001															
Dichlorobromomethane	0.27	0.00005	NO	0.33	NONE	NONE	0.50	0.92	20.00	0.60	0.6	38	0.45	0.19	386
Chloroform	5.70	0.0142	NO	0.33	NONE	NONE	0.50	0.92	16.50	0.60	0.6	38	0.45	5.50	386
Tetrachloroethylene	0.80	0.0011	NO	0.33	NONE	NONE	0.50	0.92	0.95	0.60	0.6	38	0.45	0.00	386
Toluene	6800	0.0001	NO	0.33	NONE	NONE	0.50	0.92	0.09	0.60	0.6	38	0.45	0.00	386
1,1,1-Trichloroethane	200	0.0039	NO	0.33	NONE	NONE	0.50	0.92	3.30	0.60	0.6	38	0.45	0.00	386
Bis(2-ethylhexl)-phthalate	1.80	0.0000	NO	0.33	NONE	NONE	0.50	0.92	0.00	0.60	0.6	38	0.45	0.00	386
Trichloroethylene	2.70	0.0023	NO	0.33	NONE	NONE	0.50	0.92	2.00	0.60	0.6	38	0.45	0.00	386
Mercury	0.14	0.0006	NO	0.33	NONE	NONE	0.50	0.92	0.50	0.60	0.6	38	0.45	0.00	386
Cyanide	700	0.0000	NO	0.33	NONE	NONE	0.50	0.92	0.00	0.60	0.6	38	0.45	0.00	386

Freshwater un-ionized ammonia criteria based on Chapter 173-201A WAC
Amended November 20, 2006
Columbia River near Vernita 36A070

INPUT		
1. Temperature (deg C):	90th Percentile	20.0
2. pH:	90th Percentile	8.38
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:	0.283
Chronic:	0.042
2. Total ammonia nitrogen criteria (mgN/L):	
Acute:	2.857
Chronic:	0.428

Columbia River near Vernita

	pH	Temp	NH3
			mg/L
1/14/2004	8.15	3.4	0.01
2/11/2004	8.14	3.4	0.01
3/10/2004	8.14	4.6	0.01
4/14/2004	8.26	8.7	0.01
5/5/2004	7.99	10.7	0.01
6/9/2004	8.2	13.8	0.01
7/14/2004	8.3	17.2	0.01
8/4/2004	8.22	20	0.01
9/15/2004	8.24	19	0.012
10/4/2004	8.18	18.6	0.01
11/3/2004	7.97	12.6	0.01
12/6/2004	8.45	9.3	0.01
2/7/2005	7.95	3.8	0.01
5/2/2005	8.33	10.8	0.01
6/6/2005	8.28	15.1	0.01
7/11/2005	8.42	18	0.01
8/1/2005	8.37	19.7	0.01
9/12/2005	8.36	19.3	0.01
10/3/2005	8.27	17.5	0.01
11/8/2005	8.21	12.5	0.01
12/5/2005	8.15	8.3	0.01
1/10/2006	8.22	5.8	0.01
2/6/2006	8.2	4.2	0.01
3/6/2006	8.09	4.1	0.01
4/10/2006	8.48	5.9	0.01
5/8/2006	8.23	10.4	0.01
6/6/2006	8.06	13.9	0.01
7/17/2006	8.31	18.8	0.01
8/14/2006	8.34	20.3	0.01
9/11/2006	8.28	20.2	0.01
10/9/2006	8.45	17	0.01
11/14/2006	8.03	11	0.01
1/8/2007	8.16	5.1	0.01
2/5/2007	8.27	2.4	0.01
3/5/2007	8.14	3.2	0.01
4/9/2007	8.25	7	0.01
6/12/2007	8.05	14.4	0.01
8/15/2007	8.22	20.7	0.01
9/11/2007	8.24	21	0.01
Maximum	8.48	20.7	
90th Percentile	8.38	20.0	