

EHS&L Document
SNM-1227 - Chapter 9
Environmental Protection

Nature of Changes

Item	Paragraph	Description	Justification
1.	9.4.2	Replaced "gross alpha beta" with "isotopic uranium and Tc-99"	Uranium and Tc-99 are the specific analytes of concern.
2.			
3.			
4.			
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6.			
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8.			
9.			
10.			
List Below any Documents, including Forms & Operator Aids which must be issued concurrently with this document revision:			

This document contains a total of 10 pages excluding the signature page.

DOCUMENT REVIEW/APPROVAL/DELETION CHECKLIST

All new and/or revised procedures shall be approved by the change author, cognizant manager(s) of areas affected by the changes, and by applicable manager(s) of any function that approved the previous revision of the document unless responsibility for such approval has been transferred to another organization. Also, the procedure shall be approved by manager(s) of functional organizations that provide technical reviews. Finally, Document Control shall verify that the required approvals have been properly obtained and that any documents that must be issued concurrently are ready to be issued.

Document Reviews			Document Approvals	
Purpose/Function of Review	Specify Reviewer(s) (Optional except for change author)	(Check all that apply)	Title of Approver	(Check all that Apply)
Document Control (Automatic)		<input checked="" type="checkbox"/>	Document Control (Automatic)	<input checked="" type="checkbox"/>
Change Author	CD Manning	<input checked="" type="checkbox"/>	Author	<input checked="" type="checkbox"/>
Independent Technical Review	TJ Tate	<input checked="" type="checkbox"/>		
Operability Review(s)			Mgr, Richland Operations ⁽¹⁾	<input type="checkbox"/>
Conversion		<input type="checkbox"/>	Mgr, Uranium Conversion & Recovery Operations ⁽¹⁾	<input type="checkbox"/>
Recovery		<input type="checkbox"/>	Mgr, Ceramic Operations ⁽¹⁾	<input type="checkbox"/>
Ceramics		<input type="checkbox"/>	Mgr, Rods & Bundles ⁽¹⁾	<input type="checkbox"/>
Rods		<input type="checkbox"/>	Mgr, Component Fabrication ⁽¹⁾	<input type="checkbox"/>
Bundles		<input type="checkbox"/>	Mgr, Analytical Services ⁽¹⁾	<input type="checkbox"/>
Components		<input type="checkbox"/>	Mgr, Maintenance	<input type="checkbox"/>
Lab Review		<input type="checkbox"/>	Mgr, Ops Strategy & Supply Chain	<input type="checkbox"/>
Maintenance Review		<input type="checkbox"/>	Mgr, EHS&L ⁽²⁾	<input checked="" type="checkbox"/>
Transportation		<input type="checkbox"/>	Mgr, Nuclear Safety	<input type="checkbox"/>
EHS&L Review(s)			Mgr, Safety	<input type="checkbox"/>
Criticality		<input type="checkbox"/>	Mgr, Security & Emergency Preparedness	<input type="checkbox"/>
Radiation Protection		<input type="checkbox"/>	Mgr, Licensing & Compliance	<input type="checkbox"/>
Safety		<input type="checkbox"/>	Mgr, Mechanics Richland	<input type="checkbox"/>
Security/Emergency Prep.		<input type="checkbox"/>	Mgr, Plant Engineering & TS&M	<input type="checkbox"/>
Fire Safety		<input type="checkbox"/>	Mgr, Richland Site Quality	<input type="checkbox"/>
MC&A		<input type="checkbox"/>	Mgr, Purchasing	<input type="checkbox"/>
Transportation		<input type="checkbox"/>	Mgr, PP&CPC	<input type="checkbox"/>
Environmental	JB Perryman	<input checked="" type="checkbox"/>	Mgr, Richland Site/Other	<input type="checkbox"/>
Mechanics Richland Review		<input type="checkbox"/>	Richland Records Management	<input type="checkbox"/>
Mechanics Lynchburg Review		<input type="checkbox"/>	Training & Employee Dev.	<input type="checkbox"/>
Plant Engineering Review		<input type="checkbox"/>		
Quality Review		<input type="checkbox"/>		
Purchasing Review		<input type="checkbox"/>		
PP&CPC Review		<input type="checkbox"/>		
Others:		<input type="checkbox"/>		
Document Control		<input type="checkbox"/>		
Training & Employee Dev.		<input type="checkbox"/>		

⁽¹⁾Note: If approvals include 2 or more product center managers, the Operations manager can be substituted for the applicable product center managers.

⁽²⁾Note: The EHS&L manager can be substituted for the applicable EHS&L functional managers.

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EHS&L CHANGE IMPACT EVALUATION FORM			
The scope and content of this document have been determined by EHS&L to not impact the safety disciplines checked below. Future revisions do not require review by those EHS&L component(s) unless the scope changes such that a previously excluded safety discipline may be impacted.			
<input type="checkbox"/> Criticality <input type="checkbox"/> Radiation Protection <input type="checkbox"/> Safety/Security <input type="checkbox"/> Emergency Preparedness <input type="checkbox"/> MC&A <input type="checkbox"/> Transportation <input type="checkbox"/> Environmental			
DOCUMENT VERSION:	EHS&L REVIEW COMPONENT:	EVALUATION DATE:	CHANGE EVALUATOR*: 2 ND PARTY APPROVAL*:

The scope and content of this document have been determined by EHS&L to not directly impact the safe handling of licensed materials (enriched uranium). Future revisions to this document do not require the 10CFR 70.72 change evaluation unless the scope of the document changes such that it directly impacts the handling of licensed materials.			<input type="checkbox"/>
DOCUMENT / ECN No**: E10-08-009	EVALUATION DATE: 7/12/2021	CHANGE EVALUATOR: CD Manning	
Does the change potentially impact Criticality Alarm System (CAS) coverage?			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
EVALUATION OF NRC PRE-APPROVAL:			
IS NRC PRE-APPROVAL (LICENSE AMENDMENT) NEEDED? ➤ Based on "YES" answer to any of five questions below. ➤ Based on "NO" answer to all five questions below.			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
1. Does the change create new types of accident sequences that, unless mitigated or prevented, would exceed the performance requirements of 10 CFR 70.61 (create high or intermediate consequence events) and that have not previously been described in Framatome's ISA Summary?			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
2. Does the change use new processes, technologies, or control systems for which Framatome has no prior experience?			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
3. Does the change remove, without at least an equivalent replacement of the safety function an item relied on for safety (IROFS) that is listed in the ISA Summary?			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
4. Does the change alter any item relied on for safety, listed in the ISA Summary, that is the sole item preventing or mitigating an accident sequence of high or intermediate consequences?			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
5. Does the change qualify as a change specifically prohibited by NRC regulation, order or license condition?			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
Evaluation of Actions Required PRIOR TO OR CONCURRENT with Change Implementation:			
6. Modification / Addition to CAS system or system coverage documentation			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
7. Acquire NRC pre-approval (LICENSE AMENDMENT)			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
8. Conduct/modify ISA			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
9. Modify / update the following:		<input checked="" type="checkbox"/> None <input type="checkbox"/> ISA Database <input type="checkbox"/> NCSA <input type="checkbox"/> NCSP <input type="checkbox"/> RHA <input type="checkbox"/> ChHA <input type="checkbox"/> Other <input type="checkbox"/> Red-Line Drawings/P&ID <input type="checkbox"/> NCSS <input type="checkbox"/> PHA <input type="checkbox"/> FHA <input type="checkbox"/> Procedures	
Evaluation of Actions Required SUBSEQUENT TO Change Implementation:			
10. Modify / update the following:		<input checked="" type="checkbox"/> None <input type="checkbox"/> ISA Database <input type="checkbox"/> NCSA <input type="checkbox"/> NCSP <input type="checkbox"/> RHA <input type="checkbox"/> ChHA <input type="checkbox"/> Other <input type="checkbox"/> AS-Built Drawings/P&ID <input type="checkbox"/> NCSS <input type="checkbox"/> PHA <input type="checkbox"/> FHA <input type="checkbox"/> Procedures	
Justification Section for "YES" preceding Questions 1 – 8 or other for 9, 10:			

(*) Only required if one or more of the boxes to exclude a particular safety discipline review is checked.

(**) If this form exists as a part of a document, the document number is not required.

Table of Contents

9.0	Environmental Protection	9-1
9.1	Environmental ALARA	9-1
9.2	Gaseous Effluent Control.....	9-1
9.2.1	Gaseous Effluent Sampling	9-1
9.2.2	High-Efficiency Particulate Absolute (HEPA) Filtration.....	9-1
9.2.3	Final HEPA Filter Surveillance.....	9-2
9.3	Liquid Effluent Controls.....	9-2
9.3.1	Wastewater Collection/Treatment.....	9-2
9.3.2	Wastewater Sampling.....	9-3
9.4	Environmental Monitoring	9-3
9.4.1	Surface Environmental Sampling	9-3
9.4.2	Groundwater Sampling	9-3
9.4.3	Sanitary Sewer Sludge Sampling	9-4

List of Figures

Figure 9-1	Environmental Sampling Stations	9-5
Figure 9-2	Groundwater Monitoring Wells.....	9-6

9.0 Environmental Protection

9.1 *Environmental ALARA*

The Richland site's as low as reasonably achievable (ALARA) program is described in Chapter 4.0, "Radiation Protection." With respect to environmental protection, Framatome Inc.'s (Framatome's) goal is to maintain concentrations of radioactive materials in plant effluents and the surrounding environs at ALARA levels. Furthermore, environmental releases shall be limited and monitored such that compliance with the public dose limits of 10 CFR 20.1301 and the effluent limits of 10 CFR 20.1302 can be achieved and demonstrated.

9.2 *Gaseous Effluent Control*

Operating and engineered controls will be used as necessary to ensure that environmental airborne concentrations of radioactive materials attributable to gaseous effluents and resultant radiological doses to members of the public comply with the concentration limits and public dose limits specified in 10 CFR 20. The site will maintain procedures with action levels to assure that compliance with applicable limits is maintained. This includes the ALARA constraint on air emissions of 10 CFR 20.1101(d).

Dose calculations as well as environmental concentrations in 10 CFR 20, Appendix B, Table 2 for members of the public may be modified based on ICRP 66 and 68, assuming an Activity Median Aerodynamic Diameter (AMAD) of 1 micrometer.

9.2.1 Gaseous Effluent Sampling

Continuous representative sampling shall be provided on stacks exhausting air with potential concentrations of radioactive materials that are significant with respect to the site's compliance with 10 CFR 20. These samples shall be periodically analyzed for particulate radioactive material, generally on a weekly basis. Stack samples of gaseous effluents potentially containing uranium shall be analyzed for gross alpha activity. Non-uranium isotopes likely to contribute less than 0.1 mrem total effective dose equivalent (TEDE) per year to a member of the public will not necessarily be accounted for.

Sampling of exhaust air stacks may be suspended when the underlying ventilation system has been shut down in conjunction with a cessation of the processing of radioactive materials in the affected ventilated spaces (see Sec. 4.6.1, Ventilation). Any passive emissions of radioactive materials from the stack shall be abated via the continued presence of the HEPA filters required to be in place when the emission unit is operating. Special provisions for restart, if deemed necessary, shall be formally documented/implemented.

9.2.2 High-Efficiency Particulate Absolute (HEPA) Filtration

Air exhausted from areas, equipment, and/or activities that may contain concentrations of radioactive materials that are significant with respect to the site's compliance with 10 CFR 20 shall be passed through at least one stage of HEPA filtration prior to release via an exhaust stack. Fire-resistant HEPA filters that are certified by the manufacturer as meeting HEPA efficiency specifications shall be used.

The adequacy of final HEPA filter installations shall be verified by in-place testing prior to initiating operations with radioactive materials in the following instances:

- Startup of a new facility.
- Following replacement of final filters
- After maintenance work on the final filter bank that could have foreseeable adverse impacts on their effective operation.
- After exposure of the final filters to a condition or agent that may have adversely impacted their effective operation, if deemed necessary based on a visual/operational inspection.

9.2.3 Final HEPA Filter Surveillance

Measures will be taken to conservatively monitor the potential onset of, or adverse emissions impacts from, HEPA filter deterioration caused by corrosive chemical fumes. These measures will include the following:

- implementation of a preventive maintenance (PM) procedure for the periodic inspection of HEPA filters (primary and final banks) in systems exhausting air from areas or process equipment containing corrosive fumes. The PM procedure will designate the applicable systems, specify required frequencies of inspections, and identify required actions in the event of unacceptable results.
- maintenance of a site procedure for the periodic measurement of differential pressures across HEPA filter banks; and
- maintenance of a stack emissions monitoring procedure that includes action levels triggering notifications to the maintenance/engineering organization and performance of HEPA filter inspections at measured offgas radionuclide concentrations well below applicable modified 10 CFR 20 Appendix B effluent limits. Inspections trigger repair or replacement as needed.

Final HEPA filter installations shall be equipped with pressure differential measuring/indicating devices. Measured differential pressures shall be used to evaluate the need for filter changeout/maintenance. See Chapter 4, Section 4.6.1 for evaluation criteria.

9.3 ***Liquid Effluent Controls***

Operating and engineered controls will be used as necessary to ensure that concentrations of radioactive materials in liquid effluents and sewer discharges are compliant with 10 CFR 20.1302 and 10 CFR 20.2003, respectively. The site will maintain procedures with action levels to ensure that compliance with applicable limits is maintained.

9.3.1 Wastewater Collection/Treatment

Wastewaters contaminated with, or subject to contamination with, radioactive materials shall be managed, as appropriate, within the plant's process wastewater management system(s). After any necessary treatment, process wastewaters may be combined with plant sanitary sewage and non-contaminated cooling water streams for discharge to the City of Richland sewer system. The process wastewater management system(s) shall provide treatment required to assure compliance with 10 CFR 20 radiological sewerage limits.

9.3.2 Wastewater Sampling

The plant's combined liquid effluent shall be proportionately sampled for uranium and measured for flow at the Framatome plant effluent monitoring station prior to discharge to the city sewer. Utilization of an appropriate grab sampling program is permissible on a short-term interim basis

to cover instances when the proportional sampler is inoperable. Discharge data based on grab samples shall be so noted in the plant liquid effluent sampling records.

9.4 ***Environmental Monitoring***

Framatome shall conduct a routine environmental surveillance program relative to operation of the Richland fuel fabrication facility. Surface environmental media and groundwater samples shall be collected from strategic locations in the surrounding environs and analyzed for pertinent constituents of concern.

9.4.1 Surface Environmental Sampling

Surface-level environmental media shall be sampled for uranium and fluorides per the following schedule. See Figure 9-1 for the location of the stations.

Sample Station	Media	Frequency	Analysis
1	Soil	Quarterly	Uranium
2	Soil	Quarterly	Uranium
3	Air	Monthly	Fluoride
4	Air	Monthly	Fluoride
5	Forage	Monthly*	Fluoride
6	Forage	Monthly*	Fluoride

* During the growing season only (April-September)

9.4.2 Groundwater Sampling

Samples of groundwater shall be collected as outlined below. The program design (sampled constituents and well locations) focuses on current facilities managing the plant's major process wastewater streams as well as the legacy surface impoundment (lagoon) system. See Figure 9-2 for locations of the groundwater monitoring wells.

Well Numbers	Frequency	Analysis
GM-1, GM-2, GM-5, GM-6, GM-7, GM-8, GM-10, GM-12	Semi-Annually	Isotopic Uranium, Tc-99, fluoride, nitrate, pH

9.4.3 Sanitary Sewer Sludge Sampling

The release of radioactive materials to the municipal sewer system shall be controlled and sampled as described in Section 9.3. In addition to the effluent monitoring described therein, Framatome shall conduct a routine sampling program for the radioactive content of sewage sludge produced at the City of Richland sewage treatment plant. Samples of the sludge in its

dewatered (semi-dry) state, as subsequently landfilled, shall be collected quarterly and analyzed for uranium and moisture content. The uranium-based activity in picocuries per gram of sewage sludge (as landfilled) shall be maintained below 30 pCi/gram for any confirmed single sample result and below 25 pCi/gram of sewage sludge as an annual running average. Results in excess of these values shall be cause for investigation, with a follow-up action plan as appropriate to restore compliance with limits.

Figure 9-1 Environmental Sampling Stations

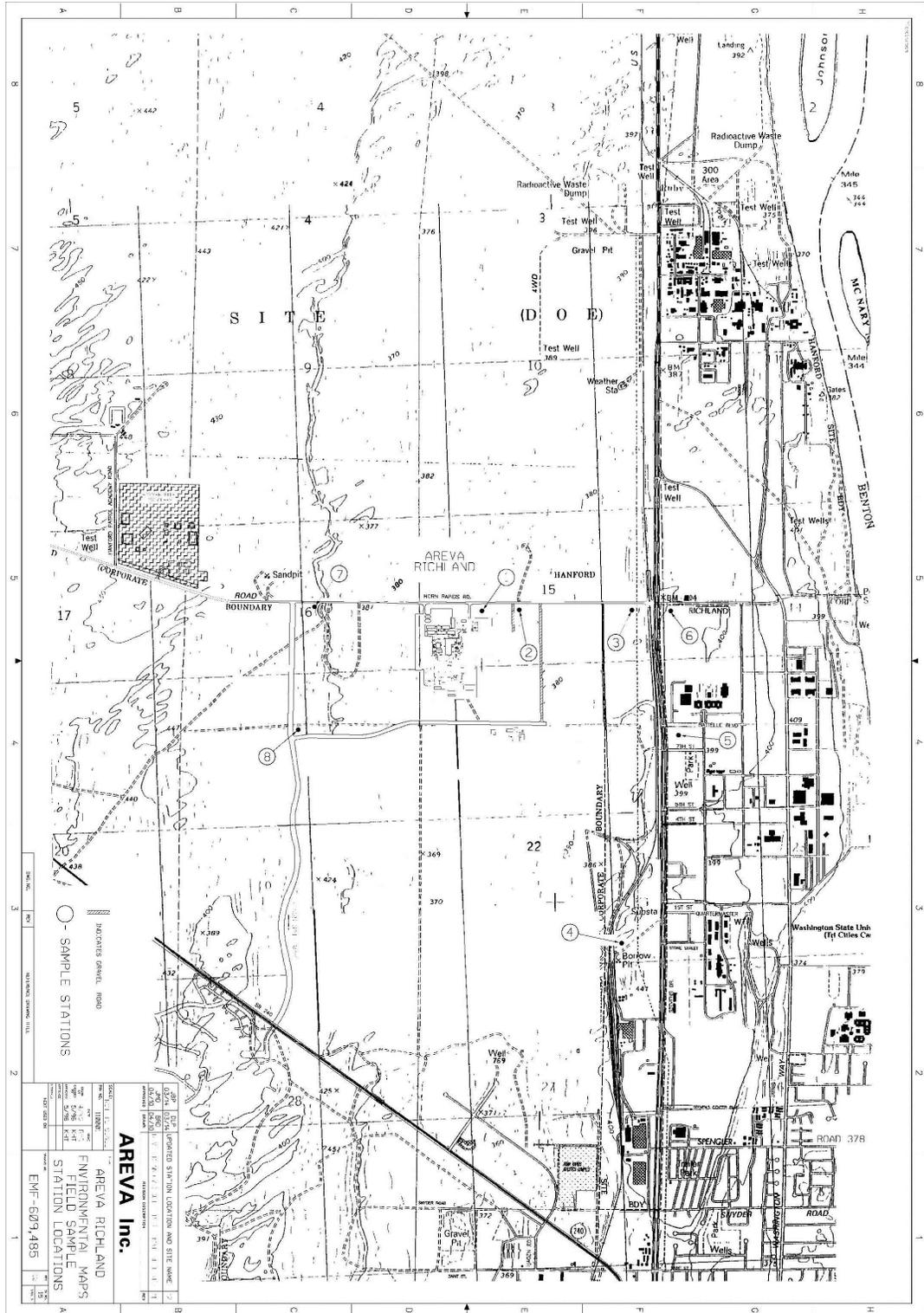
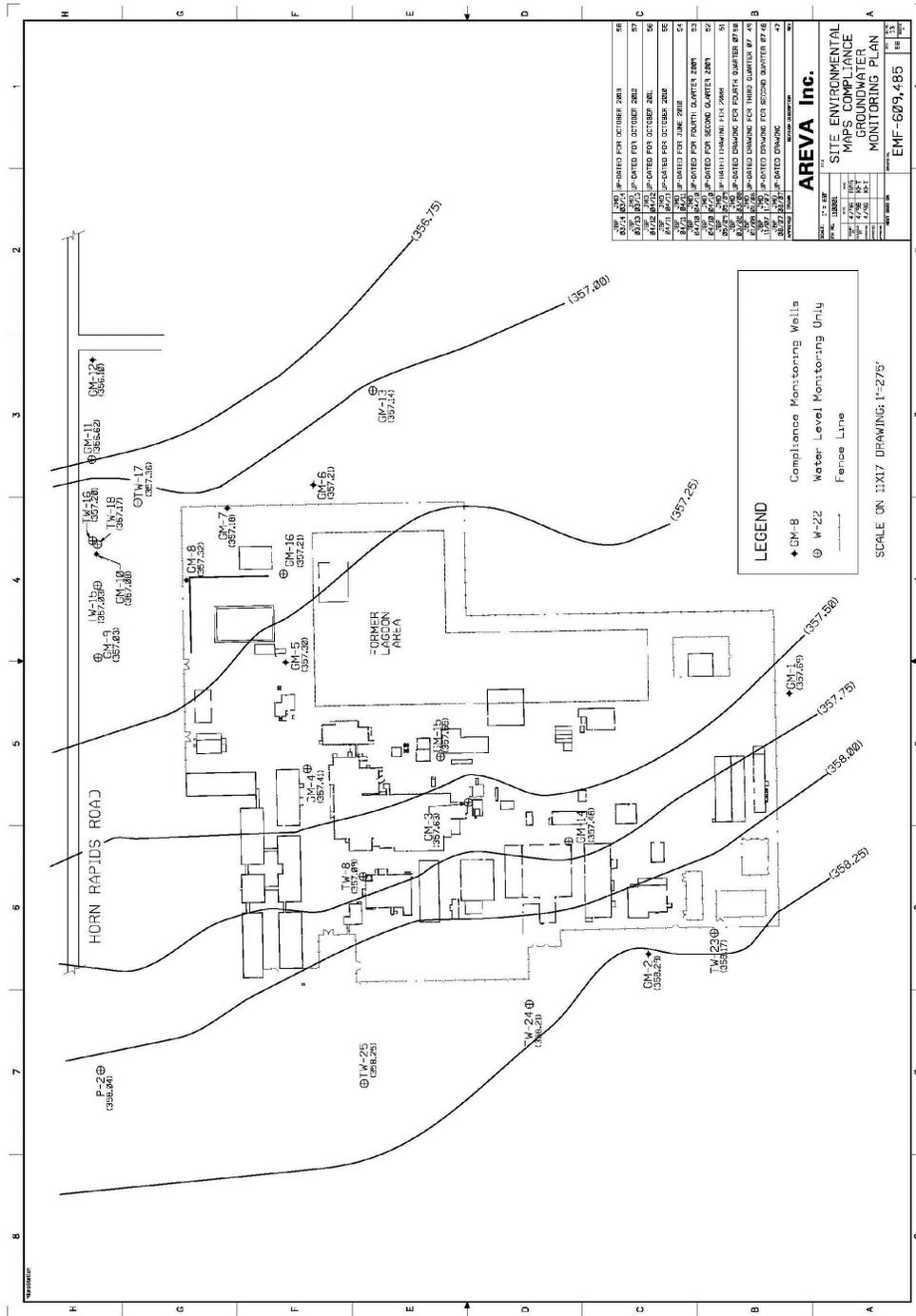


Figure 9-2 Groundwater Monitoring Wells



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Signature Date	User	Meaning of Signature
12-Jul-2021	Manning, Calvin	Author
12-Jul-2021	Tate, Timothy on behalf of ehsl_mgr (ehsl_mgr)	Richland EHS and L Manager