WHC-EP-0342
Addendum 24

284-E Powerplant Wastewater Stream-Specific Report

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management

Westinghouse
Hanford Company Richland, Washington

Hanford Operations and Engineering Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

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Operations Support Services Department

Date Published
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284-E POWERPLANT WASTEWATER STREAM-SPECIFIC REPORT

OPERATIONS SUPPORT SERVICES DEPARTMENT

ABSTRACT

The proposed wastestream designation for the 284-E Powerplant Wastewater wastestream is that this stream is not a dangerous waste, pursuant to the Washington (State) Administration Code 173-303, Dangerous Waste Regulations.* *A combination of process knowledge and sampling data was used to make this determination.*

*Ecology, 1989, *Dangerous Waste Regulations*, Washington (State) Administrative Code (WAC) 173-303, Washington State Department of Ecology, Olympia, Washington.

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EXECUTIVE SUMMARY

The proposed wastestream designation for the 284-E Powerplant Wastewater stream is that it is not a dangerous waste, pursuant to the Washington (State) Administrative Code (WAC) 173-303, *Dangerous Waste Regulations**. This proposed designation is based on applying both process knowledge and sample data to the WAC 173-303 requirements for the three types of dangerous waste: (1) listed, (2) criteria, and (3) characteristic dangerous waste. The "listed" dangerous waste determination was made with process knowledge; the "criteria" and "characteristic" dangerous waste determinations were made with sampling data. Process knowledge was based on knowledge of 284-E Powerplant operations. Sample data are based on samples downstream of all process contributors. The proposed designation is made using "validated" data from routine operations samples taken from October 1989 through March 1990. Samples of the other two waste contributing activities, blowdown and softener regeneration, were taken prior to implementation of a data validation procedure. These data are included in Appendix A to further support the proposed designation.

*Ecology, 1989, *Dangerous Waste Regulations*, WAC 173-303, Washington State Department of Ecology, Olympia, Washington.

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LIST OF TERMS

DOE	U.S. Department of Energy
EC%	percent equivalent concentration
Ecology	Washington State Department of Ecology
EP	extraction procedure
EPA	U.S. Environmental Protection Agency
HH	halogenated hydrocarbons
PAH	polycyclic aromatic hydrocarbons
PUREX	Plutonium/Uranium Extraction (Plant)
SARA	*Superfund Amendments and Reauthorization Act*
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
WAC	Washington (State) Administrative Code

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STREAM-SPECIFIC CHARACTERIZATION REPORT FOR 284-E POWERPLANT WASTEWATER

1.0 INTRODUCTION

1.1 BACKGROUND

In response to the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989), comments were received from the public regarding reduction of the discharge of liquid effluents into the soil column. As a result, the U.S. Department of Energy (DOE), with the concurrence of the Washington State Department of Ecology (Ecology), and the U.S. Environmental Protection Agency (EPA), committed to assess the contaminant migration potential of liquid discharges at the Hanford Site (Lawrence 1989).

This assessment is described in the *Liquid Effluent Study Project Plan* (WHC 1990), a portion of which characterizes 33 liquid effluent streams. This characterization consists of integrating the following elements, pursuant to the Washington (State) Administrative Code, (WAC) 173-303 (Ecology 1989): process data, sampling data, and dangerous waste regulations.

The results of the characterization study are documented in 33 separate reports, one report per wastestream. The complete list of stream-specific reports appears in Table 1-1. This document is one of the 33 reports.

1.2 APPROACH

This report characterizes the 284-E Powerplant wastewater stream in sufficient detail so that a wastestream designation, in accordance with WAC 173-303 *Dangerous Waste Regulations*, can be proposed. This report also provides information so an assessment of the relative effluent priorities can be made with regard to the need for treatment and/or alternative disposal practices.

This characterization strategy (shown in Figure 1-1) is implemented by means of the following steps.

1. Describe both process and sampling data (Sections 2.0 and 3.0, respectively).

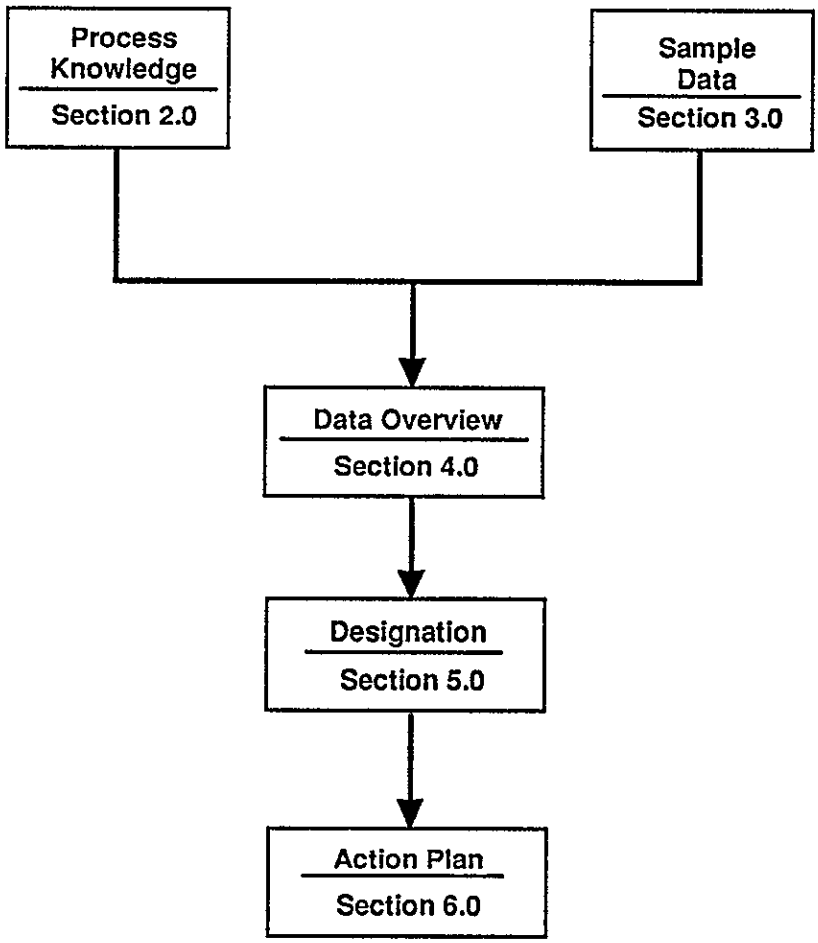
2. Propose a designation (Section 5.0).

3. Design an action plan, if needed, to obtain additional characterization data (Section 6.0).

Table 1-1. Stream-Specific Characterization Reports.

WHC-EP-0342	Addendum 1	300 Area Process Wastewater
WHC-EP-0342	Addendum 2	PUREX Plant Chemical Sewer
WHC-EP-0342	Addendum 3	N Reactor Effluent
WHC-EP-0342	Addendum 4	163N Demineralization Plant Wastewater
WHC-EP-0342	Addendum 5	PUREX Plant Steam Condensate
WHC-EP-0342	Addendum 6	B Plant Chemical Sewer
WHC-EP-0342	Addendum 7	UO_3/U Plant Wastewater
WHC-EP-0342	Addendum 8	Plutonium Finishing Plant Wastewater
WHC-EP-0342	Addendum 9	S Plant Wastewater
WHC-EP-0342	Addendum 10	T Plant Wastewater
WHC-EP-0342	Addendum 11	2724-W Laundry Wastewater
WHC-EP-0342	Addendum 12	PUREX Plant Process Condensate
WHC-EP-0342	Addendum 13	222-S Laboratory Wastewater
WHC-EP-0342	Addendum 14	PUREX Plant Ammonia Scrubber Condensate
WHC-EP-0342	Addendum 15	242-A Evaporator Process Condensate
WHC-EP-0342	Addendum 16	B Plant Steam Condensate
WHC-EP-0342	Addendum 17	B Plant Process Condensate
WHC-EP-0342	Addendum 18	2101-M Laboratory Wastewater
WHC-EP-0342	Addendum 19	UO_3 Plant Process Condensate
WHC-EP-0342	Addendum 20	PUREX Plant Cooling Water
WHC-EP-0342	Addendum 21	242-A Evaporator Cooling Water
WHC-EP-0342	Addendum 22	B Plant Cooling Water
WHC-EP-0342	Addendum 23	241-A Tank Farm Cooling Water
WHC-EP-0342	Addendum 24	284-E Powerplant Wastewater
WHC-EP-0342	Addendum 25	244-AR Vault Cooling Water
WHC-EP-0342	Addendum 26	242-A Evaporator Steam Condensate
WHC-EP-0342	Addendum 27	284-W Powerplant Wastewater
WHC-EP-0342	Addendum 28	400 Area Secondary Cooling Water
WHC-EP-0342	Addendum 29	242-S Evaporator Steam Condensate
WHC-EP-0342	Addendum 30	241-AY/AZ Tank Farms Steam Condensate
WHC-EP-0342	Addendum 31	209-E Laboratory Reflector Water
WHC-EP-0342	Addendum 32	T Plant Laboratory Wastewater
WHC-EP-0342	Addendum 33	183-D Filter Backwash Wastewater

Figure 1-1. Characterization Strategy.



1.3 SCOPE

The scope of this report is the characterization of the current 284-E Powerplant Wastewater effluent and a corresponding analysis to determine a waste designation for the effluent. The location of the facility on the Hanford Site is given in Figure 1-2.

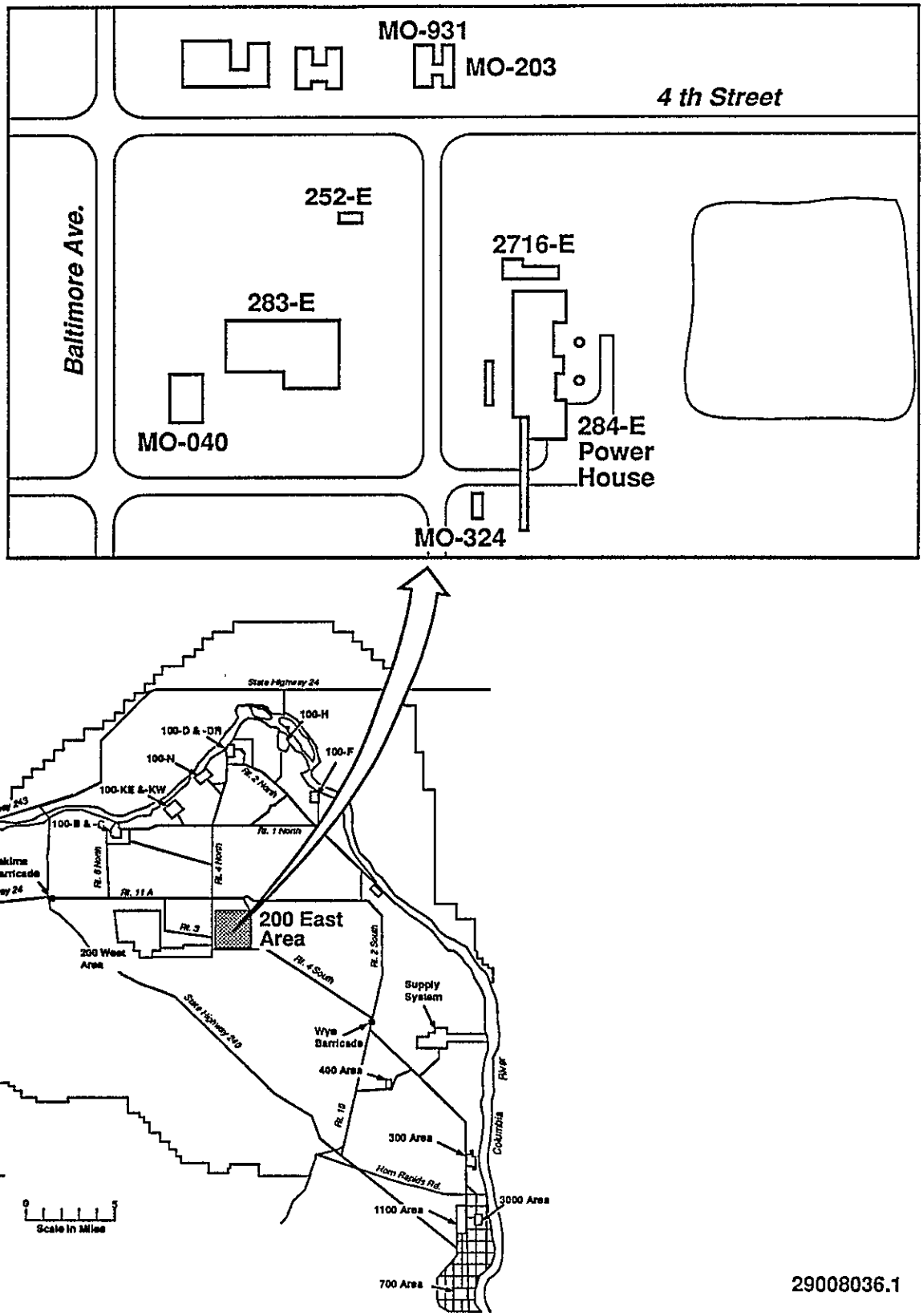
Stream designation involves identification and characterization of all of the contributing sources of the effluent. Sources have been identified by reviewing available drawings and completing a field inspection. The three that have been identified are as follows:

1. 284-E Powerplant Wastewater, Routine Operation
2. 284-E Powerplant Wastewater, Softener Regeneration
3. 284-E Powerplant Wastewater, Blowdown.

The scope of this report is restricted to these wastestreams and does not include any other wastestreams such as solid packaged waste, gaseous waste, or sanitary waste from the 284-E Powerplant.

The characterization sampling data used in the body of this report were collected from October 1989 through March 1990 and are for routine operation. The body of this report concerns only routine operation designation, and the softener regeneration and blowdown activities were sampled before October 1989. While good data were collected from samples taken before October 1989, there was no data validation program in place at that time. For this reason, data collected before October 1989 are not used in making the proposed designation but are included in Appendix A for comparison and completeness.

Figure 1-2. Aerial View of 284-E Powerplant.



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2.0 PROCESS KNOWLEDGE

This section presents a qualitative and quantitative process-knowledge-based characterization of the chemical and radiological constituents of the 284-E Powerplant Wastestream. These process data are discussed in terms of the following factors:

1. Location and physical layout of the process facility
2. The identity of the wastestream contributors
3. A general description of the present, past, and future activities of the process
4. The identity of concentration of the constituents of each contributor.

Since no on-line monitoring capability exists for this wastestream, administrative controls have been put in place to keep stream constituents to concentrations well within the law. These administrative controls are also addressed in this section.

2.1 PHYSICAL LAYOUT

The 284-E Powerplant facility consists of the 284-E Powerplant building with its associated boilers and machinery.

There are three different facility operational modes associated with the 284-E Powerplant Wastewater: routine operations, water softener, and blowdown. Routine operations includes all wastewater sources for the plants, excluding wastewaters from water softener regeneration and blowdown. Softener regeneration includes all sources except blowdown wastewaters, and blowdown includes all sources except softener regeneration wastewaters. The effluent is discharged to the soil column in the B Pond (Figure 2-1).

A schematic drawing of the equipment and the associated flowpaths in the powerplant is shown in Figure 2-2. It depicts the three contributors to the effluent and the sequence in which they are combined. It also depicts the 283-E Water Treatment Facility and the 282-E Reservoir with their waste flows to the B Pond.

The 284-E Powerplant is serviced with purified water from the 283-E Water Treatment Facility which is adjacent to it. The water treatment facility is serviced by the 100-B Area River Pumphouse with screened water from the Columbia River.

Water for the 284-E Powerplant is delivered from the 283-E Water Treatment Facility. In operation, the 283-E Water Treatment Facility filters river water supplied to it from the 100-B Area River Pumphouse. River water from the Columbia River is screened ant then pumped to the 282-E Reservoir.

Figure 2-1. The B Pond Area.

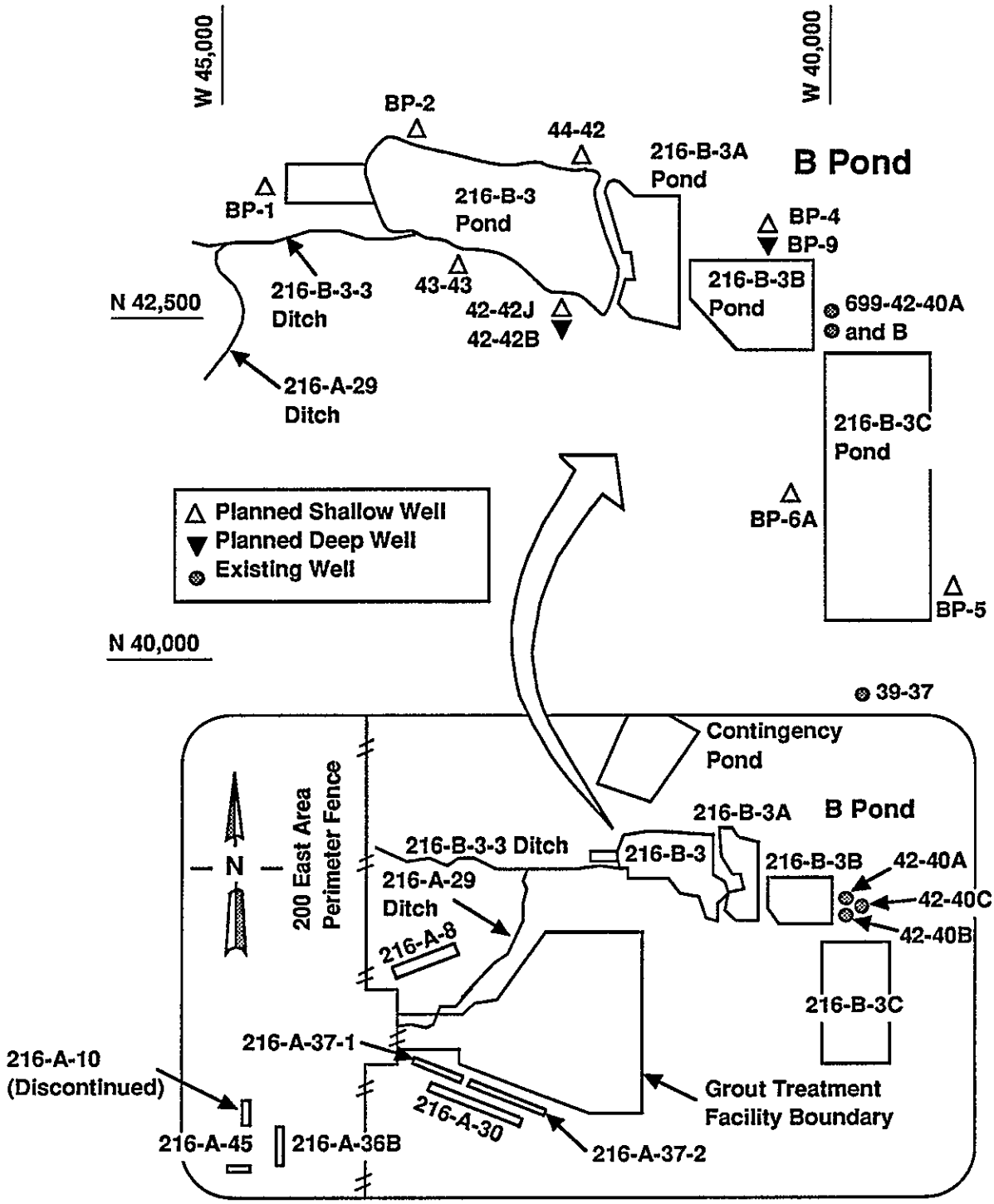

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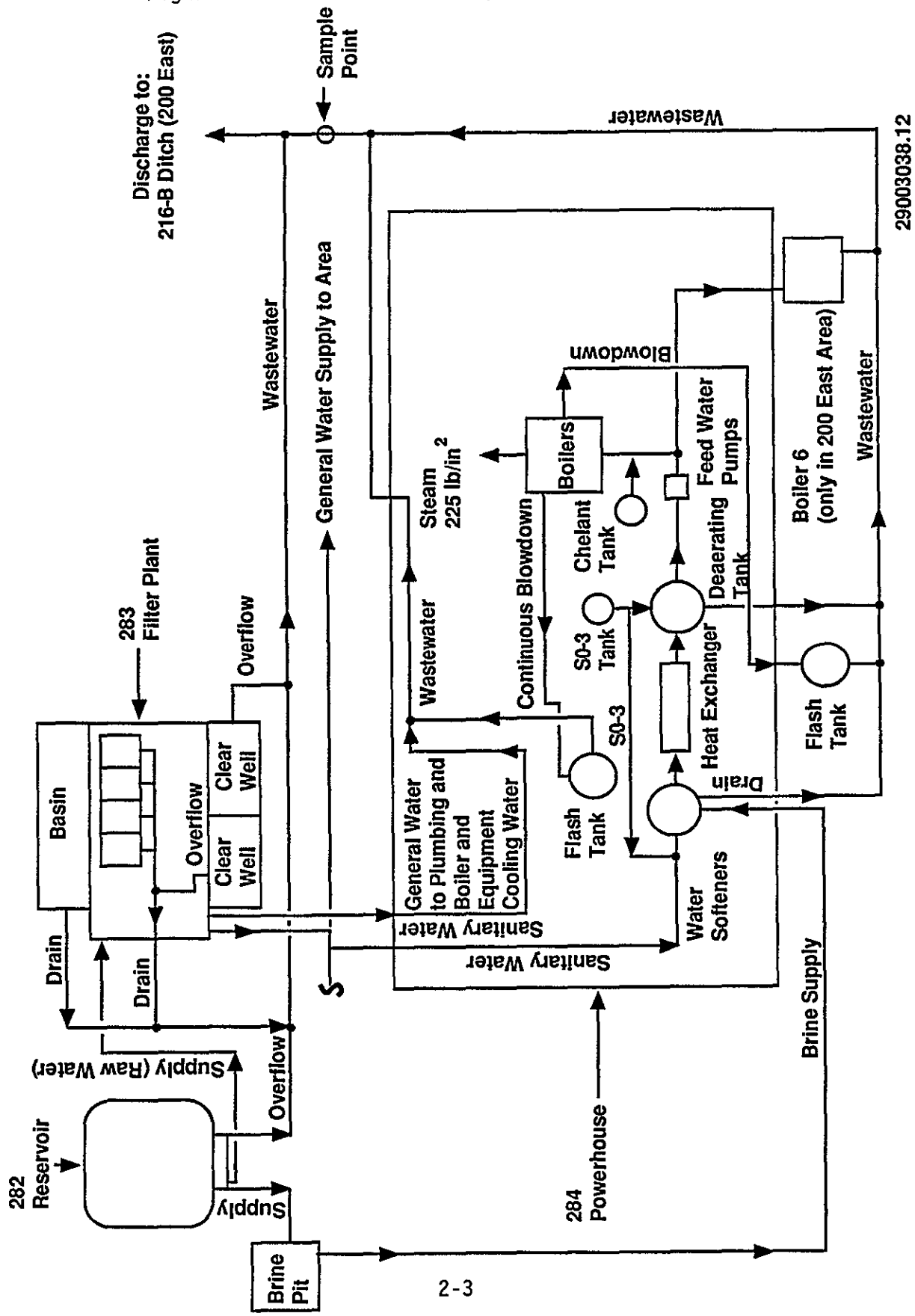
Figure 2-2. The 284-E Powerplant Flow Schematic.



This water is filtered by the 283-E Water Treatment Facility and has the chemicals alum and chlorine added to the water in the settling basin before the filtration. This water is the source of sanitary water form all the 200 East Area.

2.2 CONTRIBUTORS

Of the three contributors to the 284-E Powerplant Wastewater, the routine operations contributor is the largest. The sources for it are wastewaters from cooling operations within the powerplant and wastewaters from the 283-E Water Treatment Facility. Cooling water is used for such equipment as air compressors, turbines, generators, boiler water jackets, and feed pumps. It is a constant flow discharge and averages 3,250,000 gal/mo (12,300,000 L/mo). The other two contributors are discharges from batch processes. The softener regeneration contributor is associated with the use of a brine solution to recondition zeolite water softener units. Softener regeneration is the contributor with the highest concentration of dissolved solids, being about 9 weight percent in sodium chloride. The flowrate for this activity averages about 300,000 gal/mo (1,140,000 L/mo). The third is the blowdown contributor which is a discharge from the operation of blowing down the boilers to remove scaling. It has an average monthly discharge of 100,000 gal/mo (378,000 L/mo) and contains boiler treatment chemicals.

Contributor flowrates and constituent concentrations are variable but predictable if plant operation modes or configurations are taken into consideration. Because the 284-E Powerplant provides steam for heat purposes to many buildings in the 200 Areas. There is some seasonal variance in the flowrates with winter flowrates being higher. This is because there is a higher demand for building steam heating from the many buildings throughout the 200 Areas during the winter.

The janitorial sinks and drains in the 284-E Powerplant are not included in this effluent because they discharge into the sanitary sewer.

An engineering estimate can be made of the overall discharge flowrate based on operational and engineering knowledge. First, the flowrate of the softener regeneration is known because it is measured directly and is an operational control parameter in the process of adding brine solution to the zeolite column. In the cases of the other two contributors, engineering estimates can be made based on plant production. On this basis, the total average monthly flowrate of the 284-E Powerplant Wastewater effluent is found to be of the order of 3,650,000 gal/mo (13,800,000 L/mo).

2.3 PROCESS DESCRIPTIONS

The process associated with the 284-E Powerplant Wastewater is steam production. In this process purified water from the 283-E Water Treatment Facility is heated in coal fired boilers to produce steam. During this process three major discharges of wastewater occur and are combined to make up the 284-E Powerplant Wastewater effluent. The biggest single discharge

is associated with the purified water used to cool various components in the 284-E Powerplant. It averages a flowrate of about 3,250,000 gal/mo (12,300,000 L/mo). The most concentrated single discharge in terms of dissolved solids is the waste brine solution used to regenerate the zeolite water softener columns in the plant. This waste is approximately 9 weight percent sodium chloride. It contains other minor constituents that bring the total concentration of dissolved solids to almost 10 weight percent. It has an average monthly flowrate of 300,000 gal/mo (1,140,000 L/mo), although the source of it is a batch process. The remaining discharge comes from the blowdown of scale from inside the boilers. This discharge is about 100,000 gal/mo (378,000 L/mo). The discharge contains dissolved boiler scale and residual oxygen scavenging chemicals, the latter in very low concentrations. Ethylenediaminetetraacetic acid is used as a scaling compound and sodium sulfite is used as an oxygen scavenging agent. The pressure of the effluent in the discharge piping is reduced from the system pressure to atmospheric pressure in the flash tanks before the effluent is discharged.

For the purposes of this report the discharge associated with the plant component cooling is referred to as the 284-E Powerplant Wastewater, routine operations, the one associated with the zeolite regeneration is referred to as 284-E Powerplant Wastewater, softener regeneration and the one associated with boiler blowdown as 284-E Powerplant Wastewater, blowdown.

2.3.1 Present Activities

The 284-E Powerplant has steam production as its only function. In order to make steam, sanitary water is sent through a water softener to remove as many minerals and chlorine as possible. The softened water is then introduced into one of the 284-E Powerplant coal-fired boilers and boiled into steam. The steam is superheated 52 to 54° F (about 225 lb pressure) before being introduced into distribution piping for the entire 200 East Area.

Minerals remaining in the water are naturally concentrated into a sludge in the process of boiling off the water. This sludge is removed in a process called "blowdown." The water softener adsorption beds, made of zeolite, are regenerated by backwashing them with a 9% brine solution.

Sodium sulfide is added to the boilers as an oxygen scavenging agent. The resulting sulfite/sulfate mixture is expelled in the sludge with the wastewater. Ethylenediaminetetraacetic acid is also added to prevent scaling from occurring on the inside surfaces of the boilers.

The 284-E Powerplant has three "D" configuration boilers and two "A" configuration boilers. It also has a small "pony" boiler for added steam capacity during times the main boilers may be down for maintenance.

Present activities associated with the combined discharges that make up the 284-E Powerplant Wastewater effluent are all in support of steam production in the 284-E Building. There are no major process changes planned for the future although there could be minor changes made to improve the operational performance of the powerplant.

2.3.2 Past Activities

Past activities have been essentially the same as they are today: steam production. One change of regulatory significance was made in late 1989 when the brine concentration in the zeolite water softener regeneration solution was lowered to 9 weight percent. The concentration was reduced to give a higher confidence level that the overall concentration of the waste solution from the process would be less than environmental regulatory threshold limits.

The change was achieved by resetting plant valve adjustments and verifying the change by obtaining brine level graphs of the input brine concentration.

2.3.3 Future Activities

Future plans for 284-E Powerplant Wastewater effluent simply cover continued operation of the powerplant as a steam production facility. There are no Tri-Party Agreements milestones associated with the 284-E Powerplant and there are no configuration or process modifications planned that would result in significant changes to the effluent. A very minor change is to replace ethylenediametetraacetic acid with potassium hydroxide as a scale reducing chemical in the boilers. Therefore, the designation for the 284-E Powerplant (proposed elsewhere in this report) should not be impacted by some future change.

2.3.4 Administrative Controls

Administrative Controls have been enacted to implement the overall policy of conducting operations to meet the requirements, intent, and spirit of all applicable federal, state, and local environmental laws, regulations, and standards. A program of regulatory compliance based on the requirements of applicable environmental laws and input from appropriate regulatory agencies has been developed.

2.3.4.1 General 284-E Powerplant Wastewater Management. Since current technology does not exist for on-line (real-time) monitoring for all regulated materials, the Steam and Water Utilities Management has incorporated administrative controls as an aid to regulate use of the 284-E Powerplant Wastewater.

2.3.4.2 General Requirements. The Administrative Controls have general requirements that apply to all activities associated with regulated materials.

Training is a very important function of the administrative controls. General training courses are given to all employees, and specific training is given to employees working with regulated materials or in areas where they may come into contact with them. This training program includes annual refresher training.

A general requirement that acts as an important control is the system of frequent surveillances and inspections with the associated action findings and follow-up inspections. These are conducted on a regular basis and are supplemented with random surveillances.

2.3.4.3 Specific Requirements. Administrative Controls for materials regulated by Ecology, EPA, and DOE have the clear goal of assuring that no regulated dangerous (hazardous) material is released into Hanford sewer systems.

Specific activity control is maintained by the use of detailed, written procedures. These outline proper handling of materials as an aid to assure regulatory compliance. They are updated as needed when new regulatory requirements are mandated.

In terms of the management of sinks and drains, there are several stipulations. The most important one is that no dangerous (hazardous) waste shall be disposed of in drains. In the cases of new installations of floor drains or janitorial sinks, extra consideration is given to the location of them so that any accidental spills will not result in a prohibited discharge to the 284-E Powerplant Wastewater. Currently, there are no sink or floor drains which feed into the 284-E Powerplant Wastewater.

There are also several requirements for the acquisition, storage, use and disposal of materials. They are to be physically controlled so that the risks of them entering the Hanford sewer systems are minimized. This is achieved by placing them, wherever possible, at distances removed from entry points to the sewer system. Also, physical barriers such as closed doors and dams are utilized wherever possible.

2.3.4.4 "Diligent Search". A very important new administrative control is a documented "diligent search." In this activity, a written record is maintained when an inspection is made of a facility for materials or activities that have a direct bearing on the environmental compliance of that facility. In the case of preparation of this report the "diligent search" encompassed review of appropriate documentation and inspection of selected operating activities for product and waste handling. This was to assure that an accurate proposed designation of the 284-E Powerplant Wastewater could be presented in this report.

Documentation reviewed included material safety data sheets, Superfund Amendments and Reauthorization Act (SARA) 312 inventory reports, dangerous waste shipping reports, and facility operating procedures. A facility inspection was made that covered inspection of activities associated with

wastewater management as well as solid waste shipping. The inspection included discussions with facility staff on procedures relating to the 284-E Powerplant Wastewater contributor disposal practices that were not being conducted at the time of the visits.

Results of the "diligent search" and the potential for prohibited disposal of materials in the 284-E Powerplant Wastewater are incorporated in the discussions of Section 5.0.

2.4 PROCESS DATA

The chemical constituents of the wastewater are those normally associated with steam production. Although the 284-E Powerplant is located on the Hanford Site there are no activities conducted in it that involve work with radioactive materials. The constituent of potential environmental regulatory interest is the sodium chloride because of the large (9 weight percent) concentration. The concentration of sodium chloride is controlled to ensure that the regulatory concentration limit for a Category D Toxic Waste is not exceeded. The constituents added to the process waters that become discharged in the waste effluent are sodium hydroxide, a caustic; sodium sulfite, an oxygen scavenger; and ethylenediaminetetraacetic acid, a common solvating agent.

Chemical reaction between the contributors is of little regulatory significance because they are not likely to react together in a way that produces a chemical species potentially more harmful to the environment. There are two reasons for this. The first is that the concentrations of most of the constituents in the contributors are low, parts per million at best. The concentration of sodium chloride is the exception to this but as it is a neutral salt it usually exhibits a benign chemistry. The other reason the contributors are not likely to react with each other is that the chemistries of the constituents are compatible. For example, there is little difference in oxidative potential between them and they are similar in pH.

Products warehoused in the 284-E Powerplant, not discussed above, are of little significance to the wastewater designation. This is because there is only a remote possibility they would ever be discharged in the effluent. They are stored at distances well removed from the few available points of entry to the effluent. Liquid products are kept in storage areas with spill containment, and solid products are in rooms with doors that are only opened when products are transferred. In the event of a spill, an applicable "Building Emergency Plan" for the 284-E Powerplant contains instructions on spill response.

Based on process knowledge, all of the constituents of the contributors, except for sodium and chloride ions, are estimated to be found only in dilute (parts per million) concentrations. The primary reasons for this are that they are added in small quantities and there is considerable dilution from

the prime contributor, the cooling wastewater. Sodium and chloride ions are present in much higher concentrations because the brine solution used in zeolite water softener regeneration is at 9% concentration in sodium chloride.

The two variables for this wastestream are flowrate and chemical constitution. Variations in flowrate are directly related to the seasons of the year. This is because the demand for steam heating varies throughout the year. Little variation in chemical constitution occurs because operations in the facility do not change significantly throughout the year. The product is steam, made the same way all year, with only the quantity varying throughout the year. Therefore, during the seasons, a measurable variation in flowrate occurs, but little change in chemical composition occurs.

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3.0 SAMPLE DATA

This section provides an evaluation of the sampling data pertaining to 284-E Powerplant Wastewater stream. These data include both chemical data and radiological data.

3.1 DATA SOURCE

Only the "Routine Operations" data presented in the body of this report are new (October 1989 to March 1990). Data presented in Appendix A for "Softener Regeneration" and "Blowdown" activities pre-date the "Routine Operations" data and are not used in making the current waste designation proposal (Section 1.3).

3.1.1 Sample Data

The sampling data is made up of two distinct sources, the chemical data set and the radiological data set, however, both sets of data are reported together. The new data utilized in this section which is associated with the "Routine Operations" activities were obtained from samples taken after October 1, 1990 and are included in Appendix A. All old data utilized in this section, associated with the "Softener Regeneration" and "Blowdown" configurations, are contained in Appendix A.

Table 3-1 is a listing of the different analytical methods used on each new sample. Table 3-2 is a listing of the statistics associated with each new sample.

3.1.1.1 Chemical Data. The new chemical data were obtained from 4 samples taken after October 1, 1989 and not reported previously. The samples were obtained from a common sampling point (Figure 2-2).

The samples were chemically analyzed at the contract laboratory. A description of the sampling techniques and analytical procedures is beyond the scope of this report. However, details of the sampling and analytical procedures used are described in Volume 4 of the *Wastestream Characterization Report* (WHC 1989).

3.1.1.2 Radiological Data. The 284-E Powerplant is not in a radiation zone and no radioactive processes or activities are conducted there. Radiological checks are made, however, because of the general location of the facility in relation to contaminated facilities near the 284-E Powerplant location. Radiological analyses are performed on the Hanford Site at the 222-S Laboratory.

Table 3-1. Procedures for 284-E Powerplant Cooling Water--Routine Operation Samples. (sheet 1 of 2)

LEAD# / CofC#	50721 / 50721	50736 / 50736	50842 / 50842	51024 / 51024
Alkalinity	X	X	X	X
Alpha counting	X	X	X	X
Ammonia	X	X	X	X
Arsenic	X	X	X	X
Atomic emission spectroscopy	X	X	X	X
Beta counting	X	X	X	X
Conductivity-field	X	X	X	X
Cyanide	X	X	X	X
Direct aqueous injection (GC)	X	X	X	X
Fluoride (LDL)	X	X	X	X
Gamma energy analysis	X	X	X	
Hydrazine	X	X	X	X
Ion chromatography	X	X	X	X
Lead	X	X	X	X
Mercury	X	X	X	X
pH-field	X	X	X	X
Selenium	X	X	X	X
Semivolatile organics (GC/MS)	X	X	X	X
Sulfide	X	X	X	X
Suspended solids	X	X	X	X
Temperature-field	X	X	X	X
Thallium	X	X	X	X
Total carbon	X	X	X	X
Total dissolved solids	X	X	X	X
Total organic carbon	X	X	X	X
Total organic halides (LDL)	X	X	X	X
Total radium alpha counting	X	X	X	X
Tritium	X	X		X
Uranium	X	X	X	X
Volatile organics (GC/MS)	X	X	X	X

LEAD# / CofC#	50721B / 50722	50736B / 50737	50842B / 50843	51024B / 51025
Volatile organics (GC/MS)	X	X	X	X

LEAD# / CofC#	50721T / 50723	50736T / 50738		51024T / 51026
Volatile organics (GC/MS)	X	X		X

Table 3-1. Procedures for 284-E Powerplant Cooling Water--Routine Operation Samples. (sheet 2 of 2)

LEAD# / CofC#	50721E 50724	50736E 50739	50842E 50844	51024E 51027
Atomic emission spectroscopy	X	X	X	X
Ignitability	X	X	X	X
Mercury (mixed matrix)	X	X	X	X
Reactive cyanide	X	X	X	X
Reactive sulfide	X	X	X	X

Notes: Procedures that were performed for a given sample are identified by an "X". Procedure references appear with the data. LEAD# is the Liquid Effluent Analytical Data number that appears in the data reports. CofC# is the chain-of-custody number.
Abbreviations: gas chromatography (GC), low-detection limit (LDL), mass spectrometry (MS).

Table 3-2. Statistics for 284-E Powerplant Wastewater--Routine Operation.
(sheet 1 of 2)

Constituent	N	MDA	Method	Mean	StdErr	90%CILim	Maximum
Aluminum	4	2	DL	3.64E+02	1.73E+02	6.47E+02	8.74E+02
Arsenic (EP Toxic)	4	4	n/a	<5.00E+02	0.00E+00	<5.00E+02	<5.00E+02
Barium	4	0	n/a	6.02E+01	1.26E+01	8.09E+01	9.60E+01
Barium (EP Toxic)	4	4	n/a	<1.00E+03	0.00E+00	<1.00E+03	<1.00E+03
Boron	4	0	n/a	5.25E+01	3.88E+00	5.89E+01	6.20E+01
Cadmium (EP Toxic)	4	4	n/a	<1.00E+02	0.00E+00	<1.00E+02	<1.00E+02
Calcium	4	0	n/a	1.96E+04	5.24E+02	2.05E+04	2.09E+04
Chloride	4	0	n/a	3.70E+03	8.36E+02	5.07E+03	6.00E+03
Chromium (EP Toxic)	4	4	n/a	<5.00E+02	0.00E+00	<5.00E+02	<5.00E+02
Fluoride	4	0	n/a	1.57E+02	1.06E+01	1.74E+02	1.86E+02
Iron	4	0	n/a	1.54E+02	6.63E+01	2.62E+02	3.30E+02
Lead (EP Toxic)	4	4	n/a	<5.00E+02	0.00E+00	<5.00E+02	<5.00E+02
Magnesium	4	0	n/a	4.34E+03	7.82E+01	4.47E+03	4.44E+03
Manganese	4	3	DL	5.50E+00	5.00E-01	6.32E+00	7.00E+00
Mercury (EP Toxic)	4	4	n/a	<2.00E+01	0.00E+00	<2.00E+01	<2.00E+01
Nitrate	4	0	n/a	5.25E+02	2.50E+01	5.66E+02	6.00E+02
Potassium	4	0	n/a	8.56E+02	6.80E+01	9.67E+02	1.04E+03
Selenium (EP Toxic)	4	4	n/a	<5.00E+02	0.00E+00	<5.00E+02	<5.00E+02
Silicon	4	0	n/a	3.10E+03	3.55E+02	3.68E+03	4.06E+03
Silver (EP Toxic)	4	4	n/a	<5.00E+02	0.00E+00	<5.00E+02	<5.00E+02
Sodium	4	0	n/a	9.04E+03	2.53E+03	1.32E+04	1.38E+04
Strontium	4	0	n/a	2.40E+02	1.46E+01	2.64E+02	2.65E+02
Sulfate	4	0	n/a	1.71E+04	1.51E+03	1.96E+04	1.99E+04
Uranium	4	0	n/a	4.72E-01	5.47E-02	5.62E-01	6.18E-01
Zinc	4	2	DL	7.25E+00	1.93E+00	1.04E+01	1.30E+01
Ammonia	4	2	DL	5.35E+01	2.06E+00	5.69E+01	5.80E+01
1-Butanol	1	0	n/a	1.80E+01	n/a	n/a	1.80E+01
Trichloromethane	4	0	n/a	1.55E+01	4.77E+00	2.33E+01	2.60E+01
Alkalinity (Method B)	4	0	n/a	6.55E+04	4.50E+03	7.29E+04	7.80E+04
Alpha Activity (pCi/L)	4	1	DL	8.98E-01	2.54E-01	1.31E+00	1.22E+00
Beta Activity (pCi/L)	4	3	DL	1.80E+00	3.89E-01	2.44E+00	2.75E+00
Conductivity (uS)	4	0	n/a	1.68E+02	1.66E+01	1.95E+02	2.01E+02
Ignitability (degrees F)	4	0	n/a	2.08E+02	2.45E+00	2.04E+02	2.02E+02
pH (dimensionless)	4	0	n/a	9.08E+00	2.19E-01	9.44E+00	9.50E+00
Reactivity Cyanide (mg/kg)	4	4	n/a	<1.00E+02	0.00E+00	<1.00E+02	<1.00E+02
Reactivity Sulfide (mg/kg)	4	4	n/a	<1.00E+02	0.00E+00	<1.00E+02	<1.00E+02
Suspended Solids	4	2	DL	1.50E+04	8.12E+03	2.83E+04	3.90E+04
TDS	4	0	n/a	8.70E+04	5.99E+03	9.68E+04	1.03E+05
Temperature (degrees C)	4	0	n/a	1.37E+01	1.84E+00	1.67E+01	1.75E+01
TOC	4	2	DL	1.70E+03	3.19E+02	2.22E+03	2.60E+03
Total Carbon	4	0	n/a	1.52E+04	1.25E+02	1.54E+04	1.55E+04
TOX (as Cl)	4	0	n/a	9.32E+01	1.63E+01	1.20E+02	1.25E+02

Table 3-2. Statistics for 284-E Powerplant Wastewater--Routine Operation. (sheet 2 of 2)

STATISTICS REPORT FOOTNOTES

Mean values, standard errors, confidence interval limits and maxima are in ppb (parts per billion) unless indicated otherwise.

The column headed MDA (Minimum Detectable Amount) is the number of results in each data set below the detection limit.

The column headed Method shows the MDA replacement method used: replacement by the detection limit (DL), replacement of single-valued MDAs by the log-normal plotting position method (LM), or replacement of multiple valued MDAs by the normal plotting position method (MR).

The column headed "90%CILim" (90% Confidence Interval Limit) is the lower limit of the one-tailed 90% confidence interval for all ignitability data sets and pH data sets with mean values below 7.25. For all other data sets it is the upper limit of the one-tailed 90% confidence interval.

The column headed "Maximum" is the minimum value in the data set for ignitability, the value furthest from 7.25 for pH, and the maximum value for all other analytes.

The data analysis convention used in the 222-S Laboratory is as follows. The value reported represents a composite of two tests: the level of radionuclides found in the sediment and the level of radionuclides found in the filtrate portion of the sample. The following rule is applied to the data: if the contribution of either the sediment data or the filtrate data represents a fraction greater than 10% of the total and is at a lower limit of detection, then a less than (<) symbol precedes the result.

3.2 DATA PRESENTATION

The range of the data encompasses all of the chemical species for which the samples were analyzed. This is a very wide range because of the use of sophisticated, modern techniques of chemical analysis with computerized spectra comparison.

New data, taken after October 1, 1990, is only available for the "Routine Operations" plant configuration contributor to the 284-E Powerplant Wastewater. The proposed designation will be made based only on the data for routine operations, since that data comprises the whole of the new data received and since the volume of routine operations chemically overwhelms the other contributors.

One of the analytical techniques used was gas chromatography combined with mass spectrometry with computer evaluation of the data. The spectra obtained from the mass spectrometry were compared to the combined libraries of known spectra catalogued by the EPA, National Institute of Occupational Safety and Health, and the National Bureau of Standards. These libraries have more than 40,000 different chemical species catalogued.

Another technique used was inductively coupled plasma for the analysis of metals. This technique is extremely sensitive and can detect most of the metals of regulatory interest.

It should be noted for the purposes of this report, detection is reported based on the contract laboratory contract detection limits. These limits are usually moderately greater than instrument detection limits or state-of-the-art detection limits currently reported in the scientific literature.

The data have been evaluated to determine what chemical compounds are present that could be subject to environmental regulation. The procedure used was to consider all the possible chemical compounds that could be made from the ionic chemical species found in the four samples from the three contributors. This was done by comparing all the possible cation-anion combinations of ions that form compounds of potential regulatory interest. All of the organic compounds were then added to make up the final listing. The listing so obtained is shown in Table 5-2 "Dangerous Waste Designation Report." The listing comprises compounds or classes of compounds potentially subject to regulation as "dangerous wastes." In this listing there are both organic and inorganic compounds and classes of compounds based on metals "and compounds, not otherwise specified."

Report." The listing comprises compounds or classes of compounds potentially subject to regulation as "dangerous wastes." In this listing there are both organic and inorganic compounds and classes of compounds based on metals "and compounds, not otherwise specified."

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4.0 DATA OVERVIEW

This section presents a comparison of the sampling data set (see Section 3.0) with current drinking water standards. This section also presents calculated 284-E Powerplant Wastewater contaminant deposition rates to the 216-B-10 Ditch, and hence, to the soil column.

4.1 DATA COMPARISON

Table 4-1 compares the 284-E Powerplant Wastewater--Routine Operations with current drinking water standards for chemicals, and the Derived Concentrations Guides for radioactivity.

4.2 STREAM DEPOSITION RATES

Table 4-2 is a listing of the calculated stream contaminant deposition rates into the B Pond. Table entries are arrived at by multiplying the average contaminant concentrations by the average monthly flow of the three contributors to the 284-E Powerplant Wastewater stream.

Table 4-1. Evaluation of 284-E Powerplant Wastewater--Routine Operation.

Constituent	Result a	SV1 b	SV2 c
Aluminum	3.6E-01	5.0E-02 f *	
Barium	6.0E-02	5.0E+00 g	
Chloride	3.7E+00	2.5E+02 h	
Fluoride	1.6E-01	2.0E+00 g	
Iron	1.5E-01	3.0E-01 h	
Manganese	5.5E-03	5.0E-02 h	
Nitrate	5.3E-01	4.5E+01 e	
Sulfate	1.7E+01	2.5E+02 h	
Zinc	7.3E-03	5.0E+00 h	
Trichloromethane (j)	1.5E-02	1.0E-01 g	
Alpha Activity (pCi/L) (n)	9.0E-01	1.5E+01 g	3.0E+01
Beta Activity (pCi/L)	1.8E+00		1.0E+03
TDS	8.7E+01	5.0E+02 h	

Footnotes:
(a) Units of results are mg/L unless indicated otherwise. The results are the mean values reported in the Statistics table of Chapter 3.
(b) Screening Value 1 (SV1) lists the value first, basis second and an asterisk (*) third if the result exceeds the regulatory value. The basis is the proposed primary MCL (e), the proposed secondary MCL (f), the primary MCL (g), or the secondary MCL (h). The value is the smaller of two MCLs: the proposed primary MCL (or the primary MCL as a default) or the proposed secondary MCL (or the secondary MCL as a default).
(c) Screening Value 2 (SV2) lists the value first and an aterisk (*) second if the result exceeds the SV2). These values are derived concentration guides obtained from Appendix A of WHC-CM-7-5, "Environmental Compliance Manual", Revision 1, January 1990.
(j) The SV1 value for trihalomethanes is used to evaluate trichloromethane results.
(n) The SV1 and SV2 values for Gross Alpha are used to evaluate Alpha Activity.
(o) The SV2 for Gross Beta is used to evaluate Beta Activity.

Table 4-2. Deposition Rate for 284-E Powerplant Wastewater--Routine Operation (Flowrate: 1.38 E+07 L/mo).

Constituent	Kg/L*	Kg/mo*
Aluminum	3.64E-07	5.03E+00
Barium	6.02E-08	8.32E-01
Boron	5.25E-08	7.26E-01
Calcium	1.96E-05	2.71E+02
Chloride	3.70E-06	5.11E+01
Fluoride	1.57E-07	2.17E+00
Iron	1.54E-07	2.13E+00
Magnesium	4.34E-06	6.00E+01
Manganese	5.50E-09	7.60E-02
Nitrate	5.25E-07	7.26E+00
Potassium	8.56E-07	1.18E+01
Silicon	3.10E-06	4.29E+01
Sodium	9.04E-06	1.25E+02
Strontium	2.40E-07	3.32E+00
Sulfate	1.71E-05	2.36E+02
Uranium	4.72E-10	6.52E-03
Zinc	7.25E-09	1.00E-01
Ammonia	5.35E-08	7.40E-01
1-Butanol	1.80E-08	2.49E-01
Trichloromethane	1.55E-08	2.14E-01
Alpha Activity *	8.98E-13	1.24E-05
Beta Activity *	1.80E-12	2.49E-05
Suspended Solids	1.50E-05	2.07E+02
TDS	8.70E-05	1.20E+03
TOC	1.70E-06	2.35E+01
Total Carbon	1.52E-05	2.10E+02
TOX (as Cl)	9.32E-08	1.29E+00

Footnotes:
Data collected from October 1989 through March 1990.
Flow rate is the average of rates from Chapter 2.
Constituent concentrations are average values from the Statistics Report in Chapter 3.
Concentration units of flagged (*) constituents are reported as curies per liter.
Deposition rate units of flagged (*) constituents are reported as curies per month.

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5.0 DESIGNATION

This section proposes that the 284-E Powerplant Wastewater Stream not be designated a dangerous waste. This proposed designation uses data from both the effluent source description and sample data (Sections 2.0 and 3.0) and complies with the designation requirements of WAC 173-303-070.

The Washington State Dangerous Waste Regulations (WAC 173-303-070) contains a procedure for determining if a waste is dangerous. This procedure is illustrated in Figure 5-1 and includes the following:

- Dangerous Waste Lists (WAC 173-303-080)
- Dangerous Waste Criteria (WAC 173-303-100)
- Dangerous Waste Characteristics (WAC 173-303-090).

5.1 DANGEROUS WASTE LISTS

A waste is considered a dangerous waste if it either contains a discarded chemical product (WAC 173-303-081) or originates from a dangerous waste source (per WAC 173-303-082). The proposed designation was based on a combination of process knowledge and sampling data.

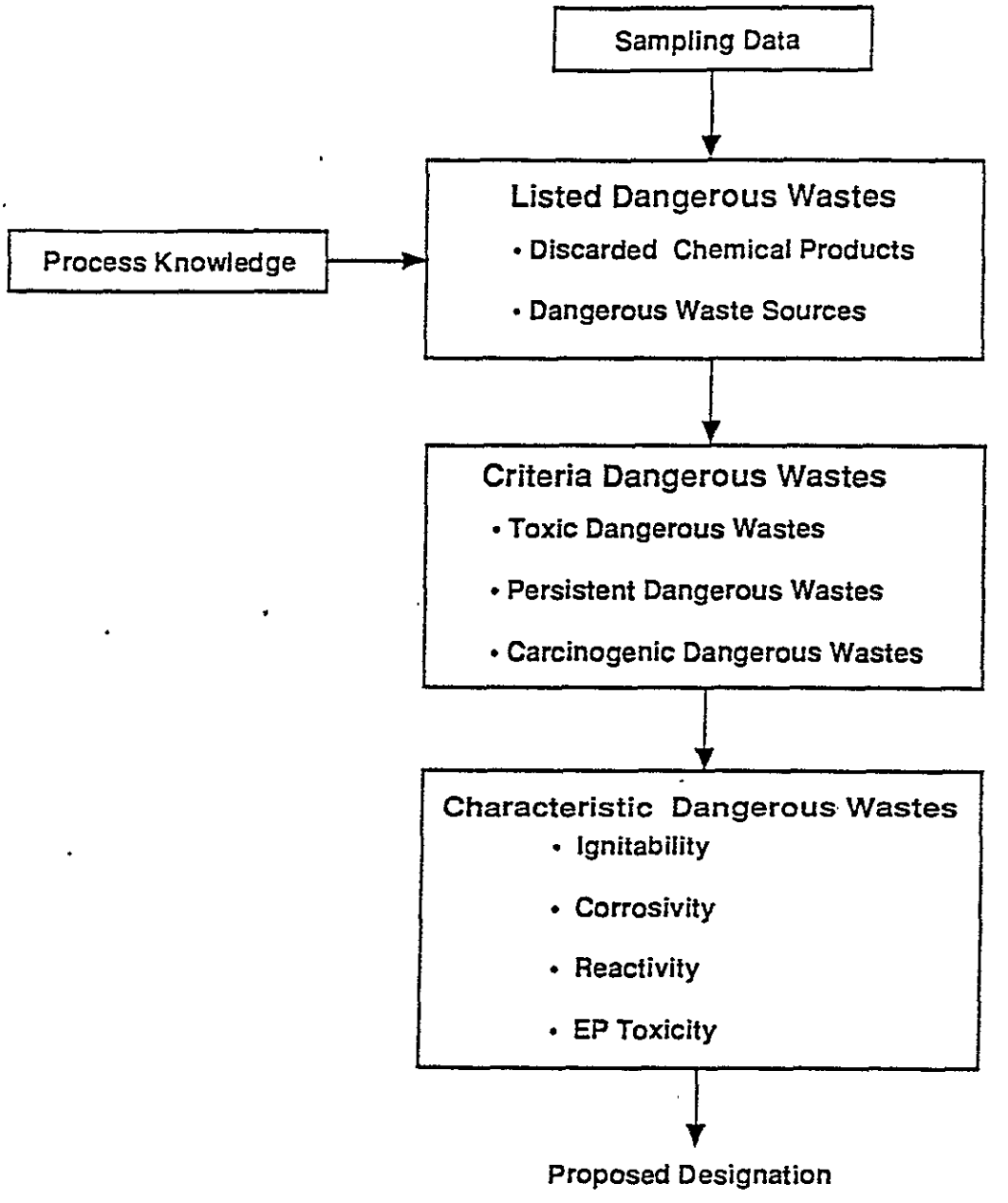
5.1.1 Discarded Chemical Products

A wastestream constituent is a discarded chemical product (WAC 173-303-081) if it is listed in WAC 173-303-9903 and is characterized by one or more of the following descriptions.

- The listed constituent is the sole active ingredient in a commercial chemical product which has been discarded. Commercial chemical products which, as purchased, contained two or more active ingredients were not designated as discarded chemical products. Products which contained nonactive components such as water, however, were so designated if the sole active ingredient in the mixture was listed in WAC 173-303-9903.

- The constituent results from a spill of unused chemicals. (A spill of a discarded chemical product would cause a wastestream to be designated during the time that the discharge is occurring. The approach taken is that the current wastestream would not be designated unless a review of past spill events indicates that the spills are predictable, systematic events that are ongoing or are reasonably anticipated to occur in the future. In this report, the evaluation of this criterion is based on a review of spill data reported to Ecology.)

Figure 5-1. Designation Strategy.



- The constituent is discarded in the form of a residue resulting from cleanup of a spill of an unused commercial chemical on the discarded chemical products list. A chemical product that is used in a process and then discarded is not a discarded chemical product. Off-specification, unused chemicals, and chemicals that have exceeded a shelf life but have not been used are considered discarded chemical products.

5.1.2 Dangerous Waste Sources

A list of dangerous waste sources is contained in WAC 173-303-9904, pursuant to WAC 173-303-082. There are three major categories of sources in WAC 173-303-9904. The first is nonspecific sources from routine operations occurring at many industries. The second is specific sources (e.g., wastes from ink formulation, etc.). The third is state sources which may be limited to polyvinyl biphenyl-contaminated transformers and capacitors resulting from salvaging, rebuilding, or discarding activities.

5.2 LISTED WASTE DATA CONSIDERATIONS

The proposed designation of the wastestream described in this report is based on an evaluation of process and sampling data. The following sections describe the types of information used in this designation.

5.2.1 Process Evaluation

The process evaluation began with a thorough review of the processes contributing to the wastestream. Processes were reviewed and compared with the discarded chemical products list and the dangerous waste source list. This process evaluation is necessary because the stream could be a listed waste if a listed waste was known to have been added at any upstream location, even if a listed constituent was not detected at the sample point. The process evaluation included a review of the following information sources:

- Material Safety Data Sheets
- SARA Inventory reports
- Operating procedures
- Process chemical inventories
- Physical inspections, where possible.

Additionally, appropriate interviews with facility personnel were conducted to determine if there were any activities or laboratory processes that generated a listed waste which may not have been evident during other portions of the process evaluation.

If a listed chemical was identified, the specific use of the chemical was evaluated to determine if such use resulted in the generation of a listed waste.

5.2.2 Sampling Data

Sampling data were used as screening tools to enhance and support the results of the process evaluation. This screening compared the results of the sampling data with the WAC 173-303-9903 and -9904 lists. If a constituent was cited on one or both of these lists, an engineering evaluation was performed to determine if the constituent had entered the wastestream as a discarded chemical product or came from a dangerous waste source.

Screening organic constituents is a simple procedure because analytical data for organic constituents are reported as neutral compounds and are easily compared to the WAC 173-303-9903 and -9904 lists. It is not as simple to screen inorganic analytical data because inorganic data are reported as ions rather than as neutral compounds. For example, an analysis may show that a wastestream contains the cations sodium and calcium along with the anions chloride and nitrate. The possible combinations of neutral substances in this simple example include: sodium chloride, sodium nitrate, calcium chloride, and calcium nitrate. In a situation with many cation and anions, however, the list of possible combinations is extensive.

A procedure was developed by Westinghouse Hanford Company for combining the inorganic constituents into neutral compounds. This screening procedure is described in Jungfleisch (1990) and is intended to be a tool in the evaluation of a wastestream. The listing of the inorganic compounds developed by this screening procedure is not intended to be an indication that the compound was discharged to the wastestream, only that the necessary cations and anions are present and an investigation should be conducted to determine how they entered the wastestream. Table 5-1 documents how ion analytes were assigned to neutral substances which are required for designation. The table accounts for charge balancing the ion assemblage (from Table 3-2) and the subsequent formulation of neutral substances. A detailed discussion can be found in Jungfleisch (1990).

5.3 PROPOSED LISTED WASTE DESIGNATIONS

A "diligent search," as described in Section 2.3.4.4, was conducted at the 284-E Powerplant. One of the purposes of this search was to determine if any of the potentially discarded chemical products listed in the Waste Designation Report of Table 5-2 were indeed located or inventoried in the facilities that discharge wastewaters to the 284-E Powerplant Wastewater stream. Another purpose of the search was to verify that if such listed chemical products were found in the facilities, they were not being improperly disposed of into the wastewater. During the course of the search, no chemical products on the WAC 173-303-9903 "Discarded chemical products list" were discovered in the facilities.

For the purposed of this addendum, if a normal facility activity was identified that routinely is a source of a constituent, it is considered as a "primary" source for that constituent. A "secondary" source for a

Table 5-1. Inorganic Chemistry for 284-E Powerplant Wastewater--Routine Operation. (sheet 1 of 2)

CHARGE NORMALIZATION

Constituent	ppb	Ion	Eq/g	Normalized
Aluminum	6.47E+02	Al+3	7.20E-08	
Barium	8.09E+01	Ba+2	1.18E-09	
Boron	5.89E+01	B4O7-2	2.72E-09	6.57E-09
Calcium	2.05E+04	Ca+2	1.02E-06	
Chloride	5.07E+03	Cl-1	1.43E-07	3.45E-07
Fluoride	1.74E+02	F-1	9.16E-09	2.21E-08
Iron	2.62E+02	Fe+3	1.41E-08	
Magnesium	4.47E+03	Mg+2	3.68E-07	
Manganese	6.32E+00	Mn+2	2.30E-10	
Nitrate	5.66E+02	NO3-1	9.13E-09	2.20E-08
Potassium	9.67E+02	K+1	2.47E-08	
Silicon	3.68E+03	SiO3-2	2.62E-07	6.33E-07
Sodium	1.32E+04	Na+1	5.74E-07	
Strontium	2.64E+02	Sr+2	6.03E-09	
Sulfate	1.96E+04	SO4-2	4.08E-07	9.86E-07
Uranium	5.62E-01	UO2+2	4.72E-12	
Zinc	1.04E+01	Zn+2	3.19E-10	
Hydrogen Ion (from pH 9.4)		H+	(3.66E-13)	
Hydroxide Ion (from pH)		OH-	(2.74E-08)	
Cation total			2.08E-06	
Anion total			8.62E-07	

Anion normalization factor: 2.414

SUBSTANCE FORMATION

Substance	%	Cation Out	Anion Out
Uranyl nitrate	9.30E-08	0.00E+00	2.20E-08
Iron(III) fluoride	5.30E-05	0.00E+00	8.03E-09
Potassium fluoride	4.66E-05	1.67E-08	0.00E+00
Barium chloride	1.23E-05	0.00E+00	3.44E-07
Zinc nitrate	3.02E-06	0.00E+00	2.17E-08
Aluminum nitrate	2.72E-04	5.02E-08	0.00E+00
Magnesium chloride	1.64E-03	2.40E-08	0.00E+00
Calcium tetraborate	6.42E-05	1.01E-06	0.00E+00
Magnesium sulfate	1.45E-04	0.00E+00	9.62E-07
Sodium metasilicate	3.50E-03	0.00E+00	5.98E-08
Aluminum sulfate	1.51E-04	0.00E+00	9.12E-07
Potassium metasilicate	1.29E-04	0.00E+00	4.31E-08
Manganese(II) metasilicate	1.51E-06	0.00E+00	4.28E-08
Strontium sulfate	5.54E-05	0.00E+00	9.05E-07
Calcium sulfate	6.16E-03	1.09E-07	0.00E+00

Table 5-1. Inorganic Chemistry for 284-E Powerplant Wastewater--Routine Operation. (sheet 2 of 2)

CHEMISTRY REPORT FOOTNOTES

Statistics based on a single datum are noted by an asterisk (*). With the exception of hydrogen ion and hydroxide, others report the upper limit of the one-tailed 90% confidence interval. Hydrogen ion is based on the lower limit of the one-tailed 90% confidence interval for pH sets with mean values below 7.25 and on the upper limit of the one-tailed 90% confidence interval for pH data sets with mean values of 7.25 or higher. The hydroxide magnitude is equal to 1.00E-20 (Eq/g)**2 divided by the hydrogen ion value (in Eq/g).

Ion concentrations in equivalents per gram (Eq/g) are based on the statistic. Conversions include scale (ppb to g/g), molecular weight (constituent form to ionic form), and equivalents (charges per ion). The column headed "Normalized" shows normalized concentrations (also in Eq/g) calculated by increasing concentrations of cations, excluding Hydrogen ion, or anions, excluding hydroxide, by the normalization factor. The normalization factor is the larger of the cation total, including Hydrogen ion, or anion total, including hydroxide, divided by the smaller total.

Substance names may include MB (monobasic), DB (dibasic), TB (tribasic) to identify the equivalents of hydrogen ion that have been neutralized from polyprotic weak acids to form their conjugate bases.

Substances are formulated in the order listed. The column headed "%" is the percent of the substance in the waste (g/100g). Substances formulated with oxygen are based on the residual concentration of the counterion. Other substance concentrations are based on the limiting residual concentration of the cation or anion. The columns headed "Cation Out" and "Anion Out" indicate the residual concentrations (in Eq/g) of each ion after a substance concentration has been calculated.

Table 5-2. Dangerous Waste Designation Report for the 284-E Powerplant Wastewater. (sheet 1 of 2)

Dangerous Waste Data Designation Report for 284-E Powerhouse Wastewater-Routine Operation

Finding: Undesignated

Discarded Chemical Products - WAC 173-303-081

Substance	Review Number	Status	DW Number
Hydrogen fluoride	U134(DW)	Not Discarded	Undesignated
*1-Butanol	U031(DW)	Not Discarded	Undesignated
Trichloromethane	U044(EHW)	Not Discarded	Undesignated

Dangerous Waste Sources - WAC 173-303-082

Substance	Review Number	Status	DW Number
*1-Butanol	F003	Unlisted Source	Undesignated

Infectous Dangerous Waste - WAC 173-303-083

No regulatory guidance

Dangerous Waste Mixtures - WAC 173-303-084

Substance	Toxic EC%	Persistant HH%	Persistant PAH%	Carcinogenic Total%
Aluminum nitrate	2.72E-07	0.00E+00	0.00E+00	0.00E+00
Aluminum sulfate	1.51E-08	0.00E+00	0.00E+00	0.00E+00
Barium chloride	1.23E-08	0.00E+00	0.00E+00	0.00E+00
Calcium tetraborate	6.42E-09	0.00E+00	0.00E+00	0.00E+00
Iron(III) fluoride	5.30E-07	0.00E+00	0.00E+00	0.00E+00
Magnesium chloride	1.64E-07	0.00E+00	0.00E+00	0.00E+00
Magnesium sulfate	1.45E-08	0.00E+00	0.00E+00	0.00E+00
Potassium fluoride	4.66E-08	0.00E+00	0.00E+00	0.00E+00
Sodium metasilicate	3.50E-07	0.00E+00	0.00E+00	0.00E+00
Uranyl nitrate	9.30E-10	0.00E+00	0.00E+00	0.00E+00
Zinc nitrate	3.02E-09	0.00E+00	0.00E+00	0.00E+00
Ammonia	5.69E-08	0.00E+00	0.00E+00	0.00E+00
*1-Butanol	1.80E-10	0.00E+00	0.00E+00	0.00E+00
Trichloromethane	2.33E-07	2.33E-06	0.00E+00	2.33E-06
Total	1.70E-06	2.33E-06	0.00E+00	2.33E-06
DW Number	Undesignated	Undesignated	Undesignated	Undesignated

Dangerous Waste Characteristics - WAC 173-303-090

Characteristic	Value	DW Number
Ignitability (Degrees F)	>203	Undesignated
Corrosivity-pH	9.44	Undesignated
Reactivity Cyanide (mg/kg)	<1.00E+02	Undesignated
Reactivity Sulfide (mg/kg)	<1.00E+02	Undesignated
EP Toxic Arsenic (mg/L)	<5.00E-01	Undesignated
EP Toxic Barium (mg/L)	<1.00E+00	Undesignated
EP Toxic Cadmium (mg/L)	<1.00E-01	Undesignated
EP Toxic Chromium (mg/L)	<5.00E-01	Undesignated
EP Toxic Lead (mg/L)	<5.00E-01	Undesignated
EP Toxic Mercury (mg/L)	<2.00E-02	Undesignated
EP Toxic Selenium (mg/L)	<5.00E-01	Undesignated
EP Toxic Silver (mg/L)	<5.00E-01	Undesignated

Table 5-2. Dangerous Waste Designation Report for the 284-E Powerplant Wastewater. (sheet 2 of 2)

Dangerous Waste Data Designation Report for 284-E Powerhouse Wastewater-Routine Operation

Dangerous Waste Criteria - WAC 173-303-100

Substance	Toxic EC%	Persistant HH%	Persistant PAH%	Carcinogenic Total%	DW Number-Positive
Aluminum nitrate	2.72E-07	0.00E+00	0.00E+00	0.00E+00	
Aluminum sulfate	1.51E-08	0.00E+00	0.00E+00	0.00E+00	
Barium chloride	1.23E-08	0.00E+00	0.00E+00	0.00E+00	
Calcium tetraborate	6.42E-09	0.00E+00	0.00E+00	0.00E+00	
Iron(III) fluoride	5.30E-07	0.00E+00	0.00E+00	0.00E+00	
Magnesium chloride	1.64E-07	0.00E+00	0.00E+00	0.00E+00	
Magnesium sulfate	1.45E-08	0.00E+00	0.00E+00	0.00E+00	
Potassium fluoride	4.66E-08	0.00E+00	0.00E+00	0.00E+00	
Sodium metasilicate	3.50E-07	0.00E+00	0.00E+00	0.00E+00	
Uranyl nitrate	9.30E-10	0.00E+00	0.00E+00	0.00E+00	
Zinc nitrate	3.02E-09	0.00E+00	0.00E+00	0.00E+00	
Ammonia	5.69E-08	0.00E+00	0.00E+00	0.00E+00	
*1-Butanol	1.80E-10	0.00E+00	0.00E+00	0.00E+00	
Trichloromethane	2.33E-07	2.33E-06	0.00E+00	2.33E-06	Undesignated
Total	1.70E-06	2.33E-06	0.00E+00	2.33E-06	
DW Number	Undesignated	Undesignated	Undesignated	Undesignated	

Dangerous Waste Constituents - WAC 173-303-9905

Substance
Hydrogen fluoride
Trichloromethane
Barium and compounds,NOS

Substance names may include MB (monobasic), DB (dibasic), or TB (tribasic) to identify the equivalence of hydrogen ion that have been nutralized from polyprotic weak acids to form their conjugate bases.

Results based on a single datum are noted by an asterisk (*). Others are based on the lower limit of the one-tailed 90% confidence interval for pH data sets with mean values below 7.25 or by the upper limit of the one-tailed 90% confidence interval for all other data sets.

EP Toxic contaminants, ignitability, and reactivity are reported by standard methods when available. In the absence of EP Toxicity data, total contaminant concentrations are evaluated. In lieu of closed cup ignition results, ignitability is estimated from the sum of the contributions of all substances that are ignitable when pure. A waste is flagged as dangerous if sum of the ignitable substances exceeds one percent. Reactivity is by SW-846: 250 mg of cyanide as hydrogen cyanide per kg of waste or 500 mg of sulfide as hydrogen sulfide per kg of waste. Total cyanide and total sulfide are used in lieu of amenable cyanide and amenable sulfide.

Inorganic substances are fomulated and their possible concentrations calculated for designation purposes only. The actual existance in the waste of these substances is not implied and should not be infered.

constituent is one that is identified as a potential source for that constituent. A secondary source may be proposed on the basis of process knowledge, known chemistry, or chemical engineering principles.

5.3.1 Discarded Chemical Products

Table 5-2 contains a list of three chemical products identified from sampling data. For these three compounds, although none were identified as being present in the facility, an attempt has been made to address the most probable reason for the appearance of them in Table 5-2.

5.3.1.1 Hydrogen Fluoride. Fluoride ion was identified in the wastewater. Consequently, the compound hydrogen fluoride is presented in the computer listing of chemical products in Table 5-2. However, it is not used in the facilities associated with the wastewater.

A secondary source of fluoride ion in the 284-E Powerplant Wastewater is the Columbia River because the water treatment process does not remove it. Fluoride ion is found in the river and in the 284-E Powerplant Wastewater at comparable concentrations.

5.3.1.2 1-Butanol. The 1-Butanol is not used in the facilities associated with the wastewater.

The 1-Butanol was identified in 1 of the 4 samples of wastewater at 18 ppb concentration. The rejection criteria for 1-butanol based on blank analyses is 33 ppb as presented in Section 5.2 of WHC-EP-0342. Because the concentration of 1-butanol seen in the wastewater samples is less than the rejection criteria, these data will not be considered in the designation of the wastewater as it is likely that 1-butanol is present in these wastewater samples due to sample contamination.

5.3.1.3 Trichloromethane. Trichloromethane is not used in the facilities associated with the wastewater. However, it was found in all four of the samples taken for waste designation.

Trichloromethane appeared in all samples taken from the wastewater stream and ranged from 6 ppb to 26 ppb. The threshold limit for trichloromethane based on sanitary water supplied to the 284-E Powerplant is 50 ppb as presented in Section 5.2 of WHC-EP-0342. Because the concentration of trichloromethane seen in all samples of this wastewater stream is less than the threshold limit, these data will not be considered in the designation of the wastewater as it is likely that it is present in these wastewater samples due to the presence of trichloromethane in the facility water supply.

5.3.2 Dangerous Waste Sources

Another purpose of the "diligent search," as described in Section 2.3.4.4, was to determine if any of the waste sources of the 284-E Powerplant Wastewater included any specific waste sources (K and W wastes) or any nonspecific waste sources (F wastes) in the "Dangerous waste source list," WAC 173-303-9904. The search verified that no regulated sources exist at the 284-E Powerplant facility that generate wastes that are improperly disposed of into the wastewater.

Additionally, chemicals appearing in Table 5-2 under the heading "Dangerous Waste Sources" were specifically searched for in the facilities contributing to the wastewater. It was found that they were either not present in the facility, or if they were present, they were not being improperly disposed of into the wastewater.

5.3.2.1 1-Butanol. The 1-Butanol is not used in the 284-E Powerplant facility and has no avenue into the 284-E Powerplant Wastewater. As discussed in Section 5.3.1.2 above, the presence of it in the wastewater is questionable.

5.4 DANGEROUS WASTE CRITERIA

A waste is considered a dangerous waste if it meets any of the following criteria categories (WAC 173-303-100): toxic dangerous waste, persistent dangerous waste, or carcinogenic dangerous waste. A description of the methods used to test the sampling data against the criteria is contained in Jungfleisch (1990). Summaries of the methods, along with the results, are contained in the following sections. Dangerous Waste Criteria are considered only for the routine operations activity at the 284-E Powerplant since there is not any "new" data available for the softener regeneration and blowdown activities at the facility. The routine operations mode includes all wastewater sources for the plant, excluding wastewaters from water softener regeneration and blowdown.

5.4.1 Toxic Dangerous Wastes

The procedure for determining if a wastestream is a toxic dangerous waste is as follows (WAC 173-303-101).

- Collect and analyze multiple samples from the wastestream.
- Calculate the upper limit of the one-sided U90%CI for each analyte in the wastestream.

- Formulate substances from the analytical data.

  NOTE: This step is only required for inorganic analytes since it is not possible to complete the evaluation based on the concentration of cations and anions. This methodology is described in Jungfleisch (1990) and is based on an evaluation of the most toxic substances that can exist in an aqueous environment under normal temperatures and pressures.

- Assign toxic categories to the substances detected or, in the case of inorganic analytes, postulated to be in the wastestream.

- Calculate the contribution of each substance to the percent equivalent concentration (EC%).

- Sum the resulting EC% contributors.

- Designate the wastestream as a toxic dangerous waste if the EC% sum is greater than 0.001%, per WAC 173-303-9906.

The routine operations activity at the facility has some toxicity associated with it, however, it is very much less than the regulatory threshold of an equivalent concentration percentage of 0.001%. The sum value from Table 5-2 is 0.0000017 EC%.

Hence, on the basis of toxicity, the wastewater does not qualify as a dangerous waste.

5.4.2 Persistent Dangerous Wastes

The procedure for determining if a wastestream is a persistent dangerous waste is as follows (WAC 173-303-102).

- Collect multiple grab samples of the wastestream.

- Determine the upper limit of the one-sided 90%CI for the substances of interest.

- Calculate the weight percent contribution of each halogenated hydrocarbon (HH) and polycyclic aromatic hydrocarbon (PAH), separately.

- Sum the resulting weight percent contributions to HH% and PAH%, separately.

- Designate the wastestream as persistent if the HH% concentration is greater than 0.01% or if the PAH% is greater than 1.0%, per WAC 173-303-9907.

The routine operations activity of the 284-E Powerplant has an HH compound associated with it (trichloromethane), but has no PAH compound associated with it. The HH% associated with the routine operations activity is 0.00000283 HH%, much lower than the 0.01 HH% regulatory threshold.

Hence, on the basis of toxicity, the wastewater does not qualify as a dangerous waste.

5.4.3 Carcinogenic Dangerous Wastes

The procedure for determining if a wastestream is a carcinogenic dangerous waste is as follows (WAC 173-303-103).

- Collect multiple grab samples of the wastestream.
- Determine the upper limit of the one-sided U90%CI for the compounds of interest.
- Formulate neutral substances from the analytical data.

  NOTE: This step is only required for inorganic analytes since it is not possible to complete the evaluation based on the concentrations of cations and anions. This methodology is described in Jungfleisch (1990) and is based on an evaluation of the carcinogen compounds that can exist in an aqueous environment under normal temperatures and pressures.

- Determine which chemical compounds in the wastestream are human or animal carcinogens according to the International Agency for Research on Cancer.
- Calculate the weight percent concentration for each carcinogen.
- Sum the resulting weight percent contributions.
- Designate the wastestream as carcinogenic if any of the positive carcinogens are above 0.01% or if the total concentration of positive and suspected carcinogens is above 1.0%.

The routine operations activity of the 284-E Powerplant has one compound, trichloromethane, which was found to have carcinogenic properties. The carcinogenic total percent associated with the routine operations activity is 0.00000283 carcinogenic total percent, much lower than the 1.0 carcinogenic total percent regulatory threshold.

Hence the wastewater does not qualify as a dangerous waste due to the criteria of carcinogenicity.

5.5 DANGEROUS WASTE CHARACTERISTICS

A waste is considered a dangerous waste if it is ignitable, corrosive, reactive, or extraction procedure (EP) toxic (WAC 173-303-090). A description of the methods used to evaluate the data in terms of these characteristics is contained in Jungfleisch (1990). Summaries of the methods, along with the results, are contained in the following sections.

5.5.1 Ignitability

Since July 1989, flashpoint testing has been performed on the liquid effluent samples. All samples reached the boiling temperature of water without igniting. Therefore, the 284-E Powerplant Wastewater is not an ignitable dangerous waste.

5.5.2 Corrosivity

A waste is a corrosive dangerous waste if it has a pH of $\leq$2.0 or $\geq$12.5. Because the pH values observed during sampling ranged from 8.6 and 9.5, the wastestream is not a corrosive dangerous waste (WAC 173-303-090[6]).

5.5.3 Reactivity

An aqueous waste is reactive if the waste contains an amount of cyanide or sulfide under conditions near corrosivity sufficient to threaten human health or the environment (WAC 173-303-090[7]). A recent revision to Test Methods for Evaluating Solid Waste (EPA 1986) provides quantitative indicator levels for cyanide and sulfide. The method states that levels of (equivalent) hydrogen cyanide below 250 mg/kg or of (equivalent) H_2S below 500 mg/kg would not be considered reactive.

Both the cyanide reactivity test and the sulfide reactivity test were reported at the regulatory threshold values (<100 mg/kg), therefore, the 284-E Powerplant Wastewater stream is not regulated due to reactivity.

5.5.4 Extraction Procedure Toxicity

A waste is an EP toxic dangerous waste if individual chemical analytes exceed the limits of WAC 173-303-090(8)(c). The EP Toxic data for the inorganic species regulated as EP Toxic were all reported at less than regulatory levels (Table 5-2), therefore, the 284-E Powerplant Wastewater stream is not an EP Toxic dangerous waste.

5.6 PROPOSED DESIGNATIONS

Based on data from 284-E Powerplant wastewater samples taken from October 1989 through March 1990, it is determined that this stream does not contain any dangerous waste, as defined in WAC 170-303-070. It is proposed that the wastestream not be designated as dangerous waste.

6.0 ACTION PLAN

This chapter addresses recommendations for future waste characterization tasks for the liquid effluents that are within the scope of the Liquid Effluent Study. The final extent of and schedule for any recommended tasks are subject to negotiation between Ecology, the EPA, and DOE. An implementation schedule for the completion of these tasks will give consideration to other compliance actions already under way as part of the Tri-Party Agreement (Ecology et al. 1989), and on the availability of funding. All effluent monitoring and sampling will be conducted according to DOE Order 5400.1 ("General Environmental Protection Program," issued November 9, 1988).

6.1 FUTURE SAMPLING

The random sampling conducted during the October 1989 through March 1990 period covered only routine operations. Softener regeneration and blowdown activities were not monitored during the sampling time frame for this report. It is recommended that future sampling be done to include the unsampled activities and verify this proposed designation.

6.2 TECHNICAL ISSUES

As described in Section 2.0, the effluent was sampled at a point which was accessible and downstream of all the contributing wastestreams.

The samples collected at this point are considered to be representative of the types of constituents present in the contributing wastestreams. As a result, the sample point is capable of producing characterization data considered to be representative of the effluent stream during all Powerplant activities: routine operations, softener regeneration, and blowdown.

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7.0 REFERENCES

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- 173-303-070, Designation of Dangerous Waste
- 173-303-080, Dangerous Waste Lists
- 173-303-081, Discarded Chemical Product
- 173-303-082, Dangerous Waste Sources
- 173-303-090, Dangerous Waste Characteristics
- 173-303-090(5), Characteristics of Ignitability
- 173-303-090(6), Characteristics of Corrosivity
- 173-303-090(7), Characteristics of Reactivity
- 173-303-090(8), Characteristics of Extraction Procedure Toxicity
- 173-303-100, Dangerous Waste Criteria
- 173-303-101, Toxic Dangerous Wastes
- 173-303-102, Persistent Dangerous Wastes
- 173-303-103, Carcinogenic Dangerous Wastes
- 173-303-9903, Discarded Chemical Products List
- 173-303-9904, Dangerous Waste Sources List
- 173-303-9905, Dangerous Waste Constituents List
- 173-303-9907, Persistent Dangerous Waste Mixtures Graph.

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APPENDIX A

DETECTED ANALYTES

New Data (Routine Operation Only).

Data for 284-E Powerplant Wastewater--Routine Operation

Constituent	Sample #	Date	Method	Result
Aluminum	50721	10/24/89	ICP	<1.50E+02
Aluminum	50736	10/27/89	ICP	8.74E+02
Aluminum	50842	12/14/89	ICP	2.81E+02
Aluminum	51024	3/07/90	ICP	<1.50E+02
Arsenic (EP Toxic)	50721E	10/24/89	ICP	<5.00E+02
Arsenic (EP Toxic)	50736E	10/27/89	ICP	<5.00E+02
Arsenic (EP Toxic)	50842E	12/14/89	ICP	<5.00E+02
Arsenic (EP Toxic)	51024E	3/07/90	ICP	<5.00E+02
Barium	50721	10/24/89	ICP	4.30E+01
Barium	50736	10/27/89	ICP	9.60E+01
Barium	50842	12/14/89	ICP	6.00E+01
Barium	51024	3/07/90	ICP	4.20E+01
Barium (EP Toxic)	50721E	10/24/89	ICP	<1.00E+03
Barium (EP Toxic)	50736E	10/27/89	ICP	<1.00E+03
Barium (EP Toxic)	50842E	12/14/89	ICP	<1.00E+03
Barium (EP Toxic)	51024E	3/07/90	ICP	<1.00E+03
Boron	50721	10/24/89	ICP	4.40E+01
Boron	50736	10/27/89	ICP	6.20E+01
Boron	50842	12/14/89	ICP	5.50E+01
Boron	51024	3/07/90	ICP	4.90E+01
Cadmium (EP Toxic)	50721E	10/24/89	ICP	<1.00E+02
Cadmium (EP Toxic)	50736E	10/27/89	ICP	<1.00E+02
Cadmium (EP Toxic)	50842E	12/14/89	ICP	<1.00E+02
Cadmium (EP Toxic)	51024E	3/07/90	ICP	<1.00E+02
Calcium	50721	10/24/89	ICP	2.09E+04
Calcium	50736	10/27/89	ICP	1.88E+04
Calcium	50842	12/14/89	ICP	2.00E+04
Calcium	51024	3/07/90	ICP	1.87E+04
Chloride	50721	10/24/89	IC	3.30E+03
Chloride	50736	10/27/89	IC	3.50E+03
Chloride	50842	12/14/89	IC	6.00E+03
Chloride	51024	3/07/90	IC	2.00E+03
Chromium (EP Toxic)	50721E	10/24/89	ICP	<5.00E+02
Chromium (EP Toxic)	50736E	10/27/89	ICP	<5.00E+02
Chromium (EP Toxic)	50842E	12/14/89	ICP	<5.00E+02
Chromium (EP Toxic)	51024E	3/07/90	ICP	<5.00E+02
Fluoride	50721	10/24/89	IC	<5.00E+02
Fluoride	50721	10/24/89	ISE	1.56E+02
Fluoride	50736	10/27/89	IC	<5.00E+02
Fluoride	50736	10/27/89	ISE	1.86E+02
Fluoride	50842	12/14/89	IC	<5.00E+02
Fluoride	50842	12/14/89	ISE	1.49E+02
Fluoride	51024	3/07/90	IC	<5.00E+02
Fluoride	51024	3/07/90	ISE	1.36E+02
Iron	50721	10/24/89	ICP	5.20E+01
Iron	50736	10/27/89	ICP	3.30E+02
Iron	50842	12/14/89	ICP	1.82E+02

Data for 284-E Powerplant Wastewater--Routine Operation

Constituent	Sample #	Date	Method	Result
Iron	51024	3/07/90	ICP	5.10E+01
Lead (EP Toxic)	50721E	10/24/89	ICP	<5.00E+02
Lead (EP Toxic)	50736E	10/27/89	ICP	<5.00E+02
Lead (EP Toxic)	50842E	12/14/89	ICP	<5.00E+02
Lead (EP Toxic)	51024E	3/07/90	ICP	<5.00E+02
Magnesium	50721	10/24/89	ICP	4.39E+03
Magnesium	50736	10/27/89	ICP	4.44E+03
Magnesium	50842	12/14/89	ICP	4.11E+03
Magnesium	51024	3/07/90	ICP	4.43E+03
Manganese	50721	10/24/89	ICP	<5.00E+00
Manganese	50736	10/27/89	ICP	7.00E+00
Manganese	50842	12/14/89	ICP	<5.00E+00
Manganese	51024	3/07/90	ICP	<5.00E+00
Mercury (EP Toxic)	50721E	10/24/89	CVAA/M	<2.00E+01
Mercury (EP Toxic)	50736E	10/27/89	CVAA/M	<2.00E+01
Mercury (EP Toxic)	50842E	12/14/89	CVAA/M	<2.00E+01
Mercury (EP Toxic)	51024E	3/07/90	CVAA/M	<2.00E+01
Nitrate	50721	10/24/89	IC	5.00E+02
Nitrate	50736	10/27/89	IC	5.00E+02
Nitrate	50842	12/14/89	IC	6.00E+02
Nitrate	51024	3/07/90	IC	5.00E+02
Potassium	50721	10/24/89	ICP	7.96E+02
Potassium	50736	10/27/89	ICP	8.66E+02
Potassium	50842	12/14/89	ICP	1.04E+03
Potassium	51024	3/07/90	ICP	7.22E+02
Selenium (EP Toxic)	50721E	10/24/89	ICP	<5.00E+02
Selenium (EP Toxic)	50736E	10/27/89	ICP	<5.00E+02
Selenium (EP Toxic)	50842E	12/14/89	ICP	<5.00E+02
Selenium (EP Toxic)	51024E	3/07/90	ICP	<5.00E+02
Silicon	50721	10/24/89	ICP	2.60E+03
Silicon	50736	10/27/89	ICP	4.06E+03
Silicon	50842	12/14/89	ICP	3.22E+03
Silicon	51024	3/07/90	ICP	2.53E+03
Silver (EP Toxic)	50721E	10/24/89	ICP	<5.00E+02
Silver (EP Toxic)	50736E	10/27/89	ICP	<5.00E+02
Silver (EP Toxic)	50842E	12/14/89	ICP	<5.00E+02
Silver (EP Toxic)	51024E	3/07/90	ICP	<5.00E+02
Sodium	50721	10/24/89	ICP	4.18E+03
Sodium	50736	10/27/89	ICP	1.30E+04
Sodium	50842	12/14/89	ICP	1.38E+04
Sodium	51024	3/07/90	ICP	5.17E+03
Strontium	50721	10/24/89	ICP	2.58E+02
Strontium	50736	10/27/89	ICP	2.00E+02
Strontium	50842	12/14/89	ICP	2.39E+02
Strontium	51024	3/07/90	ICP	2.65E+02
Sulfate	50721	10/24/89	IC	1.43E+04
Sulfate	50736	10/27/89	IC	1.96E+04
Sulfate	50842	12/14/89	IC	1.99E+04
Sulfate	51024	3/07/90	IC	1.48E+04

Data for 284-E Powerplant Wastewater--Routine Operation

Constituent	Sample #	Date	Method	Result
Uranium	50721	10/24/89	FLUOR	3.53E-01
Uranium	50736	10/27/89	FLUOR	4.65E-01
Uranium	50842	12/14/89	FLUOR	6.18E-01
Uranium	51024	3/07/90	FLUOR	4.53E-01
Zinc	50721	10/24/89	ICP	<5.00E+00
Zinc	50736	10/27/89	ICP	1.30E+01
Zinc	50842	12/14/89	ICP	6.00E+00
Zinc	51024	3/07/90	ICP	<5.00E+00
Acetone	50721	10/24/89	VOA	<9.00E+00
Acetone	50721	10/24/89	ABN	<1.00E+01
Acetone	50721B	10/24/89	VOA	1.10E+01
Acetone	50721T	10/24/89	VOA	<1.00E+01
Acetone	50736	10/27/89	VOA	<8.00E+00
Acetone	50736	10/27/89	ABN	<1.00E+01
Acetone	50736B	10/27/89	VOA	1.30E+01
Acetone	50736T	10/27/89	VOA	<1.00E+01
Acetone	50842	12/14/89	VOA	<1.00E+01
Acetone	50842	12/14/89	ABN	<1.00E+01
Acetone	50842B	12/14/89	VOA	<1.00E+01
Acetone	51024	3/07/90	VOA	<1.00E+01
Acetone	51024	3/07/90	ABN	<1.00E+01
Acetone	51024B	3/07/90	VOA	<1.00E+01
Acetone	51024T	3/07/90	VOA	<1.00E+01
Ammonia	50721	10/24/89	ISE	5.60E+01
Ammonia	50736	10/27/89	ISE	5.80E+01
Ammonia	50842	12/14/89	ISE	<5.00E+01
Ammonia	51024	3/07/90	ISE	<5.00E+01
1-Butanol	50721	10/24/89	DIGC	<1.00E+04
1-Butanol	50736	10/27/89	DIGC	<1.00E+04
1-Butanol	50842	12/14/89	DIGC	<1.00E+04
1-Butanol	51024	3/07/90	VOA	1.80E+01
1-Butanol	51024	3/07/90	DIGC	<1.00E+04
1-Butanol	51024B	3/07/90	VOA	1.80E+01
1-Butanol	51024T	3/07/90	VOA	1.70E+01
2-Butanone	50721	10/24/89	VOA	<1.00E+01
2-Butanone	50721B	10/24/89	VOA	1.30E+01
2-Butanone	50721T	10/24/89	VOA	<1.00E+01
2-Butanone	50736	10/27/89	VOA	<1.00E+01
2-Butanone	50736B	10/27/89	VOA	<1.00E+01
2-Butanone	50736T	10/27/89	VOA	<1.00E+01
2-Butanone	50842	12/14/89	VOA	<1.00E+01
2-Butanone	50842B	12/14/89	VOA	<1.00E+01
2-Butanone	51024	3/07/90	VOA	<1.00E+01
2-Butanone	51024B	3/07/90	VOA	<1.00E+01
2-Butanone	51024T	3/07/90	VOA	<1.00E+01
Dichloromethane	50721	10/24/89	VOA	<5.00E+00
Dichloromethane	50721B	10/24/89	VOA	5.00E+00
Dichloromethane	50721T	10/24/89	VOA	5.90E+01

Data for 284-E Powerplant Wastewater--Routine Operation

Constituent	Sample #	Date	Method	Result
Dichloromethane	50736	10/27/89	VOA	<5.00E+00
Dichloromethane	50736B	10/27/89	VOA	<4.00E+00
Dichloromethane	50736T	10/27/89	VOA	2.40E+01
Dichloromethane	50842	12/14/89	VOA	<5.00E+00
Dichloromethane	50842B	12/14/89	VOA	5.00E+00
Dichloromethane	51024	3/07/90	VOA	<5.00E+00
Dichloromethane	51024B	3/07/90	VOA	<5.00E+00
Dichloromethane	51024T	3/07/90	VOA	<5.00E+00
Tetrahydrofuran	50721	10/24/89	VOA	<1.00E+01
Tetrahydrofuran	50721B	10/24/89	VOA	2.30E+01
Tetrahydrofuran	50721T	10/24/89	VOA	<1.00E+01
Tetrahydrofuran	50736	10/27/89	VOA	<1.00E+01
Tetrahydrofuran	50736B	10/27/89	VOA	1.30E+01
Tetrahydrofuran	50736T	10/27/89	VOA	<1.00E+01
Tetrahydrofuran	50842	12/14/89	VOA	<1.00E+01
Tetrahydrofuran	50842B	12/14/89	VOA	<1.00E+01
Tetrahydrofuran	51024	3/07/90	VOA	<1.00E+01
Tetrahydrofuran	51024B	3/07/90	VOA	<1.00E+01
Tetrahydrofuran	51024T	3/07/90	VOA	<1.00E+01
Trichloromethane	50721	10/24/89	VOA	2.10E+01
Trichloromethane	50721B	10/24/89	VOA	<5.00E+00
Trichloromethane	50721T	10/24/89	VOA	<5.00E+00
Trichloromethane	50736	10/27/89	VOA	9.00E+00
Trichloromethane	50736B	10/27/89	VOA	<5.00E+00
Trichloromethane	50736T	10/27/89	VOA	<5.00E+00
Trichloromethane	50842	12/14/89	VOA	6.00E+00
Trichloromethane	50842B	12/14/89	VOA	<5.00E+00
Trichloromethane	51024	3/07/90	VOA	2.60E+01
Trichloromethane	51024B	3/07/90	VOA	<5.00E+00
Trichloromethane	51024T	3/07/90	VOA	<5.00E+00
Alkalinity (Method B)	50721	10/24/89	TITRA	5.80E+04
Alkalinity (Method B)	50736	10/27/89	TITRA	6.60E+04
Alkalinity (Method B)	50842	12/14/89	TITRA	7.80E+04
Alkalinity (Method B)	51024	3/07/90	TITRA	6.00E+04
Alpha Activity (pCi/L)	50721	10/24/89	Alpha	1.18E+00
Alpha Activity (pCi/L)	50736	10/27/89	Alpha	1.05E+00
Alpha Activity (pCi/L)	50842	12/14/89	Alpha	1.22E+00
Alpha Activity (pCi/L)	51024	3/07/90	Alpha	<1.43E-01
Beta Activity (pCi/L)	50721	10/24/89	Beta	<1.61E+00
Beta Activity (pCi/L)	50736	10/27/89	Beta	<8.76E-01
Beta Activity (pCi/L)	50842	12/14/89	Beta	2.75E+00
Beta Activity (pCi/L)	51024	3/07/90	Beta	<1.96E+00
Conductivity (uS)	50721	10/24/89	COND-Fld	1.32E+02
Conductivity (uS)	50736	10/27/89	COND-Fld	1.91E+02
Conductivity (uS)	50842	12/14/89	COND-Fld	2.01E+02
Conductivity (uS)	51024	3/07/90	COND-Fld	1.48E+02
Ignitability (degrees F)	50721E	10/24/89	IGNIT	>2.08E+02
Ignitability (degrees F)	50736E	10/27/89	IGNIT	>2.08E+02

Data for 284-E Powerplant Wastewater--Routine Operation

Constituent	Sample #	Date	Method	Result
Ignitability (degrees F)	50842E	12/14/89	IGNIT	>2.14E+02
Ignitability (degrees F)	51024E	3/07/90	IGNIT	>2.02E+02
pH (dimensionless)	50721	10/24/89	PH-Fld	8.61E+00
pH (dimensionless)	50736	10/27/89	PH-Fld	9.40E+00
pH (dimensionless)	50842	12/14/89	PH-Fld	9.50E+00
pH (dimensionless)	51024	3/07/90	PH-Fld	8.80E+00
Reactivity Cyanide (mg/kg)	50721E	10/24/89	DSPEC	<1.00E+02
Reactivity Cyanide (mg/kg)	50736E	10/27/89	DSPEC	<1.00E+02
Reactivity Cyanide (mg/kg)	50842E	12/14/89	DSPEC	<1.00E+02
Reactivity Cyanide (mg/kg)	51024E	3/07/90	DSPEC	<1.00E+02
Reactivity Sulfide (mg/kg)	50721E	10/24/89	DTITRA	<1.00E+02
Reactivity Sulfide (mg/kg)	50736E	10/27/89	DTITRA	<1.00E+02
Reactivity Sulfide (mg/kg)	50842E	12/14/89	DTITRA	<1.00E+02
Reactivity Sulfide (mg/kg)	51024E	3/07/90	DTITRA	<1.00E+02
Suspended Solids	50721	10/24/89	SSOLID	<5.00E+03
Suspended Solids	50736	10/27/89	SSOLID	3.90E+04
Suspended Solids	50842	12/14/89	SSOLID	1.10E+04
Suspended Solids	51024	3/07/90	SSOLID	<5.00E+03
TDS	50721	10/24/89	TDS	7.60E+04
TDS	50736	10/27/89	TDS	8.90E+04
TDS	50842	12/14/89	TDS	1.03E+05
TDS	51024	3/07/90	TDS	8.00E+04
Temperature (degrees C)	50721	10/24/89	TEMP-Fld	1.62E+01
Temperature (degrees C)	50736	10/27/89	TEMP-Fld	1.75E+01
Temperature (degrees C)	50842	12/14/89	TEMP-Fld	1.11E+01
Temperature (degrees C)	51024	3/07/90	TEMP-Fld	1.01E+01
TOC	50721	10/24/89	TOC	2.60E+03
TOC	50736	10/27/89	TOC	<1.20E+03
TOC	50842	12/14/89	TOC	<1.70E+03
TOC	51024	3/07/90	TOC	1.30E+03
Total Carbon	50721	10/24/89	TC	1.53E+04
Total Carbon	50736	10/27/89	TC	1.49E+04
Total Carbon	50842	12/14/89	TC	1.55E+04
Total Carbon	51024	3/07/90	TC	1.52E+04
TOX (as Cl)	50721	10/24/89	LTOX	1.15E+02
TOX (as Cl)	50736	10/27/89	LTOX	7.80E+01
TOX (as Cl)	50842	12/14/89	LTOX	5.50E+01
TOX (as Cl)	51024	3/07/90	LTOX	1.25E+02

DATA REPORT FOOTNOTES

Sample# is the number of the sample. See chapter three for corresponding chain-of-custody number.
Date is the sampling date.
Results are in ppb (parts per billion) unless otherwise indicated.
The following table lists the methods that are coded in the method column.

Data for 284-E Powerplant Wastewater--Routine Operation

DATA REPORT FOOTNOTES (continued)

Code	Analytical Method	Reference
ABN	Semivolatile Organics (GC/MS)	USEPA-8270
AEA	Americium-241	UST-20Am01
AEA	Curium Isotopes	UST-20Am/Cm01
AEA	Plutonium Isotopes	UST-20Pu01
AEA	Uranium Isotopes	UST-20U01
ALPHA	Alpha Counting	EPA-680/4-75/1
ALPHA-Ra	Total Radium Alpha Counting	ASTM-D2460
BETA	Beta Counting	EPA-680/4-75/1
BETA	Strontium-90	UST-20Sr02
COLIF	Coliform Bacteria	USEPA-9131
COLIFMF	Coliform Bacteria (Membrane Filter)	USEPA-9132
COND-Fld	Conductivity-Field	ASTM-D1125A
COND-Lab	Conductivity-Laboratory	ASTM-D1125A
CVAA	Mercury	USEPA-7470
CVAA/M	Mercury-Mixed Matrix	USEPA-7470
DIGC	Direct Aqueous Injection (GC)	UST-70DIGC
DIMS	Direct Aqueous Injection (GC/MS)	"USEPA-8240"
DSPEC	Reactive Cyanide (Distillation, Spectroscopy)	USEPA-CHAPTER 7
DTITRA	Reactive Sulfide (Distillation, Titration)	USEPA-CHAPTER 7
FLUOR	Uranium (Fluorometry)	ASTM-D2907-83
GEA	Gamma Energy Analysis Spectroscopy	ASTM-D3649-85
GFAA	Arsenic (AA, Furnace Technique)	USEPA-7060
GFAA	Lead (AA, Furnace Technique)	USEPA-7421
GFAA	Selenium (AA, Furnace Technique)	USEPA-7740
GFAA	Thallium (AA, Furnace Technique)	USEPA-7841
IC	Ion Chromatography	EPA-600/4-84-01
ICP	Atomic Emission Spectroscopy (ICP)	USEPA-6010
ICP/M	Atomic Emission Spectroscopy (ICP)-Mixed Matrix	USEPA-6010
IGNIT	Pensky-Martens Closed-Cup Ignitability	USEPA-1010
ISE	Fluoride-Low Detection Limit	ASTM-D1179-80-B
ISE	Ammonium Ion	ASTM-D1426-D
LALPHA	Alpha Activity-Low Detection Limit	EPA-680/4-75/1
LEPD	Iodine-129	UST-20I02
LSC	C-14	UST-20C01
LSC	Tritium	UST-20H03
LTOX	Total Organic Halides-Low Detection Limit	USEPA-9020
PH-Fld	pH-Field	USEPA-9040
PH-Lab	pH-Laboratory	USEPA-9040
SPEC	Total and Amenable Cyanide (Spectroscopy)	USEPA-9010
SPEC	Hydrazine-Low Detection Limit (Spectroscopy)	ASTM-D1385
SSOLID	Suspended Solids	SM-208D
TC	Total Carbon	USEPA-9060
TDS	Total Dissolved Solids	SM-208B
TEMP-Fld	Temperature-Field	Local
TITRA	Alkalinity-Method B (Titration)	ASTM-D1067B
TITRA	Sulfides (Titration)	USEPA-9030

Data for 284-E Powerplant Wastewater--Routine Operation

DATA REPORT FOOTNOTES (continued)

TOC	Total Organic Carbon	USEPA-9060
TOX	Total Organic Halides	USEPA-9020
VOA	Volatile Organics (GC/MS)	USEPA-8240

Analytical Method Acronyms:
atomic absorption spectroscopy (AA), gas chromatography (GC), mass spectrometry (MS), inductively-coupled plasma spectroscopy (ICP)

References:

ASTM - "1986 Annual Book of ASTM Standards", American Society for Testing and Materials, Philadelphia, Pennsylvania.
EPA - Various methods of the U.S. Environmental Protection Agency, Washington, D.C.
UST - Methods of the United States Testing Company, Incorporated, Richland, Washington.
SM - "Standard Methods for the Examination of Water and Wastewater", 16th ed., American Public Health Association, American Water Works Association and Water Pollution Control Federation, Washington, D.C.
USEPA- "Test Methods for Evaluating Solid Waste Physical/Chemical Methods", 3rd ed., SW-846, U.S. Environmental Protection Agency, Washington, D.C.

All Data (All Waste Generating Activities).

Data for 284-E Powerplant Wastewater--Blowdown

Constituent	Sample #	Date	Method	Result
Aluminum	50017	9/13/85	ICP	2.27E+02
Aluminum	50044	5/15/86	ICP	2.57E+02
Aluminum	50121	8/27/86	ICP	3.53E+02
Aluminum	50208	12/31/86	ICP	<1.50E+02
Aluminum	50222	1/19/87	ICP	7.79E+02
Aluminum	50622	8/09/89	ICP	<1.50E+02
Arsenic (EP Toxic)	50622E	8/09/89	ICP	<5.00E+03
Barium	50017	9/13/85	ICP	2.80E+01
Barium	50044	5/15/86	ICP	3.70E+01
Barium	50121	8/27/86	ICP	3.40E+01
Barium	50208	12/31/86	ICP	2.70E+01
Barium	50222	1/19/87	ICP	9.30E+01
Barium	50622	8/09/89	ICP	3.80E+01
Barium (EP Toxic)	50622E	8/09/89	ICP	<1.00E+04
Boron	50622	8/09/89	ICP	2.30E+01
Cadmium (EP Toxic)	50622E	8/09/89	ICP	<1.00E+03
Calcium	50017	9/13/85	ICP	1.70E+04
Calcium	50044	5/15/86	ICP	1.78E+04
Calcium	50121	8/27/86	ICP	1.76E+04
Calcium	50208	12/31/86	ICP	1.71E+04
Calcium	50222	1/19/87	ICP	1.93E+04
Calcium	50622	8/09/89	ICP	1.76E+04
Chloride	50017	9/13/85	IC	3.78E+03
Chloride	50044	5/15/86	IC	4.96E+03
Chloride	50121	8/27/86	IC	6.01E+03
Chloride	50208	12/31/86	IC	4.65E+03
Chloride	50222	1/19/87	IC	3.73E+03
Chloride	50622	8/09/89	IC	2.40E+03
Chromium (EP Toxic)	50622E	8/09/89	ICP	<5.00E+03
Copper	50017	9/13/85	ICP	<1.00E+01
Copper	50044	5/15/86	ICP	<1.00E+01
Copper	50121	8/27/86	ICP	1.16E+02
Copper	50208	12/31/86	ICP	<1.00E+01
Copper	50222	1/19/87	ICP	9.90E+01
Copper	50622	8/09/89	ICP	<1.00E+01
Fluoride	50017	9/13/85	IC	<5.00E+02
Fluoride	50044	5/15/86	IC	<5.00E+02
Fluoride	50121	8/27/86	IC	<5.00E+02
Fluoride	50208	12/31/86	IC	<5.00E+02
Fluoride	50222	1/19/87	IC	<5.00E+02
Fluoride	50622	8/09/89	IC	<5.00E+02
Fluoride	50622	8/09/89	ISE	1.52E+02
Iron	50017	9/13/85	ICP	1.86E+02
Iron	50044	5/15/86	ICP	1.93E+02
Iron	50121	8/27/86	ICP	2.24E+03
Iron	50208	12/31/86	ICP	6.80E+01

Data for 284-E Powerplant Wastewater--Blowdown

Constituent	Sample #	Date	Method	Result
Iron	50222	1/19/87	ICP	6.05E+02
Iron	50622	8/09/89	ICP	8.40E+01
Lead (EP Toxic)	50622E	8/09/89	ICP	<5.00E+03
Magnesium	50017	9/13/85	ICP	3.47E+03
Magnesium	50044	5/15/86	ICP	3.93E+03
Magnesium	50121	8/27/86	ICP	4.33E+03
Magnesium	50208	12/31/86	ICP	3.92E+03
Magnesium	50222	1/19/87	ICP	4.15E+03
Magnesium	50622	8/09/89	ICP	4.02E+03
Manganese	50017	9/13/85	ICP	1.30E+01
Manganese	50044	5/15/86	ICP	7.00E+00
Manganese	50121	8/27/86	ICP	2.70E+01
Manganese	50208	12/31/86	ICP	<5.00E+00
Manganese	50222	1/19/87	ICP	1.10E+01
Manganese	50622	8/09/89	ICP	6.00E+00
Mercury	50017	9/13/85	CVAA	<1.00E-01
Mercury	50044	5/15/86	CVAA	<1.00E-01
Mercury	50121	8/27/86	CVAA	1.00E-01
Mercury	50208	12/31/86	CVAA	<1.00E-01
Mercury	50222	1/19/87	CVAA	<1.00E-01
Mercury	50622	8/09/89	CVAA	<1.00E-01
Mercury (EP Toxic)	50622E	8/09/89	CVAA/M	<2.00E+01
Nitrate	50017	9/13/85	IC	5.20E+02
Nitrate	50044	5/15/86	IC	5.17E+02
Nitrate	50121	8/27/86	IC	<5.00E+02
Nitrate	50208	12/31/86	IC	1.02E+03
Nitrate	50222	1/19/87	IC	5.85E+02
Nitrate	50622	8/09/89	IC	<5.00E+02
Phosphate	50017	9/13/85	IC	<1.00E+03
Phosphate	50044	5/15/86	IC	<1.00E+03
Phosphate	50121	8/27/86	IC	<1.00E+03
Phosphate	50208	12/31/86	IC	<1.00E+03
Phosphate	50222	1/19/87	IC	7.81E+03
Phosphate	50622	8/09/89	IC	<1.00E+03
Potassium	50017	9/13/85	ICP	1.25E+03
Potassium	50044	5/15/86	ICP	9.21E+02
Potassium	50121	8/27/86	ICP	7.97E+02
Potassium	50208	12/31/86	ICP	7.39E+02
Potassium	50222	1/19/87	ICP	9.40E+02
Potassium	50622	8/09/89	ICP	7.67E+02
Selenium (EP Toxic)	50622E	8/09/89	ICP	<5.00E+02
Silicon	50622	8/09/89	ICP	2.04E+03
Silver (EP Toxic)	50622E	8/09/89	ICP	<5.00E+03
Sodium	50017	9/13/85	ICP	3.46E+04
Sodium	50044	5/15/86	ICP	3.15E+04
Sodium	50121	8/27/86	ICP	5.56E+04
Sodium	50208	12/31/86	ICP	1.19E+04
Sodium	50222	1/19/87	ICP	3.91E+04
Sodium	50622	8/09/89	ICP	3.85E+03

Data for 284-E Powerplant Wastewater--Blowdown

Constituent	Sample #	Date	Method	Result
Strontium	50017	9/13/85	ICP	<3.00E+02
Strontium	50044	5/15/86	ICP	<3.00E+02
Strontium	50121	8/27/86	ICP	<3.00E+02
Strontium	50208	12/31/86	ICP	<3.00E+02
Strontium	50222	1/19/87	ICP	<3.00E+02
Strontium	50622	8/09/89	ICP	1.76E+02
Sulfate	50017	9/13/85	IC	3.19E+04
Sulfate	50044	5/15/86	IC	2.83E+04
Sulfate	50121	8/27/86	IC	2.90E+04
Sulfate	50208	12/31/86	IC	1.60E+04
Sulfate	50222	1/19/87	IC	4.00E+04
Sulfate	50622	8/09/89	IC	1.25E+04
Sulfide	50017	9/13/85	TITRA	<1.00E+03
Sulfide	50044	5/15/86	TITRA	1.05E+03
Sulfide	50121	8/27/86	TITRA	1.15E+03
Sulfide	50208	12/31/86	TITRA	<1.00E+03
Sulfide	50222	1/19/87	TITRA	6.83E+03
Sulfide	50622	8/09/89	TITRA	<1.00E+03
Uranium	50017	9/13/85	FLUOR	4.65E-01
Uranium	50044	5/15/86	FLUOR	9.79E-01
Uranium	50121	8/27/86	FLUOR	8.13E-01
Uranium	50208	12/31/86	FLUOR	5.35E-01
Uranium	50222	1/19/87	FLUOR	2.32E+00
Uranium	50622	8/09/89	FLUOR	8.54E-01
Vanadium	50017	9/13/85	ICP	<5.00E+00
Vanadium	50044	5/15/86	ICP	6.00E+00
Vanadium	50121	8/27/86	ICP	<5.00E+00
Vanadium	50208	12/31/86	ICP	<5.00E+00
Vanadium	50222	1/19/87	ICP	1.40E+01
Vanadium	50622	8/09/89	ICP	<5.00E+00
Zinc	50017	9/13/85	ICP	1.50E+01
Zinc	50044	5/15/86	ICP	1.00E+01
Zinc	50121	8/27/86	ICP	2.90E+01
Zinc	50208	12/31/86	ICP	6.00E+00
Zinc	50222	1/19/87	ICP	1.10E+01
Zinc	50622	8/09/89	ICP	<5.00E+00
Acetone	50208B	12/31/86	VOA	5.70E+01
Acetone	50622	8/09/89	VOA	<8.00E+00
Acetone	50622	8/09/89	ABN	<1.00E+01
Acetone	50622B	8/09/89	VOA	<1.00E+01
Acetone	50622T	8/09/89	VOA	<1.00E+01
Ammonia	50017	9/13/85	ISE	<5.00E+01
Ammonia	50044	5/15/86	ISE	<5.00E+01
Ammonia	50121	8/27/86	ISE	<5.00E+01
Ammonia	50208	12/31/86	ISE	9.90E+01
Ammonia	50222	1/19/87	ISE	<5.00E+01
Ammonia	50622	8/09/89	ISE	<5.00E+01
1-Butanol	50017	9/13/85	VOA	1.00E+01
1-Butanol	50622	8/09/89	DIGC	<1.00E+04

Data for 284-E Powerplant Wastewater--Blowdown

Constituent	Sample #	Date	Method	Result
Chloromethane	50017	9/13/85	VOA	<1.00E+01
Chloromethane	50044	5/15/86	VOA	<1.00E+01
Chloromethane	50044B	5/15/86	VOA	<1.00E+01
Chloromethane	50121	8/27/86	VOA	<1.00E+01
Chloromethane	50121B	8/27/86	VOA	<1.00E+01
Chloromethane	50208	12/31/86	VOA	<1.00E+01
Chloromethane	50208B	12/31/86	VOA	2.80E+01
Chloromethane	50222	1/19/87	VOA	<1.00E+01
Chloromethane	50222B	1/19/87	VOA	<1.00E+01
Chloromethane	50622	8/09/89	VOA	<1.00E+01
Chloromethane	50622B	8/09/89	VOA	<1.00E+01
Chloromethane	50622T	8/09/89	VOA	<1.00E+01
Dichloromethane	50017	9/13/85	VOA	<1.00E+01
Dichloromethane	50044	5/15/86	VOA	<1.00E+01
Dichloromethane	50044B	5/15/86	VOA	1.90E+02
Dichloromethane	50121	8/27/86	VOA	<1.00E+01
Dichloromethane	50121B	8/27/86	VOA	1.50E+02
Dichloromethane	50208	12/31/86	VOA	<1.00E+01
Dichloromethane	50208B	12/31/86	VOA	5.10E+01
Dichloromethane	50222	1/19/87	VOA	<1.00E+01
Dichloromethane	50222B	1/19/87	VOA	5.70E+01
Dichloromethane	50622	8/09/89	VOA	<5.00E+00
Dichloromethane	50622B	8/09/89	VOA	6.26E+01
Dichloromethane	50622T	8/09/89	VOA	5.90E+01
Trichloromethane	50017	9/13/85	VOA	<1.00E+01
Trichloromethane	50044	5/15/86	VOA	<1.00E+01
Trichloromethane	50044B	5/15/86	VOA	<1.00E+01
Trichloromethane	50121	8/27/86	VOA	<1.00E+01
Trichloromethane	50121B	8/27/86	VOA	<1.00E+01
Trichloromethane	50208	12/31/86	VOA	<1.00E+01
Trichloromethane	50208B	12/31/86	VOA	<1.00E+01
Trichloromethane	50222	1/19/87	VOA	<1.00E+01
Trichloromethane	50222B	1/19/87	VOA	<1.00E+01
Trichloromethane	50622	8/09/89	VOA	1.30E+01
Trichloromethane	50622B	8/09/89	VOA	<5.00E+00
Trichloromethane	50622T	8/09/89	VOA	<5.00E+00
Alpha Activity (pCi/L)	50017	9/13/85	Alpha	2.18E-01
Alpha Activity (pCi/L)	50044	5/15/86	Alpha	3.03E+00
Alpha Activity (pCi/L)	50208	12/31/86	Alpha	5.67E-01
Alpha Activity (pCi/L)	50222	1/19/87	Alpha	4.34E-01
Beta Activity (pCi/L)	50017	9/13/85	Beta	3.62E+00
Beta Activity (pCi/L)	50044	5/15/86	Beta	6.50E+00
Beta Activity (pCi/L)	50121	8/27/86	Beta	5.66E+00
Beta Activity (pCi/L)	50208	12/31/86	Beta	5.88E+00
Beta Activity (pCi/L)	50222	1/19/87	Beta	2.87E+00
Beta Activity (pCi/L)	50622	8/09/89	Beta	<6.60E-01
Conductivity (uS)	50017	9/13/85	COND-Fld	2.42E+02
Conductivity (uS)	50044	5/15/86	COND-Fld	2.50E+01
Conductivity (uS)	50121	8/27/86	COND-Fld	1.71E+02

Data for 284-E Powerplant Wastewater--Blowdown

Constituent	Sample #	Date	Method	Result
Conductivity (uS)	50208	12/31/86	COND-Fld	1.52E+02
Conductivity (uS)	50222	1/19/87	COND-Fld	1.90E+02
Conductivity (uS)	50622	8/09/89	COND-Fld	1.87E+02
Ignitability (degrees F)	50622E	8/09/89	IGNIT	>2.12E+02
pH (dimensionless)	50017	9/13/85	PH-Fld	1.01E+01
pH (dimensionless)	50044	5/15/86	PH-Fld	1.04E+01
pH (dimensionless)	50121	8/27/86	PH-Fld	9.45E+00
pH (dimensionless)	50208	12/31/86	PH-Fld	9.62E+00
pH (dimensionless)	50222	1/19/87	PH-Fld	8.25E+00
pH (dimensionless)	50622	8/09/89	PH-Fld	9.16E+00
Reactivity Cyanide (mg/kg)	50622E	8/09/89	DSPEC	<1.00E+02
Reactivity Sulfide (mg/kg)	50622E	8/09/89	DTITRA	<1.00E+02
TDS	50622	8/09/89	TDS	6.20E+04
Temperature (degrees C)	50017	9/13/85	TEMP-Fld	2.10E+01
Temperature (degrees C)	50044	5/15/86	TEMP-Fld	1.79E+01
Temperature (degrees C)	50121	8/27/86	TEMP-Fld	2.67E+01
Temperature (degrees C)	50208	12/31/86	TEMP-Fld	9.30E+00
Temperature (degrees C)	50222	1/19/87	TEMP-Fld	7.90E+00
Temperature (degrees C)	50622	8/09/89	TEMP-Fld	2.62E+01
TOC	50017	9/13/85	TOC	2.40E+03
TOC	50044	5/15/86	TOC	4.00E+03
TOC	50121	8/27/86	TOC	2.47E+03
TOC	50208	12/31/86	TOC	1.34E+03
TOC	50222	1/19/87	TOC	2.35E+03
TOC	50622	8/09/89	TOC	<1.80E+03
TOX (as Cl)	50017	9/13/85	TOX	<2.00E+01
TOX (as Cl)	50044	5/15/86	TOX	<3.46E+01
TOX (as Cl)	50121	8/27/86	TOX	<4.34E+01
TOX (as Cl)	50208	12/31/86	LTOX	3.34E+01
TOX (as Cl)	50222	1/19/87	LTOX	<2.00E+01
TOX (as Cl)	50622	8/09/89	LTOX	9.10E+01

Data for 284-E Powerplant Wastewater--Water Softener Regenerate

Constituent	Sample #	Date	Method	Result
Aluminum	50360	11/23/87	ICP	<6.95E+03
Aluminum	50376	1/14/88	ICP	<1.50E+04
Aluminum	50400	3/18/88	ICP	1.95E+03
Aluminum	50426	5/23/88	ICP	2.69E+03
Barium	50360	11/23/87	ICP	1.10E+04
Barium	50376	1/14/88	ICP	1.60E+04
Barium	50400	3/18/88	ICP	3.60E+03
Barium	50426	5/23/88	ICP	4.00E+03
Cadmium	50360	11/23/87	ICP	<1.00E+02
Cadmium	50376	1/14/88	ICP	<2.00E+02
Cadmium	50400	3/18/88	ICP	3.00E+00
Cadmium	50426	5/23/88	ICP	<2.00E+01

Data for 284-E Powerplant Wastewater--Blowdown

Constituent	Sample #	Date	Method	Result
Calcium	50360	11/23/87	ICP	9.34E+06
Calcium	50376	1/14/88	ICP	7.50E+06
Calcium	50400	3/18/88	ICP	3.52E+06
Calcium	50426	5/23/88	ICP	2.41E+06
Chloride	50360	11/23/87	IC	6.67E+07
Chloride	50376	1/14/88	IC	6.59E+07
Chloride	50400	3/18/88	IC	1.13E+07
Chloride	50426	5/23/88	IC	5.38E+07
Copper	50360	11/23/87	ICP	<1.50E+02
Copper	50376	1/14/88	ICP	<1.00E+03
Copper	50400	3/18/88	ICP	1.17E+02
Copper	50426	5/23/88	ICP	1.19E+02
Fluoride	50360	11/23/87	IC	<5.00E+02
Fluoride	50360	11/23/87	ISE	<2.00E+01
Fluoride	50376	1/14/88	IC	1.20E+05
Fluoride	50376	1/14/88	ISE	<2.00E+01
Fluoride	50400	3/18/88	IC	1.38E+05
Fluoride	50400	3/18/88	ISE	<2.00E+01
Fluoride	50426	5/23/88	ISE	7.30E+01
Iron	50360	11/23/87	ICP	<3.50E+02
Iron	50376	1/14/88	ICP	<3.00E+03
Iron	50400	3/18/88	ICP	6.20E+01
Iron	50426	5/23/88	ICP	<3.00E+02
Lead	50360	11/23/87	GFAA	<6.00E+00
Lead	50376	1/14/88	GFAA	<1.00E+01
Lead	50400	3/18/88	GFAA	<2.00E+01
Lead	50426	5/23/88	GFAA	2.70E+01
Magnesium	50360	11/23/87	ICP	1.54E+06
Magnesium	50376	1/14/88	ICP	1.49E+06
Magnesium	50400	3/18/88	ICP	6.33E+05
Magnesium	50426	5/23/88	ICP	3.68E+05
Manganese	50360	11/23/87	ICP	2.50E+02
Manganese	50376	1/14/88	ICP	<1.00E+03
Manganese	50400	3/18/88	ICP	4.20E+01
Manganese	50426	5/23/88	ICP	7.80E+01
Potassium	50360	11/23/87	ICP	3.33E+05
Potassium	50376	1/14/88	ICP	1.96E+05
Potassium	50400	3/18/88	ICP	1.48E+05
Potassium	50426	5/23/88	ICP	6.85E+04
Sodium	50360	11/23/87	ICP	3.59E+07
Sodium	50376	1/14/88	ICP	3.20E+07
Sodium	50400	3/18/88	ICP	3.82E+07
Sodium	50426	5/23/88	ICP	2.61E+07
Strontium	50360	11/23/87	ICP	4.45E+04
Strontium	50376	1/14/88	ICP	3.60E+04
Strontium	50400	3/18/88	ICP	1.08E+04
Strontium	50426	5/23/88	ICP	1.06E+04
Sulfate	50360	11/23/87	IC	3.46E+04
Sulfate	50376	1/14/88	IC	6.10E+05

Data for 284-E Powerplant Wastewater--Blowdown

Constituent	Sample #	Date	Method	Result
Sulfate	50400	3/18/88	IC	<5.00E+02
Uranium	50360	11/23/87	FLUOR	1.67E+00
Uranium	50376	1/14/88	FLUOR	9.07E+00
Uranium	50400	3/18/88	FLUOR	6.51E-01
Uranium	50426	5/23/88	FLUOR	9.52E-01
Zinc	50360	11/23/87	ICP	7.00E+02
Zinc	50376	1/14/88	ICP	1.90E+04
Zinc	50400	3/18/88	ICP	6.72E+02
Zinc	50426	5/23/88	ICP	4.33E+02
Acetone	50360	11/23/87	VOA	1.50E+01
Ammonia	50360	11/23/87	ISE	2.90E+02
Ammonia	50376	1/14/88	ISE	<5.00E+01
Ammonia	50400	3/18/88	ISE	<5.00E+01
Ammonia	50426	5/23/88	ISE	<5.00E+01
1,1,1-Trichloroethane	50360	11/23/87	VOA	<5.00E+00
1,1,1-Trichloroethane	50360B	11/23/87	VOA	9.00E+00
1,1,1-Trichloroethane	50376	1/14/88	VOA	<5.00E+00
1,1,1-Trichloroethane	50376B	1/14/88	VOA	5.00E+00
1,1,1-Trichloroethane	50400	3/18/88	VOA	<5.00E+00
1,1,1-Trichloroethane	50400B	3/18/88	VOA	<5.00E+00
1,1,1-Trichloroethane	50426	5/23/88	VOA	<5.00E+00
1,1,1-Trichloroethane	50426B	5/23/88	VOA	<5.00E+00
Trichloromethane	50360	11/23/87	VOA	8.00E+00
Trichloromethane	50360B	11/23/87	VOA	1.70E+01
Trichloromethane	50376	1/14/88	VOA	1.10E+01
Trichloromethane	50376B	1/14/88	VOA	1.50E+01
Trichloromethane	50400	3/18/88	VOA	1.30E+01
Trichloromethane	50400B	3/18/88	VOA	1.10E+01
Trichloromethane	50426	5/23/88	VOA	2.20E+01
Trichloromethane	50426B	5/23/88	VOA	<3.00E+00
Alpha Activity (pCi/L)	50360	11/23/87	Alpha	9.29E+01
Beta Activity (pCi/L)	50360	11/23/87	Beta	2.70E+01
Beta Activity (pCi/L)	50376	1/14/88	Beta	4.66E+02
Beta Activity (pCi/L)	50400	3/18/88	Beta	1.79E+02
Beta Activity (pCi/L)	50426	5/23/88	Beta	<1.99E+02
Conductivity (uS)	50360	11/23/87	COND-Fld	1.60E+04
Conductivity (uS)	50376	1/14/88	COND-Fld	1.25E+04
Conductivity (uS)	50400	3/18/88	COND-Fld	4.30E+03
Conductivity (uS)	50426	5/23/88	COND-Fld	1.57E+04
pH (dimensionless)	50360	11/23/87	PH-Fld	4.85E+00
pH (dimensionless)	50376	1/14/88	PH-Fld	6.20E+00
pH (dimensionless)	50400	3/18/88	PH-Fld	6.66E+00
pH (dimensionless)	50426	5/23/88	PH-Fld	5.45E+00
Temperature (degrees C)	50360	11/23/87	TEMP-Fld	1.40E+01
Temperature (degrees C)	50376	1/14/88	TEMP-Fld	7.70E+00
Temperature (degrees C)	50400	3/18/88	TEMP-Fld	7.70E+00
Temperature (degrees C)	50426	5/23/88	TEMP-Fld	1.51E+01
TOX (as Cl)	50360	11/23/87	LTOX	1.68E+04
TOX (as Cl)	50376	1/14/88	LTOX	8.55E+02

Data for 284-E Powerplant Wastewater--Blowdown

Constituent	Sample #	Date	Method	Result
TOX (as Cl)	50400	3/18/88	LTOX	7.00E+01
TOX (as Cl)	50426	5/23/88	LTOX	1.00E+02

Data for 284-E Powerplant Wastewater--Routine

Constituent	Sample #	Date	Method	Result
Aluminum	50450	8/19/88	ICP	1.97E+02
Aluminum	50466	9/30/88	ICP	<1.50E+02
Aluminum	50480	10/26/88	ICP	<1.50E+02
Aluminum	50496	11/17/88	ICP	<1.50E+02
Aluminum	50721	10/24/89	ICP	<1.50E+02
Aluminum	50736	10/27/89	ICP	8.74E+02
Aluminum	50842	12/14/89	ICP	2.81E+02
Aluminum	51024	3/07/90	ICP	<1.50E+02
Arsenic (EP Toxic)	50721E	10/24/89	ICP	<5.00E+02
Arsenic (EP Toxic)	50736E	10/27/89	ICP	<5.00E+02
Arsenic (EP Toxic)	50842E	12/14/89	ICP	<5.00E+02
Arsenic (EP Toxic)	51024E	3/07/90	ICP	<5.00E+02
Barium	50450	8/19/88	ICP	4.50E+01
Barium	50466	9/30/88	ICP	3.50E+01
Barium	50480	10/26/88	ICP	3.20E+01
Barium	50496	11/17/88	ICP	3.00E+01
Barium	50721	10/24/89	ICP	4.30E+01
Barium	50736	10/27/89	ICP	9.60E+01
Barium	50842	12/14/89	ICP	6.00E+01
Barium	51024	3/07/90	ICP	4.20E+01
Barium (EP Toxic)	50721E	10/24/89	ICP	<1.00E+03
Barium (EP Toxic)	50736E	10/27/89	ICP	<1.00E+03
Barium (EP Toxic)	50842E	12/14/89	ICP	<1.00E+03
Barium (EP Toxic)	51024E	3/07/90	ICP	<1.00E+03
Boron	50721	10/24/89	ICP	4.40E+01
Boron	50736	10/27/89	ICP	6.20E+01
Boron	50842	12/14/89	ICP	5.50E+01
Boron	51024	3/07/90	ICP	4.90E+01
Cadmium (EP Toxic)	50721E	10/24/89	ICP	<1.00E+02
Cadmium (EP Toxic)	50736E	10/27/89	ICP	<1.00E+02
Cadmium (EP Toxic)	50842E	12/14/89	ICP	<1.00E+02
Cadmium (EP Toxic)	51024E	3/07/90	ICP	<1.00E+02
Calcium	50450	8/19/88	ICP	2.81E+04
Calcium	50466	9/30/88	ICP	2.91E+04
Calcium	50480	10/26/88	ICP	2.18E+04
Calcium	50496	11/17/88	ICP	2.24E+04
Calcium	50721	10/24/89	ICP	2.09E+04
Calcium	50736	10/27/89	ICP	1.88E+04
Calcium	50842	12/14/89	ICP	2.00E+04
Calcium	51024	3/07/90	ICP	1.87E+04
Chloride	50450	8/19/88	IC	3.31E+03
Chloride	50466	9/30/88	IC	3.50E+03

Data for 284-E Powerplant Wastewater--Routine

Constituent	Sample #	Date	Method	Result
Chloride	50480	10/26/88	IC	3.90E+03
Chloride	50496	11/17/88	IC	2.60E+03
Chloride	50721	10/24/89	IC	3.30E+03
Chloride	50736	10/27/89	IC	3.50E+03
Chloride	50842	12/14/89	IC	6.00E+03
Chloride	51024	3/07/90	IC	2.00E+03
Chromium (EP Toxic)	50721E	10/24/89	ICP	<5.00E+02
Chromium (EP Toxic)	50736E	10/27/89	ICP	<5.00E+02
Chromium (EP Toxic)	50842E	12/14/89	ICP	<5.00E+02
Chromium (EP Toxic)	51024E	3/07/90	ICP	<5.00E+02
Copper	50450	8/19/88	ICP	<1.00E+01
Copper	50466	9/30/88	ICP	<1.00E+01
Copper	50480	10/26/88	ICP	1.50E+01
Copper	50496	11/17/88	ICP	<1.00E+01
Copper	50721	10/24/89	ICP	<1.00E+01
Copper	50736	10/27/89	ICP	<1.00E+01
Copper	50842	12/14/89	ICP	<1.00E+01
Copper	51024	3/07/90	ICP	<1.00E+01
Fluoride	50450	8/19/88	IC	<5.00E+02
Fluoride	50450	8/19/88	ISE	1.26E+02
Fluoride	50466	9/30/88	IC	<5.00E+02
Fluoride	50466	9/30/88	ISE	1.47E+02
Fluoride	50480	10/26/88	IC	<5.00E+02
Fluoride	50480	10/26/88	ISE	1.46E+02
Fluoride	50496	11/17/88	IC	<5.00E+02
Fluoride	50496	11/17/88	ISE	1.26E+02
Fluoride	50721	10/24/89	IC	<5.00E+02
Fluoride	50721	10/24/89	ISE	1.56E+02
Fluoride	50736	10/27/89	IC	<5.00E+02
Fluoride	50736	10/27/89	ISE	1.86E+02
Fluoride	50842	12/14/89	IC	<5.00E+02
Fluoride	50842	12/14/89	ISE	1.49E+02
Fluoride	51024	3/07/90	IC	<5.00E+02
Fluoride	51024	3/07/90	ISE	1.36E+02
Iron	50450	8/19/88	ICP	1.25E+02
Iron	50466	9/30/88	ICP	6.50E+01
Iron	50480	10/26/88	ICP	1.38E+02
Iron	50496	11/17/88	ICP	4.60E+01
Iron	50721	10/24/89	ICP	5.20E+01
Iron	50736	10/27/89	ICP	3.30E+02
Iron	50842	12/14/89	ICP	1.82E+02
Iron	51024	3/07/90	ICP	5.10E+01
Lead (EP Toxic)	50721E	10/24/89	ICP	<5.00E+02
Lead (EP Toxic)	50736E	10/27/89	ICP	<5.00E+02
Lead (EP Toxic)	50842E	12/14/89	ICP	<5.00E+02
Lead (EP Toxic)	51024E	3/07/90	ICP	<5.00E+02
Magnesium	50450	8/19/88	ICP	3.55E+03
Magnesium	50466	9/30/88	ICP	3.36E+03

Data for 284-E Powerplant Wastewater--Routine

Constituent	Sample #	Date	Method	Result
Magnesium	50480	10/26/88	ICP	3.67E+03
Magnesium	50496	11/17/88	ICP	3.56E+03
Magnesium	50721	10/24/89	ICP	4.39E+03
Magnesium	50736	10/27/89	ICP	4.44E+03
Magnesium	50842	12/14/89	ICP	4.11E+03
Magnesium	51024	3/07/90	ICP	4.43E+03
Manganese	50450	8/19/88	ICP	<5.00E+00
Manganese	50466	9/30/88	ICP	<5.00E+00
Manganese	50480	10/26/88	ICP	8.00E+00
Manganese	50496	11/17/88	ICP	<5.00E+00
Manganese	50721	10/24/89	ICP	<5.00E+00
Manganese	50736	10/27/89	ICP	7.00E+00
Manganese	50842	12/14/89	ICP	<5.00E+00
Manganese	51024	3/07/90	ICP	<5.00E+00
Mercury (EP Toxic)	50721E	10/24/89	CVAA/M	<2.00E+01
Mercury (EP Toxic)	50736E	10/27/89	CVAA/M	<2.00E+01
Mercury (EP Toxic)	50842E	12/14/89	CVAA/M	<2.00E+01
Mercury (EP Toxic)	51024E	3/07/90	CVAA/M	<2.00E+01
Nitrate	50450	8/19/88	IC	<5.00E+02
Nitrate	50466	9/30/88	IC	<5.00E+02
Nitrate	50480	10/26/88	IC	7.00E+02
Nitrate	50496	11/17/88	IC	7.00E+02
Nitrate	50721	10/24/89	IC	5.00E+02
Nitrate	50736	10/27/89	IC	5.00E+02
Nitrate	50842	12/14/89	IC	6.00E+02
Nitrate	51024	3/07/90	IC	5.00E+02
Potassium	50450	8/19/88	ICP	7.21E+02
Potassium	50466	9/30/88	ICP	7.80E+02
Potassium	50480	10/26/88	ICP	7.74E+02
Potassium	50496	11/17/88	ICP	7.81E+02
Potassium	50721	10/24/89	ICP	7.96E+02
Potassium	50736	10/27/89	ICP	8.66E+02
Potassium	50842	12/14/89	ICP	1.04E+03
Potassium	51024	3/07/90	ICP	7.22E+02
Selenium (EP Toxic)	50721E	10/24/89	ICP	<5.00E+02
Selenium (EP Toxic)	50736E	10/27/89	ICP	<5.00E+02
Selenium (EP Toxic)	50842E	12/14/89	ICP	<5.00E+02
Selenium (EP Toxic)	51024E	3/07/90	ICP	<5.00E+02
Silicon	50721	10/24/89	ICP	2.60E+03
Silicon	50736	10/27/89	ICP	4.06E+03
Silicon	50842	12/14/89	ICP	3.22E+03
Silicon	51024	3/07/90	ICP	2.53E+03
Silver (EP Toxic)	50721E	10/24/89	ICP	<5.00E+02
Silver (EP Toxic)	50736E	10/27/89	ICP	<5.00E+02
Silver (EP Toxic)	50842E	12/14/89	ICP	<5.00E+02
Silver (EP Toxic)	51024E	3/07/90	ICP	<5.00E+02
Sodium	50450	8/19/88	ICP	6.63E+03
Sodium	50466	9/30/88	ICP	1.16E+04
Sodium	50480	10/26/88	ICP	2.30E+04

Data for 284-E Powerplant Wastewater--Routine

Constituent	Sample #	Date	Method	Result
Sodium	50496	11/17/88	ICP	1.24E+04
Sodium	50721	10/24/89	ICP	4.18E+03
Sodium	50736	10/27/89	ICP	1.30E+04
Sodium	50842	12/14/89	ICP	1.38E+04
Sodium	51024	3/07/90	ICP	5.17E+03
Strontium	50450	8/19/88	ICP	1.74E+02
Strontium	50466	9/30/88	ICP	1.79E+02
Strontium	50480	10/26/88	ICP	1.37E+02
Strontium	50496	11/17/88	ICP	1.34E+02
Strontium	50721	10/24/89	ICP	2.58E+02
Strontium	50736	10/27/89	ICP	2.00E+02
Strontium	50842	12/14/89	ICP	2.39E+02
Strontium	51024	3/07/90	ICP	2.65E+02
Sulfate	50450	8/19/88	IC	1.86E+04
Sulfate	50466	9/30/88	IC	2.30E+04
Sulfate	50480	10/26/88	IC	2.76E+04
Sulfate	50496	11/17/88	IC	2.12E+04
Sulfate	50721	10/24/89	IC	1.43E+04
Sulfate	50736	10/27/89	IC	1.96E+04
Sulfate	50842	12/14/89	IC	1.99E+04
Sulfate	51024	3/07/90	IC	1.48E+04
Uranium	50450	8/19/88	FLUOR	3.45E-01
Uranium	50466	9/30/88	FLUOR	2.07E+00
Uranium	50480	10/26/88	FLUOR	2.60E-01
Uranium	50496	11/17/88	FLUOR	5.87E-01
Uranium	50721	10/24/89	FLUOR	3.53E-01
Uranium	50736	10/27/89	FLUOR	4.65E-01
Uranium	50842	12/14/89	FLUOR	6.18E-01
Uranium	51024	3/07/90	FLUOR	4.53E-01
Vanadium	50450	8/19/88	ICP	<5.00E+00
Vanadium	50466	9/30/88	ICP	5.00E+00
Vanadium	50480	10/26/88	ICP	<5.00E+00
Vanadium	50496	11/17/88	ICP	<5.00E+00
Vanadium	50721	10/24/89	ICP	<5.00E+00
Vanadium	50736	10/27/89	ICP	<5.00E+00
Vanadium	50842	12/14/89	ICP	<5.00E+00
Vanadium	51024	3/07/90	ICP	<5.00E+00
Zinc	50450	8/19/88	ICP	<5.00E+00
Zinc	50466	9/30/88	ICP	7.00E+00
Zinc	50480	10/26/88	ICP	1.00E+01
Zinc	50496	11/17/88	ICP	<5.00E+00
Zinc	50721	10/24/89	ICP	<5.00E+00
Zinc	50736	10/27/89	ICP	1.30E+01
Zinc	50842	12/14/89	ICP	6.00E+00
Zinc	51024	3/07/90	ICP	<5.00E+00
Acetone	50721	10/24/89	VOA	<9.00E+00
Acetone	50721	10/24/89	ABN	<1.00E+01
Acetone	50721B	10/24/89	VOA	1.10E+01
Acetone	50721T	10/24/89	VOA	<1.00E+01

Data for 284-E Powerplant Wastewater--Routine

Constituent	Sample #	Date	Method	Result
Acetone	50736	10/27/89	VOA	<8.00E+00
Acetone	50736	10/27/89	ABN	<1.00E+01
Acetone	50736B	10/27/89	VOA	1.30E+01
Acetone	50736T	10/27/89	VOA	<1.00E+01
Acetone	50842	12/14/89	VOA	<1.00E+01
Acetone	50842	12/14/89	ABN	<1.00E+01
Acetone	50842B	12/14/89	VOA	<1.00E+01
Acetone	51024	3/07/90	VOA	<1.00E+01
Acetone	51024	3/07/90	ABN	<1.00E+01
Acetone	51024B	3/07/90	VOA	<1.00E+01
Acetone	51024T	3/07/90	VOA	<1.00E+01
Ammonia	50450	8/19/88	ISE	<5.00E+01
Ammonia	50466	9/30/88	ISE	<5.00E+01
Ammonia	50480	10/26/88	ISE	<5.00E+01
Ammonia	50496	11/17/88	ISE	<5.00E+01
Ammonia	50721	10/24/89	ISE	5.60E+01
Ammonia	50736	10/27/89	ISE	5.80E+01
Ammonia	50842	12/14/89	ISE	<5.00E+01
Ammonia	51024	3/07/90	ISE	<5.00E+01
1-Butanol	50721	10/24/89	DIGC	<1.00E+04
1-Butanol	50736	10/27/89	DIGC	<1.00E+04
1-Butanol	50842	12/14/89	DIGC	<1.00E+04
1-Butanol	51024	3/07/90	VOA	1.80E+01
1-Butanol	51024	3/07/90	DIGC	<1.00E+04
1-Butanol	51024B	3/07/90	VOA	1.80E+01
1-Butanol	51024T	3/07/90	VOA	1.70E+01
2-Butanone	50450	8/19/88	VOA	<1.00E+01
2-Butanone	50450B	8/19/88	VOA	<1.00E+01
2-Butanone	50466	9/30/88	VOA	<1.00E+01
2-Butanone	50466B	9/30/88	VOA	<1.00E+01
2-Butanone	50480	10/26/88	VOA	<1.00E+01
2-Butanone	50480B	10/26/88	VOA	<1.00E+01
2-Butanone	50496	11/17/88	VOA	<1.00E+01
2-Butanone	50496B	11/17/88	VOA	<1.00E+01
2-Butanone	50721	10/24/89	VOA	<1.00E+01
2-Butanone	50721B	10/24/89	VOA	1.30E+01
2-Butanone	50721T	10/24/89	VOA	<1.00E+01
2-Butanone	50736	10/27/89	VOA	<1.00E+01
2-Butanone	50736B	10/27/89	VOA	<1.00E+01
2-Butanone	50736T	10/27/89	VOA	<1.00E+01
2-Butanone	50842	12/14/89	VOA	<1.00E+01
2-Butanone	50842B	12/14/89	VOA	<1.00E+01
2-Butanone	51024	3/07/90	VOA	<1.00E+01
2-Butanone	51024B	3/07/90	VOA	<1.00E+01
2-Butanone	51024T	3/07/90	VOA	<1.00E+01
Dichloromethane	50450	8/19/88	VOA	<1.00E+01
Dichloromethane	50450B	8/19/88	VOA	<1.00E+01
Dichloromethane	50466	9/30/88	VOA	<1.00E+01
Dichloromethane	50466B	9/30/88	VOA	<1.00E+01

Data for 284-E Powerplant Wastewater--Routine

Constituent	Sample #	Date	Method	Result
Dichloromethane	50480	10/26/88	VOA	<1.00E+01
Dichloromethane	50480B	10/26/88	VOA	<1.00E+01
Dichloromethane	50496	11/17/88	VOA	<1.00E+01
Dichloromethane	50496B	11/17/88	VOA	<1.00E+01
Dichloromethane	50721	10/24/89	VOA	<5.00E+00
Dichloromethane	50721B	10/24/89	VOA	5.00E+00
Dichloromethane	50721T	10/24/89	VOA	5.90E+01
Dichloromethane	50736	10/27/89	VOA	<5.00E+00
Dichloromethane	50736B	10/27/89	VOA	<4.00E+00
Dichloromethane	50736T	10/27/89	VOA	2.40E+01
Dichloromethane	50842	12/14/89	VOA	<5.00E+00
Dichloromethane	50842B	12/14/89	VOA	5.00E+00
Dichloromethane	51024	3/07/90	VOA	<5.00E+00
Dichloromethane	51024B	3/07/90	VOA	<5.00E+00
Dichloromethane	51024T	3/07/90	VOA	<5.00E+00
Tetrahydrofuran	50721	10/24/89	VOA	<1.00E+01
Tetrahydrofuran	50721B	10/24/89	VOA	2.30E+01
Tetrahydrofuran	50721T	10/24/89	VOA	<1.00E+01
Tetrahydrofuran	50736	10/27/89	VOA	<1.00E+01
Tetrahydrofuran	50736B	10/27/89	VOA	1.30E+01
Tetrahydrofuran	50736T	10/27/89	VOA	<1.00E+01
Tetrahydrofuran	50842	12/14/89	VOA	<1.00E+01
Tetrahydrofuran	50842B	12/14/89	VOA	<1.00E+01
Tetrahydrofuran	51024	3/07/90	VOA	<1.00E+01
Tetrahydrofuran	51024B	3/07/90	VOA	<1.00E+01
Tetrahydrofuran	51024T	3/07/90	VOA	<1.00E+01
Trichloromethane	50450	8/19/88	VOA	2.10E+01
Trichloromethane	50450B	8/19/88	VOA	<5.00E+00
Trichloromethane	50466	9/30/88	VOA	9.00E+00
Trichloromethane	50466B	9/30/88	VOA	<5.00E+00
Trichloromethane	50480	10/26/88	VOA	<5.00E+00
Trichloromethane	50480B	10/26/88	VOA	<5.00E+00
Trichloromethane	50496	11/17/88	VOA	6.90E+00
Trichloromethane	50496B	11/17/88	VOA	<5.00E+00
Trichloromethane	50721	10/24/89	VOA	2.10E+01
Trichloromethane	50721B	10/24/89	VOA	<5.00E+00
Trichloromethane	50721T	10/24/89	VOA	<5.00E+00
Trichloromethane	50736	10/27/89	VOA	9.00E+00
Trichloromethane	50736B	10/27/89	VOA	<5.00E+00
Trichloromethane	50736T	10/27/89	VOA	<5.00E+00
Trichloromethane	50842	12/14/89	VOA	6.00E+00
Trichloromethane	50842B	12/14/89	VOA	<5.00E+00
Trichloromethane	51024	3/07/90	VOA	2.60E+01
Trichloromethane	51024B	3/07/90	VOA	<5.00E+00
Trichloromethane	51024T	3/07/90	VOA	<5.00E+00
Alkalinity (Method B)	50721	10/24/89	TITRA	5.80E+04
Alkalinity (Method B)	50736	10/27/89	TITRA	6.60E+04
Alkalinity (Method B)	50842	12/14/89	TITRA	7.80E+04
Alkalinity (Method B)	51024	3/07/90	TITRA	6.00E+04

Data for 284-E Powerplant Wastewater--Routine

Constituent	Sample #	Date	Method	Result
Alpha Activity (pCi/L)	50450	8/19/88	Alpha	<8.84E+00
Alpha Activity (pCi/L)	50466	9/30/88	Alpha	<3.59E+00
Alpha Activity (pCi/L)	50496	11/17/88	Alpha	<1.97E-01
Alpha Activity (pCi/L)	50721	10/24/89	Alpha	1.18E+00
Alpha Activity (pCi/L)	50736	10/27/89	Alpha	1.05E+00
Alpha Activity (pCi/L)	50842	12/14/89	Alpha	1.22E+00
Alpha Activity (pCi/L)	51024	3/07/90	Alpha	<1.43E-01
Beta Activity (pCi/L)	50450	8/19/88	Beta	<3.16E+01
Beta Activity (pCi/L)	50480	10/26/88	Beta	1.02E+03
Beta Activity (pCi/L)	50496	11/17/88	Beta	<5.72E+01
Beta Activity (pCi/L)	50721	10/24/89	Beta	<1.61E+00
Beta Activity (pCi/L)	50736	10/27/89	Beta	<8.76E-01
Beta Activity (pCi/L)	50842	12/14/89	Beta	2.75E+00
Beta Activity (pCi/L)	51024	3/07/90	Beta	<1.96E+00
Conductivity (uS)	50450	8/19/88	COND-Fld	1.86E+02
Conductivity (uS)	50466	9/30/88	COND-Fld	2.50E+02
Conductivity (uS)	50480	10/26/88	COND-Fld	2.33E+02
Conductivity (uS)	50496	11/17/88	COND-Fld	2.12E+02
Conductivity (uS)	50721	10/24/89	COND-Fld	1.32E+02
Conductivity (uS)	50736	10/27/89	COND-Fld	1.91E+02
Conductivity (uS)	50842	12/14/89	COND-Fld	2.01E+02
Conductivity (uS)	51024	3/07/90	COND-Fld	1.48E+02
Ignitability (degrees F)	50721E	10/24/89	IGNIT	>2.08E+02
Ignitability (degrees F)	50736E	10/27/89	IGNIT	>2.08E+02
Ignitability (degrees F)	50842E	12/14/89	IGNIT	>2.14E+02
Ignitability (degrees F)	51024E	3/07/90	IGNIT	>2.02E+02
pH (dimensionless)	50450	8/19/88	PH-Fld	9.79E+00
pH (dimensionless)	50466	9/30/88	PH-Fld	9.79E+00
pH (dimensionless)	50480	10/26/88	PH-Fld	8.90E+00
pH (dimensionless)	50496	11/17/88	PH-Fld	9.46E+00
pH (dimensionless)	50721	10/24/89	PH-Fld	8.61E+00
pH (dimensionless)	50736	10/27/89	PH-Fld	9.40E+00
pH (dimensionless)	50842	12/14/89	PH-Fld	9.50E+00
pH (dimensionless)	51024	3/07/90	PH-Fld	8.80E+00
Reactivity Cyanide (mg/kg)	50721E	10/24/89	DSPEC	<1.00E+02
Reactivity Cyanide (mg/kg)	50736E	10/27/89	DSPEC	<1.00E+02
Reactivity Cyanide (mg/kg)	50842E	12/14/89	DSPEC	<1.00E+02
Reactivity Cyanide (mg/kg)	51024E	3/07/90	DSPEC	<1.00E+02
Reactivity Sulfide (mg/kg)	50721E	10/24/89	DTITRA	<1.00E+02
Reactivity Sulfide (mg/kg)	50736E	10/27/89	DTITRA	<1.00E+02
Reactivity Sulfide (mg/kg)	50842E	12/14/89	DTITRA	<1.00E+02
Reactivity Sulfide (mg/kg)	51024E	3/07/90	DTITRA	<1.00E+02
Suspended Solids	50721	10/24/89	SSOLID	<5.00E+03
Suspended Solids	50736	10/27/89	SSOLID	3.90E+04
Suspended Solids	50842	12/14/89	SSOLID	1.10E+04
Suspended Solids	51024	3/07/90	SSOLID	<5.00E+03
TDS	50721	10/24/89	TDS	7.60E+04
TDS	50736	10/27/89	TDS	8.90E+04
TDS	50842	12/14/89	TDS	1.03E+05

Data for 284-E Powerplant Wastewater--Routine

Constituent	Sample #	Date	Method	Result
TDS	51024	3/07/90	TDS	8.00E+04
Temperature (degrees C)	50450	8/19/88	TEMP-Fld	2.33E+01
Temperature (degrees C)	50466	9/30/88	TEMP-Fld	2.44E+01
Temperature (degrees C)	50480	10/26/88	TEMP-Fld	1.79E+01
Temperature (degrees C)	50496	11/17/88	TEMP-Fld	1.50E+01
Temperature (degrees C)	50721	10/24/89	TEMP-Fld	1.62E+01
Temperature (degrees C)	50736	10/27/89	TEMP-Fld	1.75E+01
Temperature (degrees C)	50842	12/14/89	TEMP-Fld	1.11E+01
Temperature (degrees C)	51024	3/07/90	TEMP-Fld	1.01E+01
TOC	50450	8/19/88	TOC	1.52E+03
TOC	50466	9/30/88	TOC	1.30E+03
TOC	50480	10/26/88	TOC	2.00E+03
TOC	50496	11/17/88	TOC	1.20E+03
TOC	50721	10/24/89	TOC	2.60E+03
TOC	50736	10/27/89	TOC	<1.20E+03
TOC	50842	12/14/89	TOC	<1.70E+03
TOC	51024	3/07/90	TOC	1.30E+03
Total Carbon	50721	10/24/89	TC	1.53E+04
Total Carbon	50736	10/27/89	TC	1.49E+04
Total Carbon	50842	12/14/89	TC	1.55E+04
Total Carbon	51024	3/07/90	TC	1.52E+04
TOX (as Cl)	50450	8/19/88	LTOX	9.58E+01
TOX (as Cl)	50466	9/30/88	LTOX	4.70E+01
TOX (as Cl)	50480	10/26/88	LTOX	4.50E+01
TOX (as Cl)	50496	11/17/88	LTOX	4.80E+01
TOX (as Cl)	50721	10/24/89	LTOX	1.15E+02
TOX (as Cl)	50736	10/27/89	LTOX	7.80E+01
TOX (as Cl)	50842	12/14/89	LTOX	5.50E+01
TOX (as Cl)	51024	3/07/90	LTOX	1.25E+02

DATA REPORT FOOTNOTES

Sample# is the number of the sample. See chapter three for corresponding chain-of-custody number.
Date is the sampling date.
Results are in ppb (parts per billion) unless otherwise indicated.
The following table lists the methods that are coded in the method column.

Code	Analytical Method	Reference
ABN	Semivolatile Organics (GC/MS)	USEPA-8270
AEA	Americium-241	UST-20Am01
AEA	Curium Isotopes	UST-20Am/Cm01
AEA	Plutonium Isotopes	UST-20Pu01
AEA	Uranium Isotopes	UST-20U01
ALPHA	Alpha Counting	EPA-680/4-75/1
ALPHA-Ra	Total Radium Alpha Counting	ASTM-D2460
BETA	Beta Counting	EPA-680/4-75/1
BETA	Strontium-90	UST-20Sr02
COLIF	Coliform Bacteria	USEPA-9131

Data for 284-E Powerplant Wastewater--Routine

DATA REPORT FOOTNOTES (continued)

COLIFMF	Coliform Bacteria (Membrane Filter)	USEPA-9132
COND-Fld	Conductivity-Field	ASTM-D1125A
COND-Lab	Conductivity-Laboratory	ASTM-D1125A
CVAA	Mercury	USEPA-7470
CVAA/M	Mercury-Mixed Matrix	USEPA-7470
DIGC	Direct Aqueous Injection (GC)	UST-70DIGC
DIMS	Direct Aqueous Injection (GC/MS)	"USEPA-8240"
DSPEC	Reactive Cyanide (Distillation, Spectroscopy)	USEPA-CHAPTER 7
DTITRA	Reactive Sulfide (Distillation, Titration)	USEPA-CHAPTER 7
FLUOR	Uranium (Fluorometry)	ASTM-D2907-83
GEA	Gamma Energy Analysis Spectroscopy	ASTM-D3649-85
GFAA	Arsenic (AA, Furnace Technique)	USEPA-7060
GFAA	Lead (AA, Furnace Technique)	USEPA-7421
GFAA	Selenium (AA, Furnace Technique)	USEPA-7740
GFAA	Thallium (AA, Furnace Technique)	USEPA-7841
IC	Ion Chromatography	EPA-600/4-84-01
ICP	Atomic Emission Spectroscopy (ICP)	USEPA-6010
ICP/M	Atomic Emission Spectroscopy (ICP)-Mixed Matrix	USEPA-6010
IGNIT	Pensky-Martens Closed-Cup Ignitability	USEPA-1010
ISE	Fluoride-Low Detection Limit	ASTM-D1179-80-B
ISE	Ammonium Ion	ASTM-D1426-D
LALPHA	Alpha Activity-Low Detection Limit	EPA-680/4-75/1
LEPD	Iodine-129	UST-20I02
LSC	C-14	UST-20C01
LSC	Tritium	UST-20H03
LTOX	Total Organic Halides-Low Detection Limit	USEPA-9020
PH-Fld	pH-Field	USEPA-9040
PH-Lab	pH-Laboratory	USEPA-9040
SPEC	Total and Amenable Cyanide (Spectroscopy)	USEPA-9010
SPEC	Hydrazine-Low Detection Limit (Spectroscopy)	ASTM-D1385
SSOLID	Suspended Solids	SM-208D
TC	Total Carbon	USEPA-9060
TDS	Total Dissolved Solids	SM-208B
TEMP-Fld	Temperature-Field	Local
TITRA	Alkalinity-Method B (Titration)	ASTM-D1067B
TITRA	Sulfides (Titration)	USEPA-9030
TOC	Total Organic Carbon	USEPA-9060
TOX	Total Organic Halides	USEPA-9020
VOA	Volatile Organics (GC/MS)	USEPA-8240

Analytical Method Acronyms:
atomic absorption spectroscopy (AA), gas chromatography (GC), mass spectrometry (MS), inductively-coupled plasma spectroscopy (ICP)

References:
ASTM - "1986 Annual Book of ASTM Standards", American Society for Testing and Materials, Philadelphia, Pennsylvania.

Data for 284-E Powerplant Wastewater--Routine

DATA REPORT FOOTNOTES (continued)

EPA - Various methods of the U.S. Environmental Protection Agency, Washington, D.C.

UST - Methods of the United States Testing Company, Incorporated, Richland, Washington.

SM - "Standard Methods for the Examination of Water and Wastewater", 16th ed., American Public Health Association, American Water Works Association and Water Pollution Control Federation, Washington, D.C.

USEPA- "Test Methods for Evaluating Solid Waste Physical/Chemical Methods", 3rd ed., SW-846, U.S. Environmental Protection Agency, Washington, D.C.

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