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OPERATIONAL SAFETY REQUIREMENTS FOR THE ADVANCED WASTEWATER TREATMENT FACILITY JANUARY 1995 - FEMP-2405

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Operational Safety Requirements

for the

Advanced Wastewater Treatment Facility

January 1995

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APPROVAL:

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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Operational Safety Requirements for the Advanced Wastewater Treatment Facility

January 1995

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2

Table of Contents

ACRONYMS iv

1.0 USE AND APPLICATION 1
- 1.1 Definitions 1
- 1.2 Operational Modes 2
- 1.3 Frequency 2
- 1.4 Mode Applicability 2
- 1.5 Limiting Conditions for Operations 3
- 1.6 Action Requirements 3
- 1.7 Surveillance Requirements 3

2.0 SAFETY LIMITS 3

3/4.0 OPERATING LIMITS AND SURVEILLANCE REQUIREMENTS 3
- 3/4.1 Limiting Control Settings 4
- 3/4.2 Limiting Conditions for Operations 4
- 3/4.3 Surveillance Requirements 4
  - LCO 1 4
  - LCO 2 5

5.0 ADMINISTRATIVE CONTROLS 6

- 5.1 Specific Requirements 6
  - 5.1.1 Unloading of sulfuric acid, sodium hydroxide and alum into storage tanks 6
  - 5.1.2 Acid addition to IX Recycle tanks 7
  - 5.1.3 Filling Acid Feed Tank 7
  - 5.1.4 Filling Caustic Feed Tank 7
  - 5.1.5 Acid Feed Line Flow Control 7
  - 5.1.6 Water Enrichment Control 8
- 5.2 Programmatic Requirements 8
  - 5.2.1 General 8
  - 5.2.2 Lockout/Tagout Program 8
  - 5.2.3 OSR Compliance and Violations 8
  - 5.2.4 Unreviewed Safety Questions 9

3

ACRONYMS

DOE-FN	Department of Energy Fernald Field Office
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration Management Corporation
FSAR	Final Safety Analysis Report
ISRC	Independent Safety Review Committee
LCO	Limiting Conditions for Operations
OSHA	Occupational Safety and Health Act
OSR	Operational Safety Requirement
PSO	Program Secretarial Officer
RSO	Remediation Support Operation
SAR	Safety Analysis Report
SOP	Standard Operating Procedure
SSOP	Site Standard Operating Procedure
TSR	Technical Safety Requirements
USQ	Unreviewed Safety Question

4

1.0 USE AND APPLICATION

The Advanced Wastewater Treatment (AWWT) Facility is a radiological facility and does not meet the requirements for a nuclear facility per DOE-EM-STD-5502-94 *Hazard Baseline Documentation*. Therefore, DOE Orders 5480.21 *Unreviewed Safety Questions*, 5480.22 *Technical Safety Requirements* and 5480.23 *Nuclear Safety Analysis Reports* do not apply. The Final Safety Analysis Report (FSAR) for the AWWT was developed using the guidance of DOE Order 5481.1B *Safety Analysis and Review System*, and a Technical Safety Requirement (TSR) document is not required. However, this Operational Safety Requirements (OSR) document provides the necessary controls to ensure worker safety and is binding upon FERMCO.

This OSR is an extension of the AWWT FSAR, FEMP-2397, since it compiles the important safety commitments and requirements from the FSAR which are necessary for the safety of personnel, equipment and the environment. It is AWWT Project Management's responsibility to implement this OSR in procedures.

1.1 Definitions

Term	Definition
ACTION	The steps listed in each requirement that are required to be performed when the specified LIMITING CONDITIONS FOR OPERATION are not met.
ADMINISTRATIVE CONTROLS	The provisions relating to organization and management, procedures, recordkeeping, reviews, and audits necessary to ensure safe operation of the facility
COMPLETION TIME	The time allowed to meet an ACTION statement condition.
FREQUENCY	The time period between SURVEILLANCES.
LIMITING CONDITIONS FOR OPERATION (LCO)	The lowest functional capability or performance level of safety-related structures, systems, components and their support systems required for normal, safe operation of the facility.
MODE APPLICABILITY	The operating mode to which a LIMITING CONDITION FOR OPERATION, LIMITING CONTROL SETTING, and SAFETY LIMIT applies.

5

OPERABLE	Equipment is capable of performing its specified function and all necessary attendant instrumentation, controls, electrical power, lubrication, or other auxiliary equipment that are required for the system, component, or device to perform its functions are also capable of performing the ir related functions.
OPERATION	Equipment is performing its intended function.
OPERATIONAL MODE	The modes in which the system may be operating.
SAFETY LIMIT	Those limits which, if exceeded, could directly cause the failure of one or more of the barriers that prevent the uncontrolled release of radioactive or other hazardous material.
SURVEILLANCE REQUIREMENTS	Requirements relating to test, calibration, or inspection to ensure that the necessary operability and quality of safety-related structures, systems, components, and their support systems required for safe operation are maintained.
VERIFY	To affirm, physically or numerically, that a specified condition or equipment component is in the defined state.

1.2 Operational Modes

This OSR generates administrative controls which are applicable whenever the associated activities take place.

1.3 Frequency

The frequency notations, as used in surveillances and elsewhere, are defined as follows:

IMMEDIATELY	As soon as the operation can be performed in a safe manner (Usually not to exceed one hour)
DAILY	At least once every 24 hours
WEEKLY	At least every 7 calendar days
MONTHLY	At least once per 31 calendar days
ANNUALLY	At least once per 366 calendar days

1.4 Mode Applicability

The mode applicability of an LCO is the operational mode of the facility that requires that the LCO be met. This OSR is applicable to all modes of AWWT operation.

6

1.5 Limiting Conditions for Operations (LCO)

LIMITING CONDITIONS FOR OPERATIONS (LCOs) establish the lowest functional capability or performance levels of equipment required for normal safe operation of the facility. LCOs shall be applied as follows:

a. Compliance with a LCO is required in the modes specified.

b. Upon the failure to meet a LCO, the associated ACTION Requirement must be met.

c. Failure to meet the specified LCO and its ACTION Statements within the time interval is considered noncompliance with the requirement. Similarly, completing the ACTION Statement within the specified interval is considered compliance with the requirement.

d. Restoration of the LCO prior to the expiration of the specified time interval(s) of the ACTION Statement removes the requirement to complete the ACTION Statement.

1.6 Action Requirements

The required ACTION associated with each LCO must be performed within the given COMPLETION TIME.

1.7 Surveillance Requirements

Requirements related to test, calibration, or inspection to assure that the necessary quality of systems or components is maintained, that facility operation will be within the SAFETY LIMITS, and that the LIMITING CONTROL SETTINGS and the LIMITING CONDITIONS FOR OPERATION will be met.

2.0 SAFETY LIMITS

There are no safety limits in the AWWT Facility, as defined in DOE Order 5480.22 *Technical Safety Requirements*, but all OSR safety limits are applicable to AWWT operations.

3/4.0 OPERATING LIMITS AND SURVEILLANCE REQUIREMENTS

The following LCOs and surveillance requirements apply to the unloading of bulk chemicals into the storage tanks.

3/4.1 Limiting Control Settings

This operation will not require LIMITING CONTROL SETTINGS since no SAFETY LIMITS are specified.

3/4.2 Limiting Conditions for Operations

Compliance with the LIMITING CONDITIONS FOR OPERATION contained in the succeeding requirements is demanded during all the operating modes.

Noncompliance with a requirement (OSR violation) shall exist when the demands of the LIMITING CONDITION FOR OPERATION and associated ACTION Statements are not met within the specified time intervals. If the LIMITING CONDITION FOR OPERATION is restored prior to expiration of the specified time intervals, completion of the ACTION Statement is not required.

3/4.3 Surveillance Requirements

SURVEILLANCE Requirements shall be met for all equipment/components/conditions to be considered operable.

Each SURVEILLANCE Requirement shall be performed within the specified interval, with a maximum extension of 25 percent of the interval between any two consecutive SURVEILLANCES. (This extension is intended to provide operational flexibility both for scheduling and for performing SURVEILLANCES. It should not be relied upon as a routine extension of the specified interval).

Failure to perform a SURVEILLANCE within the required time interval or failure of a surveillance test shall result in the equipment/component/condition being declared inoperable and the action stipulated for the inoperable equipment/component/condition being taken.

LCO 1: The locks on the unloading arms shall be in place and functional on the storage tanks for alum (tank #51-X193-TNK), caustic (tank #T-19X-3000) and sulfuric acid (tank #51-X137-TNK). This shall be accomplished by verifying that the locks at the three hose connections on the three respective unloading arms (arm # 51-X191-ARM for alum, 51-X135-ARM for acid, and 51-X121-ARM for caustic) are in place and functional.

MODE APPLICABILITY: All operating modes

8

ACTIONS:

CONDITION	ACTION	COMPLETION TIME
One or more of the locks on unloading arms # 51-X191-ARM for alum, 51-X135-ARM for acid, and 51-X121-ARM for caustic are not in place or are not functional.	1. Notify your supervisor **AND** 2. Stop the process for receiving and unloading chemicals on the unloading arm(s) with the non-functional lock(s)	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE REQUIREMENT	FREQUENCY
Visually and mechanically inspect unloading arms # 51-X191-ARM for alum, 51-X135-ARM for acid, and 51-X121-ARM to VERIFY the locks are in place and functional.	Monthly

LCO 2: The local level gauges (level transmitter LIT-623 for alum, LIT-169 for acid and LIT-149 for caustic) on the storage tanks for alum (51-X193-TNK), caustic (T-19X-3000) and sulfuric acid (51-X137-TNK) shall be verified as functional.

MODE APPLICABILITY: All operating modes

ACTIONS:

CONDITION	ACTION	COMPLETION TIME
One or more of level transmitters LIT-623 for alum, LIT-169 for acid and LIT-149 for caustic are not operational.	1. Notify your supervisor **AND** 2. Stop the process for receiving and unloading chemicals into the tank(s) with the non-functional level gauge(s)	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE REQUIREMENT	FREQUENCY
Inspect local level gauges (level transmitter LIT-623 for alum, LIT-169 for acid and LIT-149 for caustic) on the storage tanks for alum (51-X193-TNK), caustic (T-19X-3000) and sulfuric acid (51-X137-TNK) to verify they are functional.	Monthly

5.0 ADMINISTRATIVE CONTROLS

5.1 Specific Requirements

5.1.1 Unloading of sulfuric acid, sodium hydroxide and alum into storage tanks

a. Sample all chemical deliveries for the correct material at the AWWT Lab by testing for pH and specific gravity and through visual inspection, with the results obtained and confirmed, before connecting the unloading arm to the tank truck.

b. Before connecting the unloading arm to the truck, the AWWT day shift Operations Supervisor shall verify that the tank truck delivering the chemicals is stationed at the correct unloading station.

c. The AWWT day shift Operations Supervisor shall be the only person to maintain control of the three keys to the three different key locks on the three chemical unloading arms.

d. The field operator shall check the local level gauge on the chemical storage tank being filled to ensure the tank can accommodate the amount of material to be unloaded.

e. The field operator at the unloading station shall request by radio or telephone for the control room operator to enable the appropriate chemical unloading transfer pump for operation.

f. To prevent acid from draining into the acid/alum spill sump and being added to water or alum which may already be in the acid/alum spill sump:

(1) At the completion of each chemical unloading operation, empty and blow down with air the unloading arms, pumps, and storage tank fill lines. Maximum air pressure for blow down shall be 30 psi.

OR

(2) Use procedures to prevent the addition of acid to the acid/alum spill sump when water or alum are in the sump.

g. Perform periodic in-service inspection to verify that the acid, caustic and alum unloading arms are labeled properly and are capable of being operated and locked correctly.

5.1.2 Acid addition to IX Recycle tanks

a. Manually control and monitor acid addition to the Ion Exchange Recycle Tanks (51-X222-TNK or 51-X345-TNK) in order to stop acid addition if (1) the tank level is below 15%, (2) the high temperature alarm sounds at 120°F, or (3) if the recycle (mixing) pump is not operating,

OR

b. For automatic acid addition, use interlocks to stop acid addition if (1) the tank level is below 15%, (2) the tank temperature is greater than 120°F, or (3) if the recycle (mixing) pump is not operating.

5.1.3 Filling Acid Feed Tank

a. Manually control and monitor acid addition to the Acid Feed Tank (51-X148-TNK) by observing the tank level gauge, watching for acid flowing from the tank overflow pipe, and taking action to stop acid flow into the tank by closing the valve upstream of the tank or notifying the control room operator,

OR

b. For automatic filling, use a high feed tank level interlock and alarm.

5.1.4 Filling Caustic Feed Tank

a. Manually control and monitor caustic addition to the Caustic Feed Tank (51-X145-TNK) by observing the tank level gauge, watching for caustic flowing from the tank overflow pipe, and taking action to stop caustic flow into the tank by closing the valve upstream of the tank or notifying the control room operator,

OR

b. For automatic filling, use a high feed tank level interlock and alarm.

5.1.5 Acid Feed Line Flow Control

a. Verify there is a check valve in the acid line to the mixers in order to prevent reverse flow,

11

AND

b. Manually control and monitor flow to the mixers (51-X203-MXR and 51-X328-MXR) to verify the pressure regulating valves downstream of the mixers do not fail closed and cause reverse flow of wastewater back into the Acid Feed Tank.

5.1.6 Water Enrichment Control

5.1.6.1 Wastewater containing uranium with enrichment less than 1% U235

The uranium in all wastewater from the former production facilities that processed enriched uranium shall be shown to have an average enrichment of less than 1% U235 prior to processing in the AWWT. This may be from knowledge of the source of the wastewater and information on the enrichment of possible uranium contamination at that source, or from actual samples and analysis. If insufficient information is available, then the results of actual samples must be utilized. Compliance with this requirement must be documented for any wastewater released from the General Sump for processing in the AWWT.

5.1.6.2 Wastewater containing uranium with enrichment greater than or equal to 1% U235

If it cannot be shown that uranium in wastewater to be sent to the AWWT is less than 1% U235 as described in 5.1.6.1 above, then this wastewater suspected of containing uranium with an enrichment of 1% U235 or higher can be processed through the AWWT only after a Nuclear Criticality Safety evaluation. If such a batch of wastewater to be processed contains uranium with an enrichment of 1% U235 or more, Nuclear Safety shall be notified and processing shall proceed only after written approval from Nuclear Safety.

5.2 Programmatic Requirements

5.2.1 General

Procedures, training, document control and configuration management that implement the above requirements shall be in place.

5.2.2 Lockout/Tagout Program

A Lockout/Tagout Program shall be implemented in compliance with 29 CFR 1910.147.

5.2.3 OSR Compliance and Violations

An OSR Compliance Program shall be established by AWWT Project Management. This program shall outline requirements for updating the OSR as operating requirements change as well as the procedure for verifying all OSR-related administrative controls are complied with. This program shall implement documentation, recordkeeping and reporting of violations of this OSR. Violations of

the OSR occur as a result of failure to comply with an LCO or an administrative control requirement.

Reporting of OSR violations shall be administered by AWWT Project Management and performed in accordance with DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*.

5.2.4 Unreviewed Safety Questions

While this facility is not required to implement the USQ process since it is not a nuclear facility, a program which is equivalent to the USQ program described in DOE Order 5480.21 *Unreviewed Safety Questions* shall be in place and implemented to review changes to this OSR.