FACT SHEET FOR STATE WASTE DISCHARGE PERMIT NO. ST 4501

ISSUED TO UNITED STATES DEPARTMENT OF ENERGY RICHLAND OPERATIONS OFFICE RICHLAND, WASHINGTON

BY WASHINGTON STATE DEPARTMENT OF ECOLOGY KENNEWICK, WASHINGTON

SUMMARY

The Washington State Department of Ecology (Ecology) is proposing to renew a State Waste Discharge Permit, which will continue to allow discharge of industrial process wastewater effluent via infiltration through soils to the groundwaters of the state. The Applicant is the United States Department of Energy (DOE), Richland Operations Office (Permittee). The facility is called the U.S. Department of Energy (USDOE), Richland Operations Office (RL), 400 Area Fast Flux Test Facility (FFTF) complex. The FFTF complex is located on the DOE's Hanford Site about 11 miles north of Richland, Washington. The 400 Area industrial process wastewater system discharges to two unlined infiltration ponds known as the 4608 Percolation Ponds B and C, located immediately north of the 400 Area fenced boundary.

The effluent from FFTF consists of individual waste streams from four facilities located in the 400 Area. Uses that generate the effluents are primarily those associated with cooling systems, ventilation, and heating from the FFTF, Fuels and Materials Examination Facility (FMEF), and in addition, from the gland seal leakage from pumps in Building 481A. The Fuels and Material Examination Facility (FMEF) is shutdown, therefore, two of the four effluent streams are currently not discharging to the process sewer system. The Maintenance and Storage Facility (MASF) is not currently conducting any testing, therefore, no discharges are anticipated from that facility. No chemical or product handling and storage areas are related directly to the disposal ponds. The only continuing problem at the discharge appears to be high total dissolved solids; however, the facility source water has high total dissolved solids.

The draft permit complies with the regulatory requirements of Chapter 173-200 of the Washington Administrative Code (WAC) – "Water Quality Standards for Ground Waters of the State of Washington". This regulation is premised on the fact that all contaminants should be regulated to protect all existing and future beneficial uses of the groundwater. Since the use of drinking water is the most restrictive and protective, this regulation and the draft permit protects the groundwater for drinking water purposes. The draft permit establishes enforcement limits for nonradioactive contaminants or maximum allowable concentration levels, in the effluent and/or groundwater that are essentially drinking water standards. Hence, the permit requires that the effluent essentially meets the drinking water standards for nonradioactive contaminants before discharge to the disposal ponds.

The three primary proposed changes for the draft permit and from the first permit's initial issuance are: 1) Decrease and/or elimination of the monitoring requirements in the effluent, 2) Elimination of the enforcement limits in the groundwater monitoring and, 3) Total Dissolved Solids (TDS) determined by the measurement of conductivity.

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INTRODUCTION

This fact sheet is a companion document to the State Waste Discharge Permit No. **ST-4501.** Ecology is proposing to renew this permit, which will allow continued discharge of wastewater to waters of the state of Washington. This fact sheet explains the nature of the proposed discharge, Ecology's decisions on limiting the pollutants in the wastewater, and the regulatory and technical basis for those decisions.

Revised Code of Washington (RCW) 90.48.080 and 90.48.162 requires that a permit be issued before discharge of wastewater to waters of the state is allowed. Regulations adopted by the state include procedures for issuing permits (Chapter 173-216 WAC), and water quality criteria for ground waters (Chapter 173-200 WAC). They also establish requirements which are to be included in the permit.

This fact sheet and draft permit are available for review by interested persons as described in Appendix B--Public Involvement Information.

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in these reviews have been corrected. The fact sheet will not be revised. Changes to the permit will be addressed in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	United States Department of Energy, Richland Operations Office
Facility Name and Address	400 Area Industrial Wastewater Process System 400 Area on the Hanford Site P.O. Box 550, S7-41 Richland, WA 99352-1000
Type of Facility	Collection System and two disposal/infiltration ponds
Type of Discharge:	System collects, conveys, and disposes of industrial process wastewater effluent from four facilities in the 400 area of the Hanford Site.
Discharge Location	Waterbody: Discharge through infiltration will reach groundwater. Groundwater is at a depth of about 360 to 390 feet below the facility. The facility is approximately six miles from the Columbia River. Latitude: 46° 26' 23.9" N Longitude: 119° 21' 23.1" W.
Legal Description of Application Area	SW ¼, NE ¼, Section 18, Township 11N TWN, Range 28ER, Benton County, WA Latitude: 46º 26' 23.9" N. Longitude: 119º 21' 23.1" W
Contact at Facility	Mark Eby 509-376-8991
Responsible Official	O.A. Farabee Director, DOE-RL Fast Flux Test Facility Project Office P.O. Box 550, A3-04, Richland, WA.99352 Telephone #: 509-376-8089 Fax: 509-376-0177

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

The 400 Area Industrial Process Wastewater System collects and disposes of effluent from the USDOE, RL 400 Area/FFTF complex facilities, which are located about 11 miles north of Richland, Washington. The system discharges to two unlined infiltration ponds known as the 4608 Percolation Ponds B and C and are located immediately north of the 400 Area fenced boundary. The ponds are 50 feet by 100 feet at the base and have a 4 foot thick earth wall separating them. The drain line discharges into a diversion box built into the wall dividing the two ponds. Manually operated slide gates located on either side of the diversion box provide the capability to isolate a pond for maintenance. The effluent evaporates and infiltrates through the soil.

HISTORY

As a requirement for obtaining the original State Waste Discharge Permit, the Permittee had to eliminate or reduce the contaminant loading in the effluent by applying all known, available, and reasonable technology (AKART) for prevention, control, and treatment prior to its discharge to the environment. In addition, AKART was required to be applied to reduce the volume of the effluent. This program of pollution prevention, effluent treatment, and facility construction and operation was also incorporated as a portion of Milestone 17 in the 1989 Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) between the Permittee, the United States Environmental Protection Agency, and Ecology. The Tri-Party Agreement further requires that the Best Available Technology (BAT) that is economically achievable be applied to the effluent. In the case of the 400 Area Percolation (disposal) Ponds, there was no industry standard and no profit/revenue data to review to determine AKART. The procedure used to evaluate the BAT/AKART for wastewaters was, "*Best Available Technology (economically achievable) Guidance Documents for the Hanford Site"*, (WHC-EP-0137, 1988). The BAT/AKART evaluation was coupled with an ongoing waste minimization program aimed at reducing and eliminating contaminated or potentially contaminated sources and waste streams at the Hanford Site. The combined program has resulted in the implementation of best management practices, including process and facility modifications designed to reduce wastewater flows and contaminant concentrations. The BAT/AKART determination listed in the W-252 Engineering Report (WHC-SD-W252-ER-001, Rev. 0, page 2-1 and B.6-3, 39 and 65 as listed in the references) for the 400 Area Ponds is as follows: The wastewater from the 400 Area Secondary Cooling System would continue to be discharged to the existing 400 Area Percolation Ponds B and C. The application of the BAT/AKART determination process identified the current status as the selected alternative, which is no treatment needed before discharge (i.e., no new actions are required). Compliance inspections conducted by Ecology verified the implementation of the required improvements by the Permittee.

The Fast Flux Test Facility (FFTF) is a DOE owned 400-megawatt thermal, liquid-metal (sodium) cooled nuclear test reactor that was constructed in the late 1970's and brought online in 1980. From 1982 to 1992, the FFTF operated as a national research facility to test advanced nuclear fuels, materials, components, systems; nuclear power plant operation and maintenance procedures; and active and passive reactor safety technologies. The facility also produced a wide variety of medical and industrial isotopes, made tritium for the U.S. fusion research program, and conducted domestic and international research work. In December 1993, DOE began shutdown (i.e., deactivation or transition) of the FFTF due to the absence of viable missions for the facility. In January 1997, DOE decided to maintain FFTF in a standby condition while an evaluation was conducted of any potential future national tritium missions for the facility. In December 1998, DOE announced that the FFTF would not play a role in tritium production and a decision on any other future missions would be made by the Spring of 1999. In August 1999, the DOE initiated preparation of a National Environmental Policy Act (NEPA) Nuclear Infrastructure Programmatic Environmental Impact Statement (NI-PEIS), with final publication in December 2000. This NI-PEIS evaluated the potential environmental impacts resulting from DOE accomplishing expanded domestic civilian nuclear energy research and development, and isotope production using all of their reasonable existing and new resources. In the NI-PEIS, the FFTF was evaluated as an alternative irradiation services facility to accomplish the above missions. In the January 2001 NI-PEIS Record of Decision, DOE ruled out the use of FFTF and reaffirmed

their decision for its permanent deactivation, because it expected its current nuclear infrastructure would satisfy short-term irradiation services requirements for ensuring the availability of isotopes for the above missions. From April 2001 to December 2001, DOE suspended the FFTF decision (in the NI-PEIS ROD) to resume the permanent deactivation of FFTF to allow two more reviews to be conducted for all of the key factors related to this decision. Following these reviews, the DOE decided in December 2001 that restart of the FFTF was impracticable and that its deactivation would proceed.

Since December 2001, the FFTF has resumed deactivation. Major deactivation activities underway at this time consist of, but are not limited to, dry cask storage of irradiated fuel, dry storage of unirradiated and sodium-bonded fuel, sodium drain and storage, and deactivation of the auxiliary plant systems. However, in late 2002, these deactivation activities were temporarily stopped due to legal challenges on National Environmental Policy Act (NEPA) grounds by the County of Benton (County) alleging that it was not acceptable to address only deactivation activities in the DOE's NEPA *Environmental Assessment, Shutdown of the Fast Flux Test Facility, Hanford Site, Richland, Washington* (DOE/EA-0993, May 1995). The County asserted that a full NEPA EIS on the complete process of decommissioning of the reactor should have been completed before any deactivation activities were performed. On February 28, 2003, the U.S. District Court of Eastern Washington ruled in favor of DOE's decision to address deactivation activities in the May 1995 EA. The County subsequently appealed that decision in favor of DOE to the U.S. 9th Circuit Court of Appeals. On May 6, 2003, the County filed a Motion with the 9th Circuit Court to dismiss its appeal. Thus, the U.S. District Court's February 28, 2003, ruling in favor of DOE was upheld. In late May 2003, the Tri-Party agencies (i.e., DOE, Ecology, and EPA), signed into agreement the FFTF TPA M-81-00 series milestones and schedule for implementing the deactivation activities currently underway.

Since 1996, there have been no changes in the effluent streams that discharge to the disposal facility and there are no plans for any future sources. The individual effluent streams are the cooling towers associated with the FFTF which continues to be the main wastewater discharge along with a small contribution coming from an equipment drain associated with the 481-A Water Pump house and Maintenance and Storage Facility (MASF). The reactor (FFTF) is currently being deactivated. The FMEF continues to be in a shutdown condition.

INDUSTRIAL PROCESSES

The effluent streams are generated from uses that do not involve direct contact of the water with industrial processes. No manufacturing processes or products are associated with the individual effluent streams. Uses that generate the effluent are primarily those associated with the following:

- ventilation, heating, and cooling systems for the buildings,
- potable (treated) water,
- floor drains with limited and strictly controlled usage, and

- hydrotest, maintenance, construction, cooling water, condensate, and stormwater discharges that are covered by one of the Hanford Site categorical permits (ST 4508, ST 4509, or ST 4510).

TREATMENT PROCESSES

The 400 Area Industrial Process Wastewater System discharges untreated effluent to the 4608 Percolation Ponds B and C via a pipeline. A summary of the discharge sources is included below.

FFTF Secondary Cooling Water Tower System Effluent

The main process that contributes to the 400 Area industrial process wastewater systems is the FFTF secondary cooling water tower system. The eight towers that comprise this system dissipate the heat generated in the equipment supporting the FFTF auxiliary systems, such as the heating, ventilation, and the air conditioning (HVAC) system. There is no contact between the piping of the cooling towers and any radioactive liquid discharge, wastes, or nuclear materials in the reactor. Adjacent to the cooling tower pad (Pad 483) is a building that contains the water treatment process control system associated with the cooling towers. This process control system controls the conductivity of the cooling water. The conductivity of the cooling water is directly proportional to the TDS in the effluent stream. This system is adjacent to the facility's reactor containment and service buildings within the 400 Area.

Fuels and Materials Examination Facility (FMEF) Effluent

Currently, the FMEF is unoccupied, not in use, and is not discharging. FMEF is also being deactivated in conjunction with FFTF. However, under limited access it is surveyed periodically for minimum safe conditions.

The FMEF consists of the 427 and 4862 Buildings and support facilities, including the FMEF Cooling Towers, System 36B, and System 36D. The FMEF cooling towers are secured and not expected to be restarted. System 36B is a liquid storage system of two 6,000-gallon tanks housed inside the FMEF adjacent to 36B. The two tanks supporting System 36D also hold process water consisting of lunchroom waste and fire system water.

Maintenance and Storage Facility (MASF) Effluent

The MASF, or 437 Building, consists of a main structure and a two-story service wing. Its function is to provide storage, maintenance, and space for repair of equipment. It contains the Large Diameter Cleaning Vessel (LDCV), which has been used to test mixer pumps for the DOE-RL Tank Farm Project. Water from the 400 Area water tanks is used as a test fluid to evaluate new pump characteristics for waste tank gas mitigation. The test pumps are new and not contaminated. The MASF currently is not conducting any testing, therefore; no discharges are anticipated from this facility.

481-A Water Pumphouse Effluent

The 481-A Water Pumphouse was constructed to provide space for a diesel fire pump and two sanitary water pumps. Equipment drains associated with the sanitary water pump packing leakage contributes to the effluent discharge.

Collection System Status

Industrial process wastewater effluent discharges to the 400 Area percolation ponds are conveyed via a single 0.3048 m (12-in.) diameter underground pipeline totaling approximately 762 m (2,500 feet) in length. All access points to the system are strictly controlled and operated by trained personnel.

INFILTRATION BASINS AND SITE DESCRIPTION

The 400 Area industrial process wastewater system discharges to the two infiltration/disposal basins which are approximately 7.2 acres in size. They have proven to be very capable of handling the flows involved. These basins are located on the Hanford Site, north of the 400 Area. The Hanford Site is located within the semiarid Pasco Basin of the Columbia Plateau in south-central Washington State. The Hanford Site occupies an area of about 560 square miles northwest of the confluence of the Snake and Yakima rivers with the Columbia River. It comprises an area of about 30 miles north to south, and 24 miles east to west. This land has restricted public access and provides a buffer for the smaller areas currently used for storage of nuclear materials, waste storage, and waste disposal. Only about 6% of the land area has been disturbed and is actively used.

The Columbia River flows through the northern part of the Hanford Site. It then turns south and forms part of the Site's eastern boundary (see Hanford Site map page 12). The Yakima River runs along part of the southern boundary and joins the Columbia River below the City of Richland. Richland borders the Hanford Site on the southeast. Rattlesnake Mountain, the Yakima Ridge, and Umtanum Ridge form the southwestern and western boundaries of the Hanford Site. The Saddle Mountains form the northern boundary. Two small east-west ridges, Gable Butte and Gable Mountain, rise above the plateau of the central part of the Hanford Site. Adjoining lands to the west, north, and east are principally range and agricultural lands. The cities of Richland, Kennewick, and Pasco constitute the nearest population centers and are located southeast of the Hanford Site.

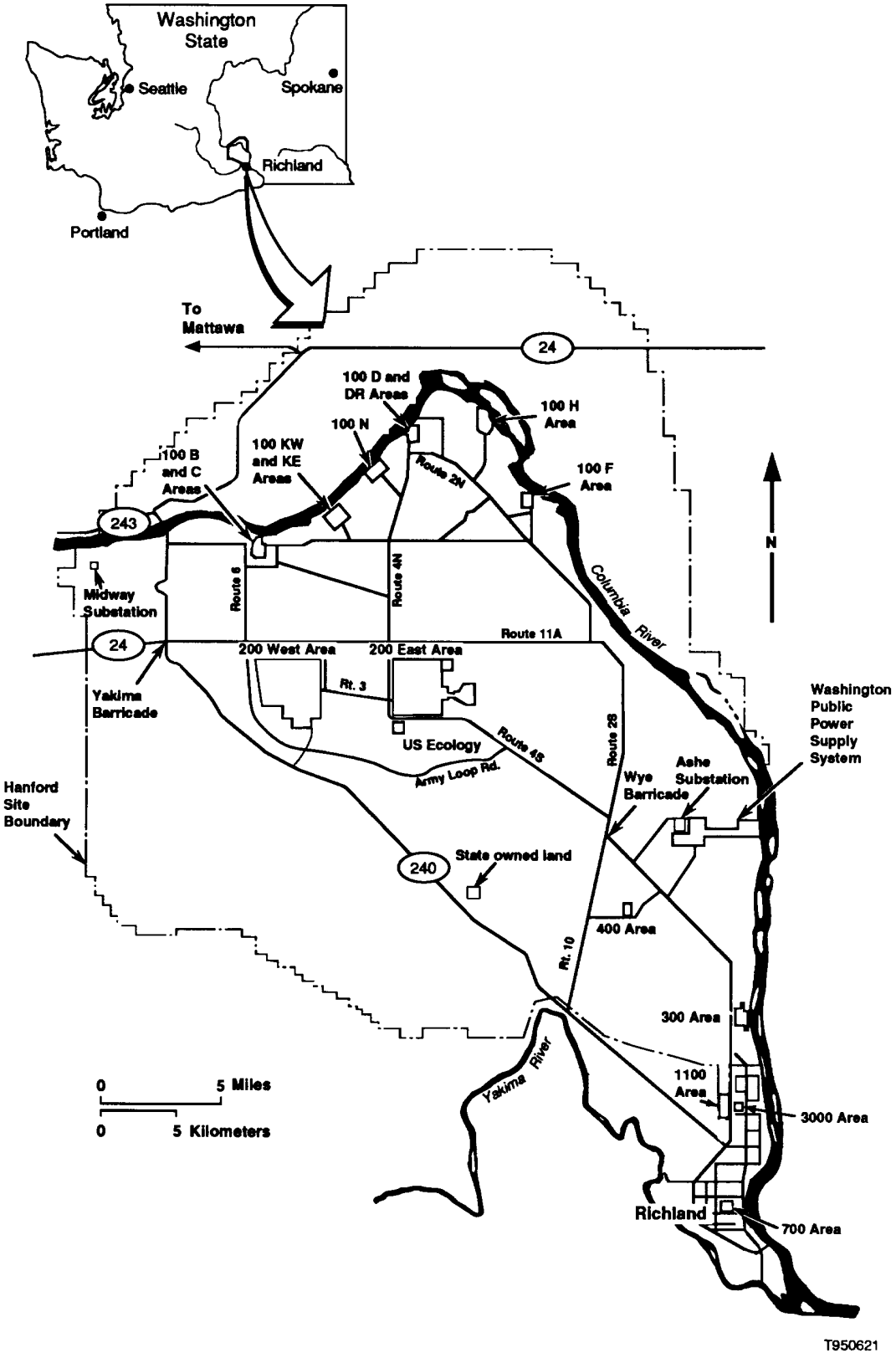
The Hanford Site encompasses more than 1500 waste management units and four groundwater contamination plumes that have been grouped into 78 operable units. The 400 Area Secondary Cooling Water discharge ponds are located in the south-central portion of the Hanford Site approximately 11 miles (17.7 km) north of the city of Richland.

The 400 Area industrial wastewater process sewer system pipeline empties into 4608 Percolation Ponds B and C, located north of the 400 Area. The unlined ponds are 50 feet by 100 feet at the base and have a 4 foot thick earth wall separating them. The drain line discharges into a

diversion box built into the wall dividing the two ponds. Manually operated slide gates located on either side of the diversion box provide the capability to isolate a pond for maintenance.

The effluent stream is currently monitored at a sample weir prior to discharge to the percolation ponds. The current monitoring capabilities include continuous pH, flow and conductivity measurements and a composite sampler. This monitoring station was upgraded in 2002 to include remote download capabilities. No process upsets associated with current operations have occurred. As a result of the limited nature of the activities within the 400 Area, a composite sample was analyzed on a bi-monthly basis. Due to limited activities and past sample data monitoring of the effluent stream, proposed sampling will include continuous pH, conductivity, and flow measurements.

The following figure is the U.S. Department of Energy, Hanford Site, Richland, Washington:


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
Route 2N
100 F Area
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
Route 2S
Washington Public Power Supply System
Ashe Substation
Wye Barricade
Army Loop Rd.
Hanford Site Boundary
State owned land
240
400 Area
Rt. 10
300 Area
Yakima River
1100 Area
3000 Area
0 5 Miles
0 5 Kilometers
Richland
700 Area
T950621

GROUNDWATER AND GEOLOGY OF THE SITE

Evaluations of lithology, stratigraphy, and geologic structure were conducted during studies in 1970 and 1971 by Westinghouse Hanford Company (WHC) contractors for support of siting and design for building FFTF. The studies indicate the three primary geologic units beneath the 400 Area are the Elephant Mountain Member of the Saddle Mountains Basalt Formation, the Ringold Formation, and the Touchet Beds of the Hanford Formation.

Drilling, during a 1969 investigation, intersected what is believed to be the Elephant Mountain flow of the Elephant Mountain Member at 181 m (594 feet) below ground surface. The basalt consists of flow breccia at a depth of 181 to 191 m (594 to 626 feet), underlaid by scoria to a depth of 195 m (641 feet). Dense basalt extends downward from the scoria to the bottom of the hole at 198 m (649 feet). The dense basalt contains horizontal to sub-horizontal flow structures and fractures dipping at 25 degrees.

The fluvial gravels and overbank and lacustrine silt and clay deposits of the lower portion of the Ringold Formation extend from the Elephant Mountain flow 101 m (330 feet) below ground surface upward. The fine-grained, thinly bedded deposits are absent below a depth of approximately 168 m (550 feet). Intervals of well-cemented material, often described in well logs as the Ringold Conglomerate, are found throughout the entire 81 m (264 feet) interval.

Overlying the lower portion of the Ringold Formation and extending upward to 67 m (220 feet) below ground surface are light brown and brown-gray, silty sands that are locally gravelly and locally clayey. Dense light gray-brown fluvial sandy gravels overlie the silty sands to a depth of approximately 55 to 46 m (180 to 150 feet). Overlying the sandy gravels, between a depth of 37 to 58 m (120 to 190 feet), are dense, well-graded, gray gravelly sands, consisting of light gray, fine to medium sand with some gravel. These gravelly sands are not continuous and may be a reworked surface of the Ringold Formation.

The Touchet Beds of the Hanford Formation overlie the discontinuous gravelly sands and these horizontally stratified beds consists of late Pleistocene, dense, glacio fluvial sands that extend to approximately 37 to 55 m (120 to 180 feet) below ground surface. Individual bedding layers range from a millimeter to several centimeters. The beds typically consist of gray-brown, poorly graded, fine to medium grained dense sands that are locally silty and locally gravelly. These sands fine upward from the dense gravelly sands (Baker et al., 1991)

Under the 400 Area, the sands have unique structural features known as “sand” dikes or clastic dikes. These dikes were encountered in excavations created during the construction of FFTF and are apparently common in the Touchet Beds of this area. The dikes are composed of silt and sand in distinct bands or beds paralleling the dike walls and separated by thin laminae of silty material. The width of the dikes ranges from 5 cm to 2 m (several inches to 6 feet). The near-vertical deposits exhibit cross lamination and dewatering features. The vertical extent of the dikes is unknown. The dikes have been interpreted as non-tectonic structures related to rapid loading and unloading during cataclysmic flooding (Baker et al., 1991).

The Hanford Formation is overlain by eolian deposits which blanket the ground surface of the 400 Area at an elevation of approximately 168 m (550 feet) above mean sea level (amsl). These deposits consist of 1.5 m to 4.6 m (5 to 15 feet) of eolian fine to medium grained sand dunes, characterized by cross-bedding. The sand is derived from the top of the Hanford Formation and is stabilized on the ground surface by sagebrush and grass.

The hydrogeology of the Pasco Basin is characterized by a multi-aquifer system that consists of four hydrogeologic units that correspond to the upper three formations of the Columbia River Basalt Group (Grande Ronde Basalt, Wanapum Basalt, and Saddle Mountains Basalt) and the suprabasalt sediments. The basalt aquifers consist of the tholeiitic flood basalts of the Columbia River Basalt Group and relatively minor amounts of intercalated fluvial and volcaniclastic sediments of the Ellensburg Formation. Confined aquifers in the basalt are in the sedimentary interbeds and/or interflow zones that occur between dense basalt flows. The water-bearing portions of the interflow zones are networks of interconnecting vesicles and fractures of the flow tops and bottoms (USDOE 1988). The suprabasalt aquifer system consists of fluvial, lacustrine, and glaciofluvial sediments. This aquifer is regionally unconfined and is within the Ringold Formation and the Hanford Formation (Delaney et al., 1991).

The Ellensburg Formation consists of all sedimentary units situated between the basalt flows of the Columbia River Basalt Group. The three uppermost interbeds of the Ellensburg Formation found at the Hanford Site are, from oldest to youngest, Selah, Rattlesnake Ridge, and Levey. The Selah interbed lies over the Esquatezel Member and under the Pomona Member. The Rattlesnake Ridge interbed lies over the Pomona Member and under the Elephant Mountain Member, and the Levey interbed is found only in the vicinity of the 300 Area and lies between the Ice Harbor Member and the Elephant Mountain Member (Smith, 1988 – Smith et al., 1989)

Borehole 499-SA-7B terminates in dense basalt at 198 m (649 feet) below ground surface and did not intersect any interflow zones, or the sedimentary interbeds of the Ellensburg Formation. Hence, the shallowest of the confined basalt aquifers beneath the 400 Area must be at an even greater depth. John A. Blume & Associates (1971) tentatively identified the dense basalt penetrated as the Elephant Mountain flow of the Elephant Mountain Member. Assuming this identification is correct, the shallowest confined basalt aquifer is probably the Rattlesnake Ridge interbed.

Sediments overlying the Elephant Mountain flow total approximately 183 m (600 feet) in thickness. Approximately 134 m (440 feet) of the lower portion of these sediments is saturated and comprise what is probably a single, unconfined aquifer. Locally confined or semiconfined conditions may, however, be present within this unconfined aquifer in areas where relatively impermeable cemented (caliche) or fine grained materials act as confining layers. The water table of the unconfined aquifer is located roughly at the contact between the Ringold Formation and the Hanford Formation. The water table surface is at a depth of approximately 49 m (160 feet) and an elevation of about 119 m (390 feet) amsl.

Groundwater in the vicinity of the 400 Area moves in the unconfined aquifer to the southeast. Pumping of the production well 499-S1-8J (drilled in 1985) at a depth of 110 to 119 (360 to 390

feet) within the 400 Area may result in the drawdown in proximity to the well, but a noticeable cone of depression is not evident with the present water level data. Disposal of sanitary and process sewer effluent may have produced a small mound of groundwater beneath the sewage lagoon and the 400 Area Ponds. The height of the groundwater mound is estimated to be on the order of 0.3 m (1 foot), based on water level data from wells in the vicinity of the 400 Area Ponds.

The average annual precipitation for the northern portion of the Hanford Site is 17.7 cm (6.95 inches). Mean annual potential evapor-transpiration has been estimated to be about 106.4 cm (41.89 inches). The actual annual evapor-transpiration rate, under current conditions, is estimated to be about 17.1 cm (6.73 inches). Minor local variations occur. Most of the precipitation occurs during the winter with nearly half of the annual amount occurring from November through February. Snowfall accounts for about 38% of all precipitation. Days with greater than 0.51 inches of precipitation occur less than 1% of the year.

Likely projections are the probable maximum flood on the Columbia River would not encroach within the 400 Area Ponds because of the 51.82 m (170 foot) difference in elevation.

The Hanford Site has been botanically characterized as a shrub-steppe. The major plant community in the vicinity of the 400 Area Ponds is Sagebrush/Cheatgrass, or Sandberg Bluegrass, and Greasewood/Cheatgrass-Saltgrass.

PERMIT STATUS

The previous permit for this facility was issued on July 31, 1996, with a modification date on February 10, 1998.

An application for permit renewal was submitted to Ecology on January 31, 2001, and accepted by Ecology on March 27, 2001.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

The facility last received a compliance inspection with sampling on October 19 and November 9, 2000. The inspections revealed eight deficiencies and two concerns. There has been no previous inspection since the permit was issued in 1996. The inspections identified incorrect well labeling and discrepancies with the 400 Area Building 4608-B Sample Hut entry log sheet (personnel signing in), sampling procedures following the Sampling Analysis Plan, pH reporting, temperature monitoring for the refrigerator holding samples, and minor Discharge Monitoring Report (DMR) errors. Concerns identified during the inspections were the Spill Control Plan and the Solid Waste Control Plan inadequacies, and if the permit required elements were in these plans. The concerns have been clarified and all the deficiencies corrected. The inspection was closed January 16, 2001.

During the history of the previous permit, the Permittee has remained in compliance with the groundwater limits at the monitoring wells, based on Discharge Monitoring Reports (DMRs) and other reports submitted to Ecology. The Permittee took reasonable action to identify process

changes when the DMRs for quarters in 1996 through 1998 reported elevated TDS and manganese discharges above the state groundwater quality standards of 500,000 μg/L and 50 μg/L, respectively (Tables 1 and 2). However, none of these high readings in the discharged effluent appear to have affected groundwater quality.

TABLE 1

ELEVATED TDS DISCHARGES*

DMR Date	High	Low	Average	Cause
3rd Quarter 1996	566,000 ug/L	529,000 ug/L	547,000 ug/L	Cooling Towers
4th Quarter 1996	519,000 ug/L	503,000 ug/L	511,000 ug/L	Cooling Towers
3rd Quarter 1997	548,000 ug/L	546,000 ug/L	547,000 ug/L	Cooling Towers
4th Quarter 1998	827,000 ug/L	436,000 ug/L	565,500 ug/L	Laboratory Error

*The state groundwater quality standard for TDS is 500,000 μg/L

TABLE 2

ELEVATED MANGANESE DISCHARGES*

DMR Date	High	Low	Average	Cause
2nd Quarter 1997	64.3 ug/L	44.4 ug/L	54.4 ug/L	Water Tank Drain
3rd Quarter 1997	78.7 ug/L	76.4 ug/L	77.6 ug/L	Water Tank Drain

* The state groundwater quality standard for manganese is 50 μg/L

The elevated TDS discharges noted in Table 1 had plausible explanations and the Permittee took appropriate actions to implement long-term corrections to the industrial wastewater process system to prevent the reoccurrence of the high levels. The FFTF cooling towers evaporate the water, which results in concentrating TDS in the cooling tower discharge. Cooling tower influent source water is groundwater from the 400 Area wells, which is high in TDS when it is pumped from the ground. To compensate for these high baseline TDS levels, the cooling tower process controls were adjusted to lower TDS in the discharge which was successful in reducing the TDS in the system. One high TDS sample has been reported on the DMRs since the changes to the cooling tower process control system were incorporated. During the 4th quarter of 1998, the TDS sample results showed one sample with a high TDS. This high reading was attributed to a laboratory error when five additional samples were tested with results reported below the 500,000 ug/L standard.

The elevated manganese levels in Table 2 were attributed to the hard water deposits settling in the 400 Area potable water storage tanks and corrosion products from the iron in the steel used to build the tanks. A drinking water sample taken from the tanks on June 25, 1997, confirmed the elevated levels of manganese in the tanks. The Permittee determined that these hard water deposits were flushed out during the water tank inspections in 1997 and resulted in the readings noted in Table 2. The average manganese exceeded the 50 ug/L limit on two occasions. The

tank draining process was changed to prevent the deposits from reaching the discharge by using filters when the tanks are drained and flushed for their required inspections. Since the filters have been used, no high manganese levels have been detected and reported on the DMRs.

The Permittee reported a high zinc level in a water sample taken from the FMEF System 36B tank T-23. The sample's high, low, and average levels reported for zinc of 9,010 µg/L, 4,440 µg/L, and 6,725 µg/L with a permit limit of 5,000 ug/L, were noted, and the water was drained and trucked to a disposal facility rather than discharging it to the industrial wastewater process system.

On some DMRs for 1999 and 2000, broken sample bottles and exceedances of sample holding times and temperature have been reported by the Permittee. Efforts to correct these issues and prevent their reoccurrence have been made successfully with no problems noted and reported since that time.

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the permit reapplication and in the discharge monitoring reports (DMR). The proposed wastewater discharge prior to infiltration is characterized for the following parameters:

WASTEWATER CHARACTERIZATION

Parameter	Average Concentration
Total Dissolved Solids	445,927 µg/l
pH	8.6

The old permit required arsenic, cobalt, manganese, nitrate, phosphorus, total organic halides, cadmium, lead, gross beta and tritium to be "monitor only" in the effluent and reported on the DMR. In addition, chloride and cyanide were required with limits set at state groundwater quality standards. The above parameters were established in the permit because there was little historical or analytical data available at the time of the original permit application. In addition, the failed 400 Area Septic System was closing down and there were concerns that some of these parameters could pose a problem in the effluent. So the above mentioned parameters were originally added to better define and characterize the effluent discharge. To date, over 4,000 samples have been collected and analyzed. Process improvements implemented over the past five years have prevented the water quality standards for the 13 above mentioned parameters from being exceeded.

Originally, FFTF cooling tower chemical control system used a biocide and anti-scaling agent that was interfering and causing radio nuclides, like Gross Beta, (due to phosphate containing potassium-40, a naturally occurring radionuclide) to adhere to the agents which could have been detected in the effluent. However, agents used for the cooling tower chemical control system were changed to agents that do not contain radionuclides. None of the treatment chemicals added to the control system have associated state groundwater quality standards.

Because the 400 Area groundwater supply wells provide influent, source water for industrial and potable (drinking water) uses, the addition of chlorine is a required disinfectant. As a result, chloride and TOX were monitored for as potential by-products created from the chlorine addition.

Historically, elevated levels of tritium measured above the interim drinking water standard of 20,000 picocuries per liter (piC/L) and associated with the groundwater plume in the vicinity of the Hanford Site's 200 East Area (i.e., Plutonium-Uranium Extraction Plant (PUREX), have been measured in the 400 Area groundwater (water supply) wells. Thus, tritium was added as a monitored parameter, because, at the time of the original permit application, the Hanford Site did not have an extensive tritium monitoring program. Nowadays, extensive groundwater monitoring of many constituents, including tritium, is conducted throughout the Hanford Site to characterize the nature and extent of site-wide contamination. In 1999, levels of tritium in samples collected from the 400 Area groundwater supply wells were measured below the 20,000 piC/L interim drinking water standard .

Arsenic, cobalt, manganese, nitrate, cadmium, and lead were added because of concerns of past disposal to the 400 Area Septic System, a sanitary sewage lagoon, located immediately west, and upgradient of the process ponds. Disposal to the lagoon has been discontinued, and the lagoon has been backfilled. Nitrate is the only significant contaminant attributable to 400 Area operations and the old sanitary lagoon. It has been detected at elevated levels in one of the wells (699-2-7) downgradient to the process ponds. These higher levels are probably attributed to the old sanitary sewage lagoon which is upgradient of the process ponds. Groundwater samples associated with this well are also frequently elevated with respect to nitrite. Nitrite may have been generated by reduction of nitrate to nitrite as part of denitrification. All nitrite values are below the 3.3 mg/L maximum contaminant level (MCL) drinking water standard. Because disposal to the sanitary lagoon has been discontinued, groundwater contamination from this source is expected to diminish in time. Nitrate and nitrite concentrations in samples obtained from the new downgradient well 699-2-6A are not significantly elevated, relative to the upgradient well 699-8-17.

As mentioned earlier, the deactivation of the FFTF is underway. There seems to be no evidence that these 13 above-mentioned parameters are in the effluent discharge or have the potential to exceed a permit state groundwater quality standard. The Permittee has demonstrated through sampling, monitoring, and other engineering controls, that the above parameters are not present in the discharge or are present only at background levels from influent, source groundwater. Furthermore, no increases in the parameters are due to activities of the Permittee.

In 2002, the Permittee purchased and installed new state-of-the art equipment to more reliably measure flow and pH continuously. With added features, the equipment could also measure conductivity. Because of the correlation between conductivity and TDS, the Permittee requested to replace the permit limit for TDS with a permit limit for conductivity.

Electric conductivity is the ability of a substance to conduct an electric current. Total Dissolved Solids (TDS) is the total amount of solids dissolved into an aqueous solution. In aqueous solutions, conductivity is directly proportional to the concentration of dissolved solids, therefore,

the higher the concentration of solids, the greater the conductivity. This allows a correlation between the conductivity of a particular solution and the TDS, measured in ppm, to be established for that solution. It is important to note, that this conductivity-TDS relationship is specific to that particular dissolved solution. When measuring conductivity or TDS in nonstandard conditions, corrections for temperature variations must be taken into account before determining the final values of conductivity and TDS. Instrumentation with temperature compensation overcomes this problem. The on-line monitoring equipment used at the FFTF does use temperature compensation.

To establish the conductivity-TDS correlation, the Permittee first sampled the FFTF Cooling Water System evaporative cooling towers, the major contributor to the effluent, as well as the system's effluent discharge point of compliance in the 400 Area Sample Hut. By taking several water samples and performing a laboratory analysis for conductivity and TDS, a correlative ratio was established.

The sampling points were Cooling Towers E-18, E-19, E-296, and E-345, as well as the Process Sewer Hut. A total of 18 samples were taken on July 16, August 7, and October 9 of 2002. The samples of the Cooling Towers were taken from sample valves, after purging for approximately 30 seconds and then filling the sample bottle. The samples at the Process Sewer Hut were taken using a peristaltic pump and purging the line for approximately one minute and then filling the sample bottle. Analytical methods referenced from the 1998 Standard Methods for the Examination of Water and Wastewater (20th Edition), were used for sample analyses.

The sample results were plotted using a spread sheet, with conductivity in micro Siemens per centimeter (µS/cm) on the X-axis (independent variable) and TDS in mg/L on the Y-axis (dependent variable). Based on the statistical analysis of the data, a "best fit" line was generated, along with its following equation: $Y= 0.7691(X) – 14.201$, (X is measured conductivity and Y is the corresponding value generated for TDS). Thus, if a conductivity value of 668 µS/cm is measured, the corresponding TDS value of around 500mg/L is obtained. Quantitatively, the ratio of conductivity to TDS is about 1.34 µS/cm to 1mg/L.

During the October 9, 2002 sampling event, the newly installed conductivity monitoring equipment was on line. The on-line conductivity data for the sampling was reviewed. The laboratory measurements showed a TDS value of around 421 mg/l with a corresponding conductivity of around 578 uS/cm. The on-line monitoring showed a conductivity reading of around 590 µS/cm. This is less than a 5% error and well within the permit's stated precision goal of +/- 20%. As a further accuracy check, 421 mg/L for TDS was input to the equation times a 1.34 µS/cm/mg/L = 564 µS/cm ratio of conductivity to TDS, which generated a conductivity value of ~564 µS/cm, which is also within a 5% error and well within the +/- 20% precision goal as stated in ST 4501. (Note: This correlation could only be performed for the October 9 sampling event; the equipment was not on line during the July 2002 and August 2002 sampling events.)

Thus, the overall conclusions of this ratio study with TDS and conductivity for the 400 Area Process Sewer System was that a quantitative, correlative relationship has been established with an appropriate permit limit set for conductivity to yield a corresponding TDS level.

PROPOSED PERMIT LIMITATIONS

State regulations require that limitations set forth in a waste discharge permit must be either technology or water quality-based. Wastewater must be treated using all known, available, and reasonable technology (AKART) and not pollute the waters of the State. In the case of the 400 Area industrial process wastewater system, there is no industry standard and no profit and revenue data that was used to determine AKART. Rather, the procedure used to evaluate the BAT/AKART for wastewaters generated on the Hanford Site, as described in, "Best Available Technology (economically achievable) Guidance Documents for the Hanford Site," WHC-EP-0137, 1988 Rev. 0, is consistent with the information and policies established in the Ecology Water Quality Program document, "Economic Reasonableness Test for NPDES and State Wastewater Discharge Permits," Ecology 1991 b.

The BAT/AKART evaluation was coupled with an ongoing waste minimization program aimed at reducing and eliminating contaminated (or potentially contaminated) sources and waste streams at the Hanford Site. These programs have resulted in the implementation of best management practices (BMP), including process and facility modifications designed to reduce wastewater flows and contaminant concentrations. The BAT/AKART determination listed in the W252 Engineering Report (WHC-SD-W252-ER-001, Rev. 0, page 2-1 and B.6-3, 39 & 65) for the 400 Area Ponds which indicated that the 400 Area industrial process wastewater effluent would continue to be discharged to the existing 400 Area Percolation Ponds B and C. The application of the BAT/AKART determination process identified the current status as the selected alternative, which is no treatment needed before discharge (i.e., no new actions are required). After consultation with DOE-RL and Fluor Hanford, Ecology accepted the selected method of treatment as AKART for this system.

The permit also includes limitations on the quantity and quality of the wastewater discharged to the infiltration basins that have been determined to protect the quality of the groundwater. The approved engineering reports include specific design criteria for this facility. Water quality-based limitations are based upon compliance with the Ground Water Quality Standards (Chapter 173-200 WAC).

The more stringent of the water quality-based or technology-based limits are applied to each of the parameters of concern. Each of these types of limits is described in more detail below.

GROUNDWATER QUALITY-BASED EFFLUENT AND GROUNDWATER LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's groundwaters including the protection of human health, WAC 173-200-100 states that waste discharge permits shall be conditioned in such a manner as to authorize only activities that will not cause violations of the Ground Water Quality Standards. Drinking water is the beneficial use generally requiring the highest quality of groundwater. Providing protection to the level of drinking water standards will protect a great variety of existing and future beneficial uses.

Applicable groundwater criteria as defined in Chapter 173-200 WAC and in RCW 90.48.520 for this discharge include the following:

GROUNDWATER QUALITY CRITERIA

Parameter	Groundwater Quality Criteria
Total dissolved solids	500,000 µg/l
pH	6.5-8.5 standard units

Ecology has reviewed existing records and was able to determine if background groundwater quality is higher or lower than the criteria given in Chapter 173-200 WAC. The discharges authorized by this proposed permit are not expected to interfere with beneficial uses.

Table 5 shows more recent 400 Area groundwater quality data that were included in the permit reapplication. For the permit, three 400 Area groundwater monitoring wells in the vicinity of the Sample Hut and Percolation Ponds B and C were each required to be monitored and sampled once per quarter (two downgradient wells; 699-2-6A and 699-2-7, and one upgradient well; 699-8-17). Well 699-2-7 is the well closest to the Sample Hut (point of compliance) and the 400 Area Percolation Ponds B and C. Parameters required to be monitored for these wells in the permit were selected by an educated best guess of potential constituents of concern, based on a one time sample used to develop a permit Sample Analysis Plan (SAP). The groundwater limits of these parameters were based on protection of groundwater quality. To date, Ecology has reviewed existing records and data and has not seen any exceedances or impact to the groundwater quality.

TABLE 5

RECENT GROUNDWATER CHARACTERISTICS

Parameter	Well 699-2-6A Recent Range of Measurements	Well 699-2-7 Recent Range of Measurements	Well 699-8-17 Recent Range of Measurements
Total Organic Carbon	<1000-1030 µg/l	<1000 µg/l	<1000 µg/l
pH	7.6 - 8.1	7.5 – 8.5	7.8 – 8.3
Sulfate	53,400 – 60,300 µg/l	51,100 – 55,500 µg/l	51,900 – 53,700 µg/l
Cadmium	<5 µg/l	< 5 µg/l	< 5 µg/l
Chromium	<10 µg/l	< 10 µg/l	< 10 µg/l
Lead	<3 µg/l	<3 µg/l	1.1 – 12.3 µg/l
Manganese	<15 µg/l	<15 µg/l	<15 µg/l
Mercury	<0.2 µg/l	<0.2 µg/l	<0.2 µg/l

Although the 400 Area effluent has had pH reported in the permit reapplication as high as 8.8, the pH is expected to be still within the range of 6.5 to 8.5, because it has not been a problem reported in DMRs to date. The pH limits in the 400 Area industrial process wastewater system were adjusted early in the permit because of a high baseline pH in the 400 Area influent groundwater supply. Historically, pH levels reported on the DMRs have been consistently in the 7.5 – 8.5 range so the pH limits for the effluent was adjusted to the range of 6.5 – 9.5 pH units.

Additionally, problems associated with a high pH in the effluent have been traced to the old pH sensor instrument failure, giving false indications. However, use of the recently-installed, state-of-the art monitoring equipment in Sample Hut, which measures pH continuously, has prevented this problem from reoccurring.

To date, there have been no discharges of radionuclides to the 400 Area industrial process wastewater system. As such for this Permit, the Permittee shall be self-regulating for radionuclides under the provisions of the U.S. Atomic Energy Act of 1954, as amended. Moreover, the Permittee plans to meet the intent of 40 CFR Part 141, "National Primary Drinking Water Regulations," in regards to radionuclides; and plans to take investigative and mitigative steps if drinking water standards are exceeded.

The other constituents listed in the table above are not known to be added to the effluent and they were determined to no longer be constituents of concern. There are no scheduled or planned discharges of these constituents from the 400 Area.

COMPARISON OF LIMITATIONS WITH THE EXISTING PERMIT ISSUED JULY 31, 1996

Table 6 compares the limitations in the old permit with the limitations planned for the new permit.

TABLE 6

COMPARISON OF PREVIOUS AND NEW LIMITS

Parameter	Existing Limits	Proposed Limits
Arsenic (total)	Monitor Only AM EFF	No Limit
Cadmium (total)	10µg/l GW 5 µg/l EW EFF	No Limit
Chromium (total)	50 µg/l GW	No Limit
Lead (total)	50 µg/l GW 50 µg/l EW	No Limit
Manganese (total)	50 µg/l GW Monitor Only AM EFF	No Limit
Mercury (total)	2 µg/l GW	No Limit
Chloride	250,000 µg/l AM EFF	No Limit
Cobalt (total)	Monitor Only AM EFF	No Limit
Cyanide (total)	50 µg/l AM EFF	No Limit
Nitrate (total)	Monitor Only AM EFF	No Limit
Nitrite (total)	Monitor Only AM EFF	No Limit
Phosphorus (total)	Monitor Only AM EFF	No Limit
Sulfate (total)	Monitor Only GW	No Limit
Total Organic Carbon	Monitor Only GW	No Limit
Total dissolved solids	500,000 µg/l AM EFF	500,000 µg/l AM EFF
Conductivity	No Limit	668 µS/cm
Total Organic Halides	Monitor Only AM EFF	No Limit

Tritium	Monitor Only AM EFF	No Limit
Gross Beta	Monitor Only AM EFF	No Limit
pH, in pH units	6.5-9.5 EFF Monitor Only GW	6.5-9.5 EFF
Flow	75 gpm AM EFF	75 gpm AM EFF
EFF means a limit in the effluent, GW means a limit in the groundwater, AM means an average monthly limit, and EW means an early warning value. No limit means the parameter was eliminated.		

Limits for pH and flow in the new permit match the limits in the old permit. Differences include replacing the parameter, total dissolved solids, with conductivity. A new limit was added in the effluent for conductivity, 668 micromhos/cm (µS/cm). This limit correlates with the old limit for total dissolved solids as previously described in this Fact Sheet.

Both the limit and monitoring for arsenic, chromium, lead, cadmium, mercury, chloride, cobalt, cyanide, phosphorus, sulfate, total organic carbon, and total organic halides have been eliminated, since no indication of these parameters have been discovered or previous results have been below PQL limits. This will provide a substantial cost savings to the facility. Arsenic, cobalt, manganese, lead, cadmium, nitrate, total organic carbon, and nitrite were added because of concerns due to past disposal to an old 400 Area sanitary sewage lagoon, which continues to be out of service. Since there have been only very low values for these constituents in the effluent and groundwater, the limits or “monitor only” were discontinued. In addition, the constituents are not added anywhere in the effluent.

Gross Beta and phosphorus monitoring have been eliminated since no indications of these two parameters have been discovered. The permit monitored these constituents due to concerns because of the type of biocide and anti-scaling agents used for the FFTF cooling tower chemical control system.. However, agents used for this system were changed to agents which do not contain radionuclides. They also do not have state groundwater quality standards.

For chloride, the old limit in the effluent and the “monitor only” of total organic halides in the effluent were removed. Historical data shows that chloride has not exceeded its effluent limit of 250,000 µg/L and the past data shows it in the effluent at an average level of 19,300 µg/L. The chloride level in the wastewater is above the PQL due to sodium hypochlorite being injected into the groundwater as it is pumped from the ground to the storage tanks.

The old permit had “monitor only” in the effluent for tritium. This has been removed because the levels have been below the interim drinking water standard for tritium. Hanford has a sitewide tracking program for tritium that monitors contamination. Furthermore, FFTF is undergoing deactivation, which will include draining the sodium from the reactor, with no planned discharges of radionuclides to the effluent anticipated.

Sulfate measured as “monitor only” in the effluent and mercury with a groundwater quality limit for groundwater, have been eliminated because these parameters were not known to be added to the effluent and there has been no indication of sulfate and mercury discovered.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are specified to verify that the system is functioning correctly, that groundwater criteria are not violated, and that effluent limitations are being achieved (WAC 173-216-110). The discharge is monitored at the end of pipe (effluent).

WASTEWATER MONITORING

The monitoring schedule is detailed in the proposed permit under Condition S1 and S2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the lack of treatment, past compliance, significance of pollutants, and cost of monitoring. The effluent is monitored at the weir box in the flow meter hut, 400 Area Building 4608-B. Continuous meters for pH, conductivity, and flow are at this location. Problems with continuous monitoring have occurred in the past due to equipment failure. New equipment was purchased and installed, so Ecology expects these problems to be solved during the term of the new permit.

GROUNDWATER MONITORING

The monitoring of groundwater at the site is required in accordance with the Ground Water Quality Standards, Chapter 173-200 WAC. Ecology has determined that this discharge may have a potential to pollute the groundwater but not to the extent that continued groundwater monitoring as required in the old permit is needed. The Permittee has evaluated the impacts on groundwater quality demonstrated through data received, to date, from the old permit. Monitoring of the groundwater at the site boundaries and within the site was an integral component of such an evaluation. Groundwater monitoring was done at monitoring wells 699-8-17 (upgradient), 699-2-6A (downgradient), and 699-2-7 (downgradient). In the efforts to further cut costs for the Hanford project and redirect the funds to more critical problems, the groundwater well sampling and monitoring for total organic carbon, sulfate, cadmium, chromium, lead, manganese, mercury, and pH are discontinued. There is no indication the effluent has reached any of the wells. Limits placed on the effluent for the new permit are pH, conductivity, and flow. The wells have demonstrated that the effluent is not impacting the groundwater that is directly under the disposal site, which is all we can expect given the peculiar hydrogeologic conditions at this site. Any future groundwater monitoring using the three ground water monitoring wells will be done at the direction of the Pacific Northwest National Laboratory (PNNL) Groundwater Monitoring Program. PNNL continues to collect field parameters for pH, TDS, conductivity, quarterly for the sitewide groundwater monitoring program and the FFTF groundwater wells are part of this program providing groundwater data if needed.

COMPARISON OF MONITORING WITH THE EXISTING PERMIT ISSUED JULY 31, 1996

The monitoring for the new permit has been reduced from the monitoring required by the existing permit. All of the reductions in monitoring were based on the results to date. The reductions also took into account the potential environmental threat of each parameter and the likely sources of each parameter. The monitoring was also shifted to put more emphasis on the effluent.

All groundwater monitoring for metals, sulfate, pH, and TOC has been eliminated, along with the elimination of monitoring of these same parameters and cobalt, cyanide, chloride, TOX, nitrate and nitrite, phosphorus, and radionuclides in the effluent. The monitoring of parameters for the new permit (conductivity, pH, and flow) was kept at a monthly basis with results to be reported semi-annually on DMRs.

The following table (Table 7) compares the monitoring requirements in the old permit with the monitoring requirements planned for the new permit.

TABLE 7

MONITORING REQUIREMENTS TO DEMONSTRATE PERMIT COMPLIANCE

Constituent or Characteristic	Existing Groundwater Sample Type and Analysis Frequency	Proposed Groundwater Sample Type and Analysis Frequency	Existing Effluent Sample Type and Analysis Frequency	Proposed Effluent Sample Type and Analysis Frequency
Cyanide (total)	Not Required	Not Required	Grab-1/60 days	Eliminate
Total Organic Halides	Not Required	Not Required	Grab-1/60 days	Eliminate
Total Organic Carbon	Grab-quarterly	Eliminate	Not Required	Not Required
Sulfate	Grab-quarterly	Eliminate	Not Required	Not Required
Cobalt (total)	Not Required	Not Required	Composite-1/60 days	Eliminate
Chloride	Not Required	Not Required	Composite-1/60 days	Eliminate
Mercury (total)	Grab-quarterly	Eliminate	Not Required	Not Required
Nitrate (total)	Not Required	Not Required	Grab-1/60 days	Eliminate
Nitrite (total)	Not Required	Not Required	Grab-1/60 days	Eliminate
Phosphorus (total)	Not required	Not required	Composite-1/60 days	Eliminate
Tritium	Not required	Not Required	Grab-1/60 days	Eliminate
Manganese (total)	Grab-quarterly	Eliminate	Composite-1/60 days	Eliminate
Gross beta	Not Required	Not Required	Composite-1/60 days	Eliminate

Constituent or Characteristic	Existing Groundwater Sample Type and Analysis Frequency	Proposed Groundwater Sample Type and Analysis Frequency	Existing Effluent Sample Type and Analysis Frequency	Proposed Effluent Sample Type and Analysis Frequency
Lead (total)	Grab-quarterly	Eliminate	Composite-1/ 60 days	Eliminate
Chromium (total)	Grab-quarterly	Eliminate	Not Required	Not Required
Arsenic (total)	Not Required	Not Required	Composite-1/60 days	Eliminate
Cadmium (total)	Grab-quarterly	Eliminate	Composite-1/ 60 days	Eliminate
Total Dissolved Solids	Not Required	Not Required	Composite-1/ 60 days	Continuous measuring Conductivity
pH	Grab-Quarterly	Eliminate	Grab-1/60 days	Continuous
Flow	Not Required	Not Required	Continuous	Continuous

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3 are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 273-216-110).

FACILITY LOADING

The flow criteria for this disposal facility are taken from the reapplication and past performance and are as follows:

Average monthly flow: 28,800 gpd
Average yearly flow: 10,368,000 gpd

The permit requires the Permittee to maintain adequate capacity to handle the flows and waste loading to the disposal facility (WAC 173-216-110[4]). For significant changes in loadings to the disposal facility, the permit requires a new application and an engineering report (WAC 173-216-110[5]).

OPERATIONS AND MAINTENANCE

The proposed permit contains condition S.5 as authorized under Chapter 173-240-150 WAC and Chapter 173-216-110 WAC. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

SAMPLING AND ANALYSIS PLAN

The Permittee will develop a plan which will describe the sampling, measurement, quality control, and assessment procedures needed to acquire the data required for this proposed permit. The plan should be designed to ensure that the future use of the conductivity data is equivalent to the Total Dissolved Solids data which was used in the previous permit.

SOLID WASTE PLAN

Ecology has determined that the Permittee has a potential to cause pollution of the waters of the state from solid waste. This proposed permit requires, under the authority of RCW 90.48.080, that the Permittee maintain a solid waste plan designed to prevent solid waste from causing pollution of the waters of the state.

NON-ROUTINE AND UNANTICIPATED DISCHARGES

Occasionally, this facility may generate wastewater, which is not characterized in their permit application, because it is not a routine discharge, and was not anticipated at the time of application. These are typically clean wastewaters but may be contaminated with pollutants. The permit contains an authorization for non-routine and unanticipated discharges. The permit requires a characterization of these wastewaters for pollutants and examination of the opportunities for reuse. Depending on the nature and extent of pollutants in this wastewater and opportunities for reuse, Ecology may authorize a direct discharge via the process wastewater outfall for clean water, require the wastewater to be placed through a wastewater treatment process or require the water to be reused.

SPILL PLAN

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

The Permittee has developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the Permittee to keep the plan updated and submit major changes to Ecology.

GENERAL CONDITIONS

General Conditions are based directly on state laws and regulations and have been standardized for all industrial waste discharge to groundwater permits issued by Ecology.

Condition G1 requires responsible officials or their designated representatives to sign submittals to Ecology. Condition G2 requires the Permittee to allow Ecology to access the system, production facility, and records related to the permit. Condition G3 specifies conditions for modifying, suspending, or terminating the permit. Condition G4 requires the Permittee to apply to Ecology prior to increasing or varying the discharge from the levels stated in the permit

application. Condition G5 requires the Permittee to construct, modify, and operate the permitted facility in accordance with approved engineering documents. Condition G6 prohibits the Permittee from using the permit as a basis for violating any laws, statutes or regulations. Conditions G7 and G8 relate to permit renewal and transfer. Condition G9 requires the payment of permit fees. Conditions G10 and G11 describes the penalties for violating permit conditions.

RECOMMENDATION FOR PERMIT ISSUANCE

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

REFERENCES FOR TEXT AND APPENDICES

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State Waste Discharge Permit Application for Industrial Discharge to Land, 400 Area Septic System, June 1994, USDOE, DOE/RL/94-28, Rev 0.

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Water Quality Standards for Ground Waters of the State of Washington, Chapter 173-200 WAC, 10/31/90.

State Waste Discharge Permit Program, Chapter 173-216 WAC, 9/22/93.

Washington State Law, RCW 90.48.

State Waste Discharge Permit ST 4501 and Fact Sheet, issued July 1, 1996, Ecology.

Hanford Waste Minimization and Pollution Prevention Awareness Program Plan, DOE-RL 91-31, Rev. 5.

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Estimation of Ground-Water Travel Time at the Hanford Site: Models used to Calculate Infiltrated Data, WHC-EP-0587

Consent Order No. DE-91NM-177 for the Permitting of Liquid Effluent Discharges Under WAC 173-216, December 23, 1991

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Phase II Liquid Effluent Program (Project W-242) Wastewater Engineering Report and BAT/AKART Studies, WHC-SD-W252-ER-001, Rev. 0

The 400 Area Secondary Cooling Water Stream Specific Report, WHC 1990 Addendum 28

Groundwater Impact Assessment Report for the 400 Area Ponds, WHC-EP-0587

Washington State Department of Health Drinking Water Standards, effective July 1994

Washington Administrative Code (WAC), Chapter 173-303

Hanford Site Groundwater Background, DOE/RL-92-23, April 1992

APPENDIX B – PUBLIC INVOLVEMENT INFORMATION

Ecology has tentatively determined to renew the permit of the applicant listed on page one of this fact sheet. The draft permit contains conditions and effluent limitations, which are described in the rest of this fact sheet.

Previous public notice of application was published on July 25 and 31, 1994, in the Tri-City Herald, to inform the public that an application had been submitted and to invite comment on the issuance of the permit.

Ecology did not publish a public notice of draft permit for this renewal permit because there are no increases in volume or changes in characteristics of the FFTF discharge beyond those previously authorized in July 1996. This permit was written by Kathy Conaway. Inquiries, requests for information and meetings, and written comments should be directed to:

Ms. Kathy Conaway
Washington State Department of Ecology
1315 West 4th Avenue
Kennewick, Washington 99336-6018
(509) 736-3045 or Hanford Hotline 1-800-321-2008

Ecology will consider comments received in formulating a final determination to issue, revise, or deny the permit. Ecology's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information can be obtained from Ecology by contacting Ms. Kathy Conaway at (509) 736-3045 or by writing to her at the above address.

APPENDIX C – GLOSSARY OF TERMS

Alluvium--Sedimentary material deposited by flowing water, as in a riverbed or delta.

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

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.

Bypass--The intentional diversion of waste streams from any portion of the collection or treatment facility.

Caliche--A hard soil layer cemented by calcium carbonate and found in deserts and other arid or semiarid regions.

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).

Confidence Interval--A statistical range with a specified probability (ex. 95%) that a given parameter lies within the range.

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.

Engineering Report--A document, signed by a professional licensed engineer, 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.

Gross Alpha--A measurement of radioactive decay of an atomic nucleus by emission of an alpha (positively charged) particle.

Gross Beta--A measurement of radioactive decay of a high-speed electron or positron.

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 stormwater and, also, leachate from solid waste facilities.

Lognormal--Of, pertaining to, or being a logarithmic function with a normal distribution; where a logarithmic function is an exponential one, and a normal distribution is represented by a bell-shaded curve that is symmetrical about the statistical mean.

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.

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.

Practical Quantification Level (PQL)-- A calculated value normally about five times the MDL (method detection level). When a WAC 173-200 groundwater criterion is at a level less than the PQL, then an enforcement limit may be established at the PQL. Compliance cannot be determined at levels below the PQL, since by definition, this is the lowest level that an analytical laboratory can reliably detect. Compliance may not be definitively determined by using the PQL

as a limit, but it will act as the first reliable and reproducible point which can be accurately measured.

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

Total Dissolved Solids--That portion of total solids in water or wastewater that passes through a specific filter.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent pollution of the receiving water.