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35 STATION 21

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RELEASE AUTHORIZATION

Document Number: WHC-SD-L045H-PC-001, Revision 0

Document Title: 300 Area Treated Effluent Disposal Facility
Operating Specifications Document

Release Date: 9/28/94

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**This document was reviewed following the
procedures described in WHC-CM-3-4 and is:**

APPROVED FOR PUBLIC RELEASE

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WHC Information Release Administration Specialist:

M. Boston
(Signature)

M. N. Boston

9/28/94
(Date)

SUPPORTING DOCUMENT		1. Total Pages 8
2. Title 300 Area Treated Effluent Disposal Facility Operating Specifications Document	3. Number ✓ WHC-SD-L045H-PC-001	4. Rev No. 0
5. Key Words OSD, 300 Area TEDF, Limits, NPDES	6. Author Name: A. R. Olander <i>AR Olander</i> 9/22/94 Signature Organization/Charge Code 86730/A2L99	
7. Abstract The operating specifications for the main processes in the Treated Effluent Disposal Facility (TEDF) are listed. Limits are included for chemical co-precipitation, ion exchange, ultra violet light oxidation, effluent pH adjustment, and chemical storage.		
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MASTER

WHC-SD-L045H-PC-001 Rev.0

300 Area Treated Effluent Disposal Facility
Operating Specifications Document

Table of Contents

Background	4
1.0 Introduction	5
1.1 Chemical Co-Precipitation Operating Ranges	5
1.2 Ion Exchange for Mercury Removal	6
1.3 UV Oxidation	7
1.4 Effluent pH	7
2.0 Hydrogen Peroxide Storage	8

Background

The 300 Area Treated Effluent Disposal Facility (TEDF) is a non-nuclear facility not subject to a Safety Analysis Report and related documentation. The governing document for the TEDF is a National Pollutant Discharge Elimination System (NPDES) permit issued by the Environmental Protection Agency. Penalties can be assessed against the operating company if the permit levels are violated. This document, formatted like nuclear facility operating specification documents, provides operating ranges and limits for best operating practices.

The operating conditions contained in this document are derived from following four sources:

- o NPDES Permit WA-002591-7
- o Hanford 300 Area Treated Effluent Disposal Facility Operational and NPDES Analytical Testing Report, WHC-SD-L045H-TRP-001, Rev. 0.
- o Hanford 300 Area Treated Effluent Disposal Facility - Inventory at Risk Calculation and Safety Analysis, Rev. 0.
- o Acceptance Test Report for the 300 Area Treated Effluent Disposal Facility Process Control System, WHC-SD-L045H-ATR-002, Rev. 0

The operating ranges identified in this document will allow for flexibility in addressing the influent stream fluctuations. There are more than 50 facilities in the 300 Area discharging to the TEDF and the treatment process may need to be adjusted to accommodate the varying operations in those facilities.

Compliance monitoring activities are specified in the permit and are not repeated in this document. This document provides operating conditions and ranges for the main treatment processes; iron co-precipitation, ion exchange, and UV oxidation. Operating limits are also to ensure hydrogen peroxide is stored within facility specific safety standards.

1.0 INTRODUCTION

These specifications deal with the release of treated water into the Columbia River via the TEDF submerged outfall. Specific limits are set for contaminants to be discharged in NPDES permit WA-002591-7. This section contains the operating ranges that will be used to best meet the permit limits.

1.1. CHEMICAL CO-PRECIPIATION SYSTEM OPERATING RANGES

The NPDES permit for the TEDF contains discharge limits for 13 metals. Twelve of the metals can be treated by the co-precipitation process. Ion exchange is used to treat the other metal, mercury. The 12 metals to be treated by co-precipitation have various removal efficiencies. Many variables can affect the removal efficiencies including three which can be controlled by the process. The three parameters which can be controlled in the treatment process are iron and polymer concentration and pH.

The concentrations of contaminants in the influent will vary due to the large number of generators. The operating ranges must remain large enough to allow for changes based on influent concentration changes.

Range (concentration or level in waste water):

<u>PARAMETER</u>	<u>LOWER LIMIT</u>	<u>UPPER LIMIT</u>
Fe	5 ppm	75 ppm
Polymer	1 ppm	no limit
pH	8	12

Technical Basis: The ranges are based on jar test studies performed by on offsite contracting laboratory. The jar testing was documented in Hanford 300 Area Treated Effluent Disposal Facility Operational and NPDES Analytical Testing, WHC-SD-L045H-TRP-001, Rev.0.

Detection/Control: The concentration of the ferric chloride feed is certified by the vendor when delivered. This concentration is entered into the computer control system. The chemical feed pumps are periodically calibrated to ensure the proper delivery rate.

Polymer is pumped directly from the vendor drum into a mixing chamber and then into the process. The polymer pump is periodically calibrated to ensure proper delivery rate.

The pH control loop includes two pH probes for monitoring the waste water discharging from the chemical mix tank. A differential alarm will sound if the probes differ by over 1 pH unit. When a differential alarm sounds, or anytime the pH level is suspected to be in error, the probes will be tested with a buffer solution.

Recovery Action: If the operating parameters are outside the ranges for Fe, polymer, or pH effluent valve FV-122 must be shut. The plant shall be taken into recirculation mode until the operating parameters are re-established with in the specification ranges.

1.2. Ion Exchange for Mercury Removal

Each ion exchange column is filled with approximately 150 cubic feet of thiol function resin for mercury removal. The influent concentration of mercury is very low and there are no anticipated discharges to the TEDF. Analyses will be periodically performed to determine break through for the columns, but loading is not expected to occur before substrate degradation.

Limit: Waste water must pass through the one ion exchange column prior to discharge to the river.

Technical Basis: The NPDES permit requires all treatment systems to be on line when waste water is being treated for disposal.

Detection/Control: The computer control system monitors valve positions and the overall status of the ion exchange treatment trains (in local or remote). Before the effluent valve is opened the computer has a verification checklist which requests the operator to verify the appropriate number of columns are on line. An alarm signal is generated if a treatment train is switched to local control. Local control or manual valve positioning is required to bypass an ion exchange treatment train.

Recovery Action: If the ion exchange system (both trains) are bypassed, effluent valve FV-122 must be shut. The plant shall be taken into recirculation mode until the ion exchange system (at least one column) is back line.

1.3. UV Oxidation

UV light and hydrogen peroxide are necessary for the oxidation of organic compounds. The number of lamps operating will vary. The UV oxidation treatment heats the waste water and temperatures above 105°F cannot be discharged to the river. The peroxide dose may be adjusted depending on the number of lamps that are on and the organic concentration in the waste water.

Lamp Limit: When waste water is being discharged to the river a minimum of three lamps must be on in the on-line chamber.

Peroxide Limit: A minimum of 1 ppm peroxide must be added to the waste stream to the on-line chamber while waste water is being discharged to the river.

Technical Basis: The NPDES permit requires all treatment systems to be on line when waste water is being treated for disposal to the river.

Detection/Control: The computer control system has been programmed with interlocks and alarms to ensure the UV oxidation process is operating while waste is being discharged. If fewer than 3 lamps are operating the UV unit will send a fail signal to the plant control system and effluent valve FV-122 will close. If the peroxide pumps fail, FV-122 will close.

Recovery Action: If the UV oxidation system or the peroxide system is not operating verify effluent valve FV-122 is closed. The waste water shall be recirculated until the UV oxidation and peroxides systems are operating.

1.4. Effluent pH

Sodium hydroxide is added to the effluent tank to raise the pH to meet the discharge criteria. The UV oxidation reaction reduces the pH and a final adjustment is necessary to ensure the permit limits are met.

<u>Limit:</u>	<u>Lower</u>	<u>Upper</u>
Effluent pH	6.5	8.5

Technical Basis: The NPDES permit limits for pH are 6 and 9.

Detection/Control: The pH control loop includes two pH probes which monitor the waste water in the effluent tank. A differential alarm will sound if the probes differ by over 1 pH unit. When a differential alarm sounds, or anytime the pH level is suspected to be in error, the probes conditions will be verified with a buffer solution. The record monitor for pH is a single probe in the effluent line. If the effluent probe or the lead probe in the effluent tank detects a pH below 6.5 or above 8.5 an alarm sounds and effluent valve FV-122 closes.

Recovery Action: If a high or low effluent pH alarm occurs verify effluent valve FV-122 has closed. The waste water shall be recirculated until the pH control is re-established.

2.0 Hydrogen Peroxide Storage

The Hanford 300 Area Treated Effluent Disposal Facility - Inventory at Risk Calculations and Safety Analysis, WHC-SD-WM-SAD-025, identifies a mass limit for storing hydrogen peroxide.

Limit:

<u>Condition</u>	<u>Quantity</u>
High Level	7,300 lbs (730 gallons)
High High Level	7,500 lbs (750 gallons)

Technical Basis: The Occupational Safety and Health Administration (OSHA) has specific hazards analysis requirements for all chemical processing facilities that store, utilize, or produce Highly Hazardous Chemicals (HHC). The specific chemicals and their threshold quantities can be found in 29 CFR 1910.119. The 50% hydrogen peroxide used in the TEDF process is not an HHC, but 52% hydrogen peroxide is an HHC. The threshold limit for 52% hydrogen peroxide is 7,500 pounds. Due to the close proximity of the hydrogen peroxide to the OSHA guidelines, engineering controls are used to ensure the 7,500 pound limit is not exceeded.

Detection/Control: The hydrogen peroxide tank has a level gauge with local and control room readout. There are local and control room alarms that activate at or below 7,300 and 7,500 pounds. There is a backup high high level conductivity probe which also activates control room and local alarms.

Recovery Action: If the high or high high alarm is activated the operators are instructed by procedures to discontinue chemical receipt from vendors. If the inventory of hydrogen peroxide has exceeded 7,500 pounds, an analysis will be performed to determine the hydrogen peroxide concentration.