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SYSTEMS PLAN

COLLECTION AND MANAGEMENT OF LEACHATE FOR THE ON-SITE DISPOSAL FACILITY

20111-PL-0001

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1.0 INTRODUCTION

1.1 OVERVIEW

This Systems Plan describes the inspection, monitoring, and maintenance activities that will be undertaken at the Fernald Environmental Management Project (FEMP) On-Site Disposal Facility (OSDF), Fernald, Ohio to collect and manage leachate collected from the disposal cells at the Fernald Environmental Management Project (FEMP) On-Site Disposal Facility (OSDF), Fernald, Ohio.

This plan only addresses the systems activities related to the collection and management of liquids draining from the Leachate Collection System (LCS) and Leak Detection System (LDS) located beneath each of the OSDF cells. Additional systems activities related to the OSDF are addressed in the *Systems Plan On-Site Disposal Facility (20100-PL-0008).*

1.2 PLAN SCOPE

This Leachate Collection and Management Systems Plan establishes the inspection, monitoring, and maintenance requirements necessary to achieve the proper performance of the LCS and LDS.

This Systems Plan has been prepared for regulatory review. The plan serves as a working document that will be periodically updated during the active life and closure of the OSDF to reflect actual conditions. In no case, however, will the updating result in a reduction in inspection, monitoring, maintenance and operational activities below the levels required by this plan unless approval for such reduction is formally obtained from the United States Environmental Protection Agency/ Ohio Environmental Protection Agency (USEPA/OEPA).

1.3 SYSTEM DESCRIPTION

The double-liner systems of each OSDF cell contains a leachate collection system (LCS), a redundant leachate collection system (RLCS) and a leak detection system (LDS) (Figure 1-1). These systems are designed to collect any liquids which enter the cells or leak from the cells, and to convey those liquids via pipes (i.e., the LCS, RLCS, and the LDS pipes) to Valve Houses located outside and adjacent to each cell. Liquids that enter the LCS include: (i) leachate generated by infiltration of water through the impacted material into the perforated LCS pipeline; and (ii) impacted runoff from active portions of the OSDF which accumulates in a granular impacted runoff catchment area and is allowed to infiltrate into the LCS. Liquid that enters the LDS prior to and during the early stages of waste placement is primarily precipitation

that percolated into the soil prior to placement of the primary liner. This water is designated construction water. Subsequently, after waste is placed and construction water has been squeezed out of the LDS layer by the weight of the overlying waste, the LDS flow is a measure of leakage through the primary liner.

Liquid that enters in the LDS or LCS of a cell flows by gravity to its respective Valve House. In turn, the Valve Houses are connected by a leachate transmission system (LTS) gravity line that conveys the combined flow from the LCS and LDS piping systems through a Control Valve House to a Permanent Lift Station. From the Permanent Lift Station, leachate is pumped through a double-wall forcemain to the Biodenitrification Surge Lagoon (BSL). The system is operated in accordance with site procedure 43-C-372 "Enhanced Permanent Leachate Transmission System Operation".

A schematic of the leachate management system is depicted in Figure 1-2.

This Systems Plan addresses all leachate management systems components up to LTS line discharge point into the Permanent Lift Station.

1.4 PLAN ORGANIZATION

The remainder of this Systems Plan is organized as follows:

- Activities for the OSDF leachate management system are presented in Section 2.0;
- Record keeping requirements are presented in Section 3.0.

1.5 PLAN RESPONSIBILITIES

Implementation responsibilities for this Systems Plan are as follows:

Operations Manager Responsibilities:

- Management of leachate management system including operation, maintenance, monitoring and inspection
- Timely transfer of monitoring data to the hydrogeology manager for evaluation and reporting

Hydrogeology Manager Responsibilities: Monitoring, evaluation and reporting of:

- LCS flow rates
- LDS accumulation rates

- Fluids accumulating in secondary containments such as the LCS, RLCS, LDS, and LTS containment pipes and the sumps in each valve house
- Analytical data from samples of liquids found in the LCS, LDS, and secondary containments

ARWWP Safety & Health Manger is the Point of Contact for Leachate Management system operation, Industrial Hygiene and radiological concerns

1.6 RELATED IMPLEMENTATION PLANS

Several other implementation plans have been prepared for the OSDF that contain information relevant to this plan. Other plans of direct relevance to this plan are listed below along with a brief statement of the relationship of the work plan to this plan:

- *OSDF Construction Quality Assurance (CQA) Plan* [GeoSyntec, 1997c]: provides testing and certification standards which are required for the OSDF construction and materials or equipment which may require replacement or repair during construction activities;
- *OSDF Surface-Water Management and Erosion Control (SWMEC) Plan* [GeoSyntec 1997d]: provides details of temporary and permanent Environmental and Safety controls for the OSDF (including maintenance requirements for channels and sediment control);
- *OSDF Post-Closure Care and Inspection Plan* [FDF, 1997]: describes post-closure inspection, operation and maintenance activities.

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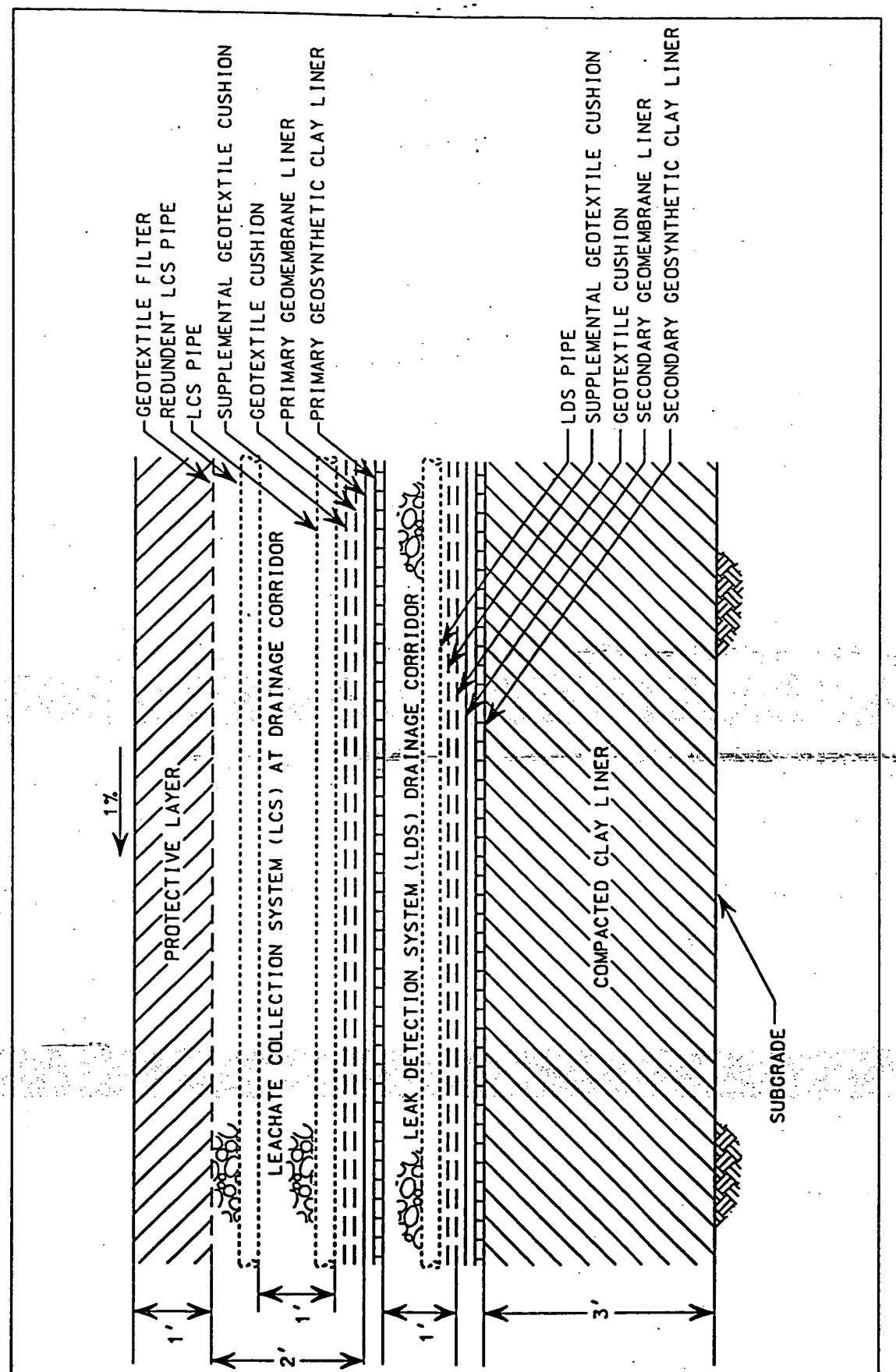

FIGURE 1-1. SCHEMATIC OF ON-SITE DISPOSAL FACILITY LINER SYSTEM AT THE DRAINAGE CORRIDOR

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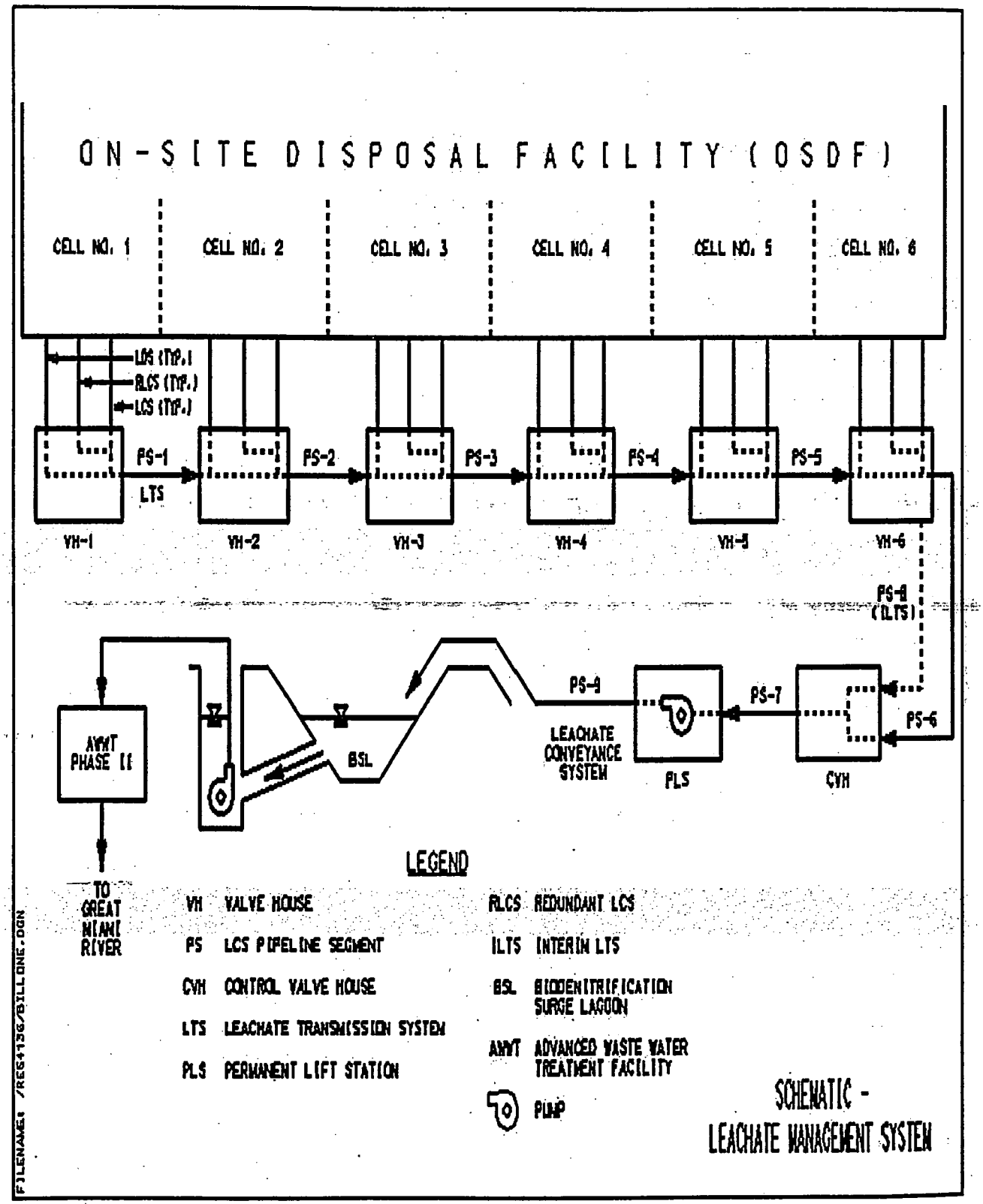
FIGURE 1-2
SCHEMATIC - LEACHATE MANAGEMENT SYSTEM



2.0 APPLICABLE REQUIREMENTS

2.1 OVERVIEW

Regulatory, DOE, and other requirements applicable to this Systems Plan are contained in the Enhanced Permanent Leachate Transmission System (EPLTS) Design Criteria Package (DCP) for the OSDF. The DCP is contained within the overall OSDF Design Package [GeoSyntec, 2000]. These requirements take the form of applicable or relevant and appropriate requirements (ARARs) and to be considered criteria (TBCs) as determined by the record of decision for each of the various FEMP operable units, functional requirements, and general design criteria. The DCP requirements applicable to this Systems Plan are described below.

2.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

ARARs that are addressed by this Systems Plan are:

- OAC 3745-27-08(C)(4)(b) Leachate collections systems pipes shall:
  - (I) Be imbedded in the drainage layer; and
  - (II) Have a minimum slope of 0.5 per cent; and
  - (III) Have lengths and configuration which shall not exceed the capabilities of clean-out devices; and
  - (IV) Be provided with access for clean-out devices, as required by U.S.EPA/OEPA, which shall be protected from differential settling; and
  - (V) Have joints sealed to prevent separations; and
  - (VI) Be physically and chemically resistant to attack by the solid waste, leachate, or other materials that they may come in contact with. Sealing material and means of access for cleanout devices shall also be physically and chemically resistant to attack by the solid waste, leachate, or other materials that they may come in contact with.

- OAC 3745-27-08(C)(4)(e): Lift stations shall be equipped with automatic high level alarms located no greater than 6 ft (2.0 m) above the invert of the leachate inlet pipe. Lift station pumps shall be of adequate capacity and shall automatically commence pumping before the accumulated leachate activates the high level alarm.

- OAC 3745-27-08(C)(5): Leachate conveyance and storage structures located outside of the limits of disposal shall be no less protective of the environment than the disposal facility, and shall:
  - Be monitored, as required by US EPA and OEPA;
  - For storage tanks, be provided with secondary containment;

- For leachate lines, lines are to be provided with double containment pipes; and
- For storage structures, have a minimum of one week of storage capacity as established by design using assumptions simulating final closure of the facility.

Post-closure care activities for all sanitary landfill facilities shall include, but are not limited to:

- Continuing operation and maintenance of the leachate management systems; and
- Continuing operation and maintenance of the surface-water management systems;

- OAC 3745-27-19(E)(26): The integrity of the engineered components of the landfill shall be maintained and any damage to, or failure of the components shall be repaired. Engineered components include components of the monitoring systems.
- OAC 3745-27-19(K)(1): If leachate is detected on the surface of the landfill facility, then the outbreak(s) shall be repaired and:
  - Leachate shall be contained and properly managed at the sanitary landfill facility;
  - If necessary, leachate shall be collected and disposed in accordance with paragraph (K)(5) and (K)(6) of OAC 3745-27-19; and
  - Actions shall be taken to minimize, control, or eliminate the conditions which contribute to the production of leachate.
- OAC 3745-27-19(K)(2): At least one lift station back-up pump shall be kept at the disposal facility at all times.
- OAC 3745-27-19(K)(3): The collection pipe network of the leachate management systems shall be inspected after placement of the initial lift of waste to ensure that crushing has not occurred and shall be inspected annually thereafter to ensure that clogging has not occurred.

  Inspection shall be between the Valve House(s) and the first 100 ft. (30 m) of subdrain pipe inside the cell(s). Inspections shall be performed using a video camera or other appropriate inspection equipment.
- OAC 3745-68-10 (2) Continue to operate the leachate collection and removal systems until leachate is no longer detected
- OAC 3745-68-10 (3) Maintain and monitor the leak detection system

2.3 FUNCTIONAL REQUIREMENTS AND DESIGN CONSIDERATIONS

The Design Criteria Package (DCP) for the Leachate Collection System includes functional requirements and design considerations that have been established for the collection of leachate from the OSDF disposal cells.

These functional requirements are specific facility design or performance criteria required by DOE. Design considerations represent those other design, construction, or operational criteria identified by the OSDF architect/engineer (A/E) as necessary for the OSDF to successfully fulfill its intended function.

2.4 OTHER CRITERIA

Other criteria applicable to this plan consist of those industry-standard practices that have proven effective at other waste disposal facilities. Inspection and monitoring requirements from the manufacturers and suppliers of materials and equipment to be installed for the Leachate Collection System for the OSDF are also criteria relevant to this plan.

3.0 LEACHATE MANAGEMENT SYSTEM

3.1 BASIC SYSTEM OPERATION

The basic operation of the OSDF leachate management systems is described below:

- The LCS, RLCS and LDS pipes drain liquid by gravity from the liner system of the OSDF cells to a Valve House for each individual cell (Figure 3-1). LCS, RLCS and LDS pipes from each cell consist of double-wall High Density Polyethylene (HDPE) pipes (i.e., inner carrier pipes and outer containment pipes). The double-wall HDPE pipes penetrate the walls of the Valve Houses and piping material is changed to single-wall steel piping inside the Valve Houses.

- The LDS piping allows for direct discharge of flow from the LDS carrier pipe into a tank located inside the Valve House. The Valve House serves as a secondary containment structure for the tank. Each LDS tank has provisions for the monitoring of collected liquid volume. The tank pump discharge pipe will be connected to the LTS gravity line which passes through each Valve House. Each LDS containment pipe has a monitoring port and fixed end seal within the Valve House to allow quantification of any liquid which accumulates in the annular space between the carrier pipe and containment pipe.

- Each Valve House has clean-out WYEs located in the LTS, RLCS, LCS and LDS carrier pipes to enable maintenance and inspection of the carrier pipes.

- LDS piping also has provisions to allow flow through monitoring of construction water through the LDS until such time as the construction waterflow decreases sufficiently to allow operation of the LDS containment tank.

- When the LDS containment tank are placed in operation (i.e., flow is diverted to the LDS containment tank), the ball valve in the LDS line that permits by-passing of the LDS containment tank will be removed blanks will be installed in the line so that all liquid collected in the LDS will be diverted to the LDS containment tank.

- The LCS piping allows for direct discharge of flow from the LCS carrier pipe into the LTS that passes through each Valve House. The LCS carrier pipe has valves for regulating leachate flow into the gravity line. Flow may need to be regulated during OSDF construction, impacted material placement, periods of gravity line maintenance, extension, repair, etc. The LCS carrier pipe in each Valve House also has a sampling port for obtaining leachate samples. Each Valve House has an inlet for a redundant RLCS carrier pipe. The RLCS has a valve (secured in a closed position) and sampling port (for periodically quantifying liquid accumulation in the pipe). The RLCS valve can be opened to allow flow to the LCS gravity line at any time in the event of clogging of the primary LCS carrier pipe. Both the LCS and RLCS pipes have monitoring ports and fixed end seals within the Valve Houses to allow quantification of liquid that accumulates in the annular space between the carrier pipe and the containment pipe.

- Each primary containment tank (one for the LDS piping and one for the LCS piping) is equipped with liquid level instrumentation consisting of a submersible liquid level sensor indicator and data-logger (level recorder).

- Each Valve House (secondary containment) has a sump equipped with liquid level sensor. The liquid level sensor shall be set such that an alarm is activated when the liquid level in the sump exceeds approximately 10 in. (250 mm).

- The LTS gravity line consists of a double-wall HDPE pipe with a 6 in. (150 mm) diameter inner carrier pipe and a 10 in. (250 mm) diameter outer containment pipe. The inner carrier pipe of the LTS gravity line is continuous over its entire length (i.e., from the most upgradient cell to its discharge point). The outer containment pipe is continuous between the Valve Houses, the control Valve House, and the Permanent Lift Station. Outer containment pipes are sealed at the downstream end and contain monitoring ports in the Valve Houses (see Figure 3-1). Valve Houses serve as secondary containment for those sections of piping not double walled but within the walls of the Valve Houses.

- The LTS gravity line is equipped with a vent at its northern end. The purpose of the vent is to prevent pressure or vacuum buildup in the systems. The LTS has two cleanouts (one facing up-gradient and the other down-gradient) in each Valve House for maintenance.

- The LCS valve located in each Valve House will be manually adjusted during early phases of cell construction if necessary to maintain a balance of flow as related to the Lift Station output capacity. The Permanent Lift Station is designed to handle flow at a rate of approximately 200 gallons per minute (gpm). The sum of the individual LCS flows will be set to ensure the Lift Station is not overwhelmed by the incoming system flow.

- The Permanent Lift Station is provided with secondary containment so as to allow for monitoring for the presence of leakage.

- The LCS and LDS primary containment tanks in each Valve House are capable of storing 300 gallons of liquid.

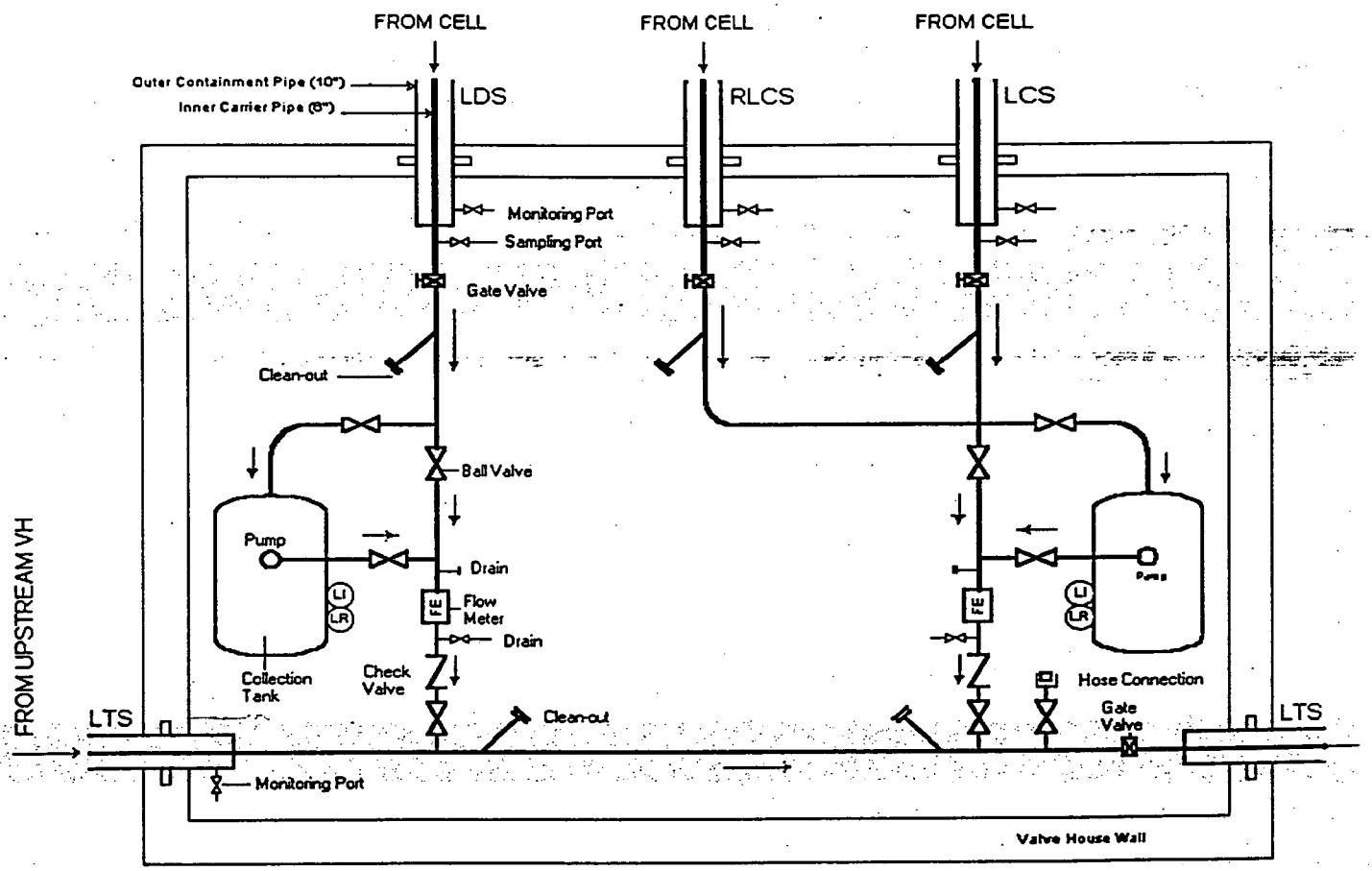
- At the Control Valve House, just prior to the discharge of liquid into the Permanent Lift Station (Figure 3-2), the liquid passes through a motor-operated valve which closes automatically in the event of power failure or if liquid levels in the Permanent Lift Station rises above the high level alarm setpoint. The Control Valve House also has manual valves, which can be closed, if needed, for maintenance activities.

- Each Valve House and the Control Valve House are provided with positive pressure ventilation and are not confined spaces.

- The LTS between the Control Valve House and the Permanent Lift Station (PLS) is monitored up-stream at the Control Valve House. Therefore all containment pipe drain port valves can be monitored without the need for confined space entry. The sampling and monitoring ports or valves are installed such that the quantity of liquid in the containment pipe between valve houses can be measured and samples can be collected. In all cases, the sampling and monitoring ports or valves are installed and also provide for removal of accumulated liquids.

- In the event of a failure or prolonged disruption of the LTS line, PLS or Leachate Transmission System, action specified in the "Leachate Management Contingency Plan" will be implemented to ensure compliance with the specifications of the ARAR's stated in section 2.2 of the System Plan On-Site Disposal Facility (20100-PL-0008).

FIGURE 3-1
TYPICAL VALVE HOUSE LAYOUT

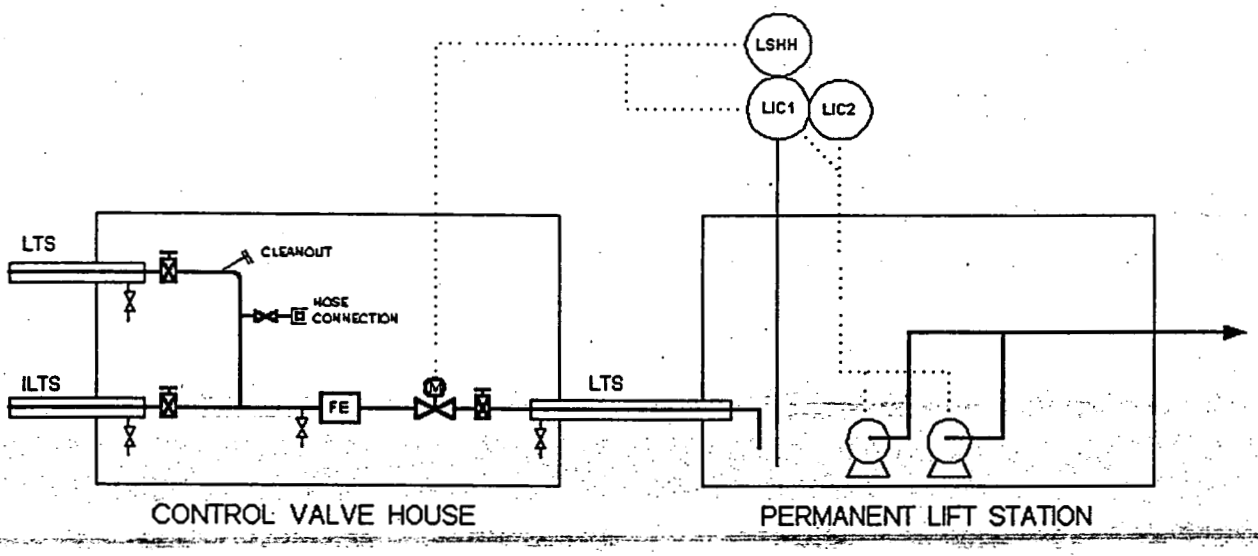


3.2 LDS, LCS, AND LTS OPERATION

The LDS and LCS of each OSDF cell and the LTS will be operated in conformance with the requirements of this section:

- Systems will not be accepted for operation until the Construction Subcontractor has completed all the requirements of the Construction Acceptance Testing.
- After construction is completed and turnover is accepted by the FEMP, but prior to the start of active operations of a cell, the LDS containment tank will be bypassed. The LDS flow rate shall be less than 10 gpm (38 lpm) (due to drainage of construction water from the LDS) prior to the start of cell operation. Once $\leq$ 10 gpm is achieved, the operation of the LCS and LDS can be turned over to ARWWP.
- When peak flows in the LCS system reduce to a level of approximately 1/2 gpm, the LCS primary containment tank will be used to collect the liquid.
- Prior to start of active operations of a cell, a sample of the liquids in the LDS primary containment shall be obtained and analyzed for constituents as specified in Table 4-2 of the OSDF Groundwater/Leak Detection and Leachate Monitoring Plan, 20100-PL-009, of August 1997.
- Prior to the start of active operations of a cell the level transmitters for the associated Valve House containment tanks shall be calibrated to measure the volume of liquid.
- Upon completion of EPLTS construction the level transmitters in each Valve House sump shall be set to activate the alarm for a liquid level of approximately 10 in. (250 mm) above the bottom of the sump.
- Active Valve Houses and PLS will be inspected on a periodic basis not less than once per day to status alarms (Note that a high level in any sump will be noted at PLS panel). An alarm condition will require action to evaluate the condition and take appropriate corrective actions.
- Since leachate will flow through all Valve Houses, piping systems inside Valve Houses will be inspected once per day.
- Prior to start of active operations of a cell, the absence of liquids in the LCS, redundant LCS, and LDS containment pipes shall be verified by opening the monitoring ports on each containment pipe and removing accumulated liquid. The monitoring log will be started concurrently.
- After impacted material placement begins in a cell, the valve on the LCS carrier pipe will be opened to allow all leachate in the cell to discharge to the associated Valve House and the LTS gravity line. This valve will be positioned so that the flow from all the active cells does not exceed the lift station capacity of about 200 gpm.

FIGURE 3-2
CONTROL VALVE HOUSE AND PERMANENT LIFT STATION



CONTROL VALVE HOUSE
and
PERMANENT LIFT STATION

- The cell impacted runoff catchment area is designed to allow impacted runoff to enter directly into the LCS collection system. If the system becomes inoperable (*e.g.*, clogging of the sacrificial geotextile has occurred) the OSDF Construction Manager shall remove impacted runoff by pumping from the impacted runoff catchment area to the adjacent cell catchment area or to hose bibs located along the reconfigured ILTS line as further described in the "Leachate Managent Contingency Plan For the On-Site Disposal Facility".

- The valve on the redundant LCS carrier pipe shall be remain closed and locked at all times, unless otherwise directed by the ARWWP Manager.

- The valve on the LCS carrier pipe shall not be shut during the active life, closure period, and post-closure period of the OSDF, except for those periods where the valve needs to be closed for systems maintenance and repair or in the event of an operational emergency.

- The Valve Houses are designed as a closed system; liquids should not accumulate in these Valve Houses; liquids that accumulate in these Valve Houses must be removed as soon as the source of the liquid is determined and personnel and equipment are available to safely perform the removal. The level transmitter in the sump of each Valve House shall be set to activate the alarm light for a liquid level of no more than approximately 10 in. (250 mm). If the alarm is activated, personnel shall respond immediately to verify a significant emergency condition does not exist (i.e. imminent filling of the Valve House, etc.) and within one shift to assess the problem, inform the ARWWP Manager and to take appropriate corrective actions.

- Throughout active operations of the OSDF, measurements of the liquid level in active LDS primary containment tank will be taken daily and recorded. A pump is provided at each tank to pump this liquid into the LTS. The LDS primary containment tank shall be evacuated as often as necessary to prevent overtopping of the tanks.

- Once cells are capped and the LCS primary containment tanks are in use as a result of reduced flow rates, the liquid level in the LCS primary containment tanks will be monitored. The LCS primary containment tank shall be evacuated as often as necessary to prevent overtopping of the tank.

- Notify the AEDO of events involving system failure as defined in the "Leachate Management Contingency Plan For the On-Site Disposal Facility".

3.3 LDS, LCS AND RLCS INSPECTION AND MAINTENANCE ACTIVITIES

The LCS, LDS, and RLCS shall be inspected and maintained in accordance with the schedule and activity requirements outlined in Table 3-1, or until leachate is no longer generated and an alternative activity schedule has been approved by U.S.EPA and OEPA. Specific details of the required inspection and maintenance activities are given below.

According to ARARs (OAC 3745-27-19(k)(3)), the LDS , LCS and RLCS pipe network shall be inspected after placement of the initial lift of impacted material and annually thereafter to ensure that crushing and/or clogging has not occurred.

Clogging can occur by deposition of particles within the pipe or by biological growth inside the pipe. The inspection of this pipe network shall be between the Valve House and 100 feet into the subdrain pipe inside the cell. The portion of the pipe beyond this point inside the cell is considered to be redundant because the gradation of the LCS granular drainage material is designed to limit the level of leachate on the geomembrane liner to less than 1 ft (0.3 m) without need for a subdrain pipe.

Access to the LDS, LCS, and RLCS pipes for inspection shall be through cleanouts located in the Valve Houses. Inspections shall be performed using a video camera. The inspection equipment shall have the ability to monitor its location (e.g., distance counter), be sized to fit within the LDS, LCS, and RLCS inner carrier pipes indicated on Construction Drawings and be capable of being pushed 100 feet beyond the penetration box.

If an inspection indicates that a LDS, LCS, or RLCS pipe is obstructed, the pipe shall be flushed by pumping fresh water through a hose inserted in the pipe cleanout. If flushing does not remove the obstruction, other methods shall be used to clean the pipe. These other methods may include blowing the obstruction out with air, vacuuming, rodding, or inserting a snake, fish tape, or other suitable device. If air or water pressure is used, the working pressure inside the pipe shall not exceed the rated pressure of the pipe.

The specific pipe maintenance procedures to use to remove a pipe obstruction should be selected on a case by case basis.

In the event that LDS, LCS, or RLCS pipe obstruction cannot be dislodged, or in the very unlikely event that a pipe has undergone crushing, the following process should be considered in the following order. The specific repair method to be selected will be submitted to the regulators for review and approval prior to proceeding with the work:

- For the LDS, LCS, or RLCS; insert a new smaller diameter pipe within the obstructed or collapsed pipe;
- For the LCS, activate the redundant LCS pipe; and
- For the LDS, LCS, or RLCS pipe, if the obstruction or collapse is sufficiently outside of the cell perimeter berm such that shoring can be safely utilized, replace the pipe.

All equipment inserted into the LDS, LCS or RLCS line for inspection and/or maintenance shall be decontaminated prior to removal from the OSDF battery limits.

In addition to the foregoing requirements, all mechanical and electrical equipment shall be calibrated, operated, maintained, and serviced in accordance with the manufacturer's instructions for that equipment.

TABLE 3-1
LEACHATE COLLECTION AND LEAK DETECTION SYSTEMS INSPECTION AND MAINTENANCE ACTIVITIES

Component	Inspections		Conditions to Check	Remedy
	Active Period	Closure Period		
LDS Gravity Line	Weekly	Weekly for the first three months after cell closure, then monthly for the remainder of the first year	• leakage from primary containment tank	• check for source of leak; if source identified then take appropriate corrective measures (i.e., spot-seal tank, replace tank, etc.)
			• condition of submersible level transmitter and appurtenances	• check level transmitter operations
			• liquid in annular space between LDS carrier pipe and the LDS containment pipe exceeding action level specified in the Contingency Plan	• Action as specified in the Contingency Plan
LCS Gravity Line	Weekly	Weekly for the first three months after cell closure, then monthly for the remainder of the first year	• condition of submersible level transmitter and appurtenances in Valve House sumps	• check level transmitter operations (e.g., operating temperature range, accuracy, etc.), electrical connections, and light
			• liquid in annular space between LCS carrier pipe and the LCS containment pipe exceeding action level specified in the Contingency Plan	• check for source of leak; if source identified then take appropriate corrective measures (i.e., spot-seal tank, replace tank, etc.)
			• leakage from primary containment tank (if tank is in use)	• Action as specified in the Contingency Plan
RLCS Gravity Line	Weekly	Weekly for the first three months after cell closure, then monthly for the remainder of the first year	• liquid in the annular space between RLCS carrier pipe and the RLCS containment pipe exceeding action level specified in the Contingency Plan	• Action as specified in the Contingency Plan
			• liquid in the redundant carrier pipe	• Notify management
LDS, LCS and RLCS Pipes	After placement of initial lift of impacted material, then annually	Annually	Video inspect for: • crushing of pipe • clogging of pipe	• flush clogged pipe with water or mechanically clean • insert small diameter pipe in crushed pipe, if possible • replace crushed pipe if crushed portion is outside of the perimeter berm and if shoring can be used • Utilize redundant LCS pipe if failed LCS cannot be repaired

NOTES: Valve Houses, LCS, RLCS, LDS and LTS gravity line shall be inspected by video cameras or other acceptable means, after the occurrence of declared major earthquakes in the vicinity of the FEMP.

3.4 LTS AND VALVE HOUSE INSPECTION AND MAINTENANCE ACTIVITIES

The LTS shall be inspected and maintained in accordance with the schedule and activity requirements outlined in Table 3-2 or until leachate is no longer generated and an alternative activity schedule has been approved by U.S.EPA and OEPA. Specific details of the required inspection and maintenance activities are given below.

In the event that damage or blockage of a segment of in the LTS cannot be addressed by normal practices, the individual carrier pipe segment can be pulled and repaired/replace or the containment pipe can be replaced or re-lined

If an inspection indicates that a LTS pipe is obstructed, the pipe shall be flushed by pumping fresh water through a hose inserted in the pipe cleanout. If flushing does not remove the obstruction, other methods shall be used to clean the pipe. These other methods may include blowing the obstruction out with air, vacuuming, rodding, or inserting a snake, fish tape, or other suitable device. If air or water pressure is used, the working pressure inside the pipe shall not exceed the rated pressure of the pipe.

The specific pipe maintenance procedures to use to remove a pipe obstruction should be selected on a case by case basis.

In the event that LTS pipe obstruction cannot be dislodged, or in the very unlikely event that a pipe has undergone crushing, the following procedures should be considered in the following order. The specific repair method to be selected will be submitted to the regulators for review and approval prior to proceeding with the work:

- Insert a new smaller diameter pipe within the obstructed or collapsed pipe;
- If the obstruction or collapse is sufficiently outside of the cell perimeter berm such that shoring can be safely utilized, replace the pipe.

All equipment inserted into the LTS line for inspection and/or maintenance shall be decontaminated prior to removal from the OSDF battery limits.

In addition to the foregoing requirements, all mechanical and electrical equipment shall be calibrated, operated, maintained, and serviced in accordance with the manufacturer's instructions for that equipment. Logs will be maintained documenting compliance with this requirement.

The Valve Houses, leachate transmission system, valves, connections, sampling ports, monitoring ports, pumps, etc. shall be routinely inspected and maintained to provide for proper OSDF operation. All mechanical and electrical equipment shall be calibrated, operated, maintained, and serviced in accordance with the manufacturer's instructions for that equipment as entered in the Computerized Maintenance Management System (CMMS).

In addition, the inspection and maintenance activities for the LTS and Valve Houses (including Control Valve House and the Permanent Lift Station) shall include the following:

- Confirm that appropriate warning signs are visible (e.g., confined space entry (PLS only), buried pipe and conduit)
- Check instruments/valves (e.g., note sticking or jammed devices, corrosion, leaks, and misalignments);
- Note any temperature extremes (e.g temperatures less than 40°F which may exist inside the Valve House e.g., temperature outside of equipment-specific operating temperature ranges);
- Check for the presence of liquids in all secondary containment systems;
- Check hoses for physical wear and poor connections prior to each use;
- Should any of the above inspections reveal systems deficiencies, the condition shall be corrected utilizing approved Fluor Fernald Operations, Maintenance and Administrative procedures.

TABLE 3-2
VALVE HOUSES, AND LTS SYSTEM INSPECTION AND MAINTENANCE ACTIVITIES

Inspections

Components	Active Period	Closure Period	Conditions to Check	Remedy
Valve Houses	Weekly	Weekly for the first three months after cell closure, then monthly	• overflow of primary containment tanks • liquid in sumps • confirm all required signage is visible	• evaluation and required action per operating procedures • determine source of liquid, inform ARWWP Manager and implement corrective actions (if any) as directed by ARWWP Manager • repair/replace as necessary
LTS Gravity Line		Triennially	• inspection of pipe using video camera or other appropriate inspection equipment to check for clogging or crushing	• flush clogged pipe with water or mechanically clean; repair as necessary
Valve Houses	Semi-Annual Each time Valve House is entered	Semi- Annual Each time Valve House is entered	• condition of level transmitters, flow meters, ventilation systems, alarms, etc. • operation of ventilation system and alarm light for ventilation fan	• perform preventative maintenance as specified in the Maintenance CMMS Program • do not enter Valve House, notify supervisor

NOTES: Valve Houses and LTS gravity line shall be inspected by video cameras or other acceptable means, after the occurrence of declared major earthquakes in the vicinity of the FEMP.

3.5 EMERGENCY PROCEDURES FOR SPILLS

The OSDF leachate management system has been designed with multiple safeguards and redundancies to prevent the accumulation of liquids in the secondary containment or the overflow of liquids from the primary containment components of the leachate management system. These safeguards and redundancies include the following:

- The LDS and LCS primary containment tanks are equipped with a level indicator which provides operations personnel with a digital display of the tank level.
- The Valve Houses' housekeeping sumps include level switches which will activate a level light if the liquid level exceeds approximately 10 in. (250 mm) in the Valve House sumps. The liquid level switch consists of a submersible switch and alarm light. If the Valve House sump level activates the alarm light it will also sound an alarm at the AWWT which is manned 24 hours per day, 7 days per week. Personnel shall respond to the alarm immediately to assess the problem and to take appropriate corrective actions.
- Notify the AEDO of any potential release to the environment.

3.6 RECORD KEEPING

Fluor Fernald shall maintain written records of all monitoring activities, inspections, and maintenance repairs as required by this section of the plan . All records shall be available for review upon request.

This section of the plan describes the general record procedures that will be followed by the various personnel and organizations performing collection and management of leachate for OSDF activities. These procedures will ensure that consistent and reproducible records are developed when the work is performed and maintained in the custody of the proper organizations to facilitate retrieval.

- Records shall be protected from damage or deterioration by being placed in lockable, fire-proof filing cabinets and by duplication and/or microfilming. Records shall be filed in accordance with a subject file index and shall be retained at the FEMP for 30 years after closure of the OSDF. Required records shall include, but not be limited to, field logbooks, other data collection forms, equipment calibration records, drawings, maintenance records, and all associated reports.

- All original data collected in the field shall be considered a permanent record. This includes all field logbooks, other data forms, and photographs. All of these documents shall be authorized by the signature and date of the originator. Errors shall be corrected by crossing a single line through the error and entering the correct information. Corrections will be initialed and dated by the person making the correction.

- Fluor Fernald shall maintain written records of all monitoring activities, inspections and maintenance or repairs directed in this plan in accordance with approved FF Administrative procedures. These records shall be maintained available for inspection.

- The reporting protocol specified in the Integrated Environmental Monitoring Plan (IEMP) will be used to provide information related to Leachate Collection System/Leachate Detection System water quality and quantity. In the event an unusual situation or anomaly occurs during the reporting period, a description of the situation and the corrective action will be provided as necessary in the weekly site update teleconferences.

4.0 REFERENCES

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