

DEC 29 2023

DRC-2023-079278

December 28, 2023

CD-2023-263

Mr. Doug Hansen, Director  
Division of Waste Management and Radiation Control  
P.O. Box 144880  
Salt Lake City, UT 84114-4880

**Subject: Federal Cell Facility Application: Responses to the Director's Request for Information – DRC-2023-078516**

Dear Mr. Hansen:

EnergySolutions hereby responds to the Utah Division of Waste Management and Radiation Control's December 21, 2023 Request for Information (RFI) on our Federal Cell Facility Application.<sup>1</sup> A response is provided for each request using the Director's assigned reference number.

#### **Application**

*In the introduction of multiple appendices (including Appendix T, Appendix H, Appendix G, etc.), it states that "... this Application serves as the regulatory point by which EnergySolutions must demonstrate compliance with applicable rules established by the Board. EnergySolutions implements procedures as a means for establishing how it intends to comply with applicable conditions of the License." However, it continues that "Periodically, EnergySolutions' procedures may be reviewed and revised to reflect improvements or changes in Federal Cell Facility activities."*

*If a procedure cited in this Application to demonstrate compliance with State and Federal Regulation is revised, modified, or otherwise removed without prior approval from, or foreknowledge of the Division, it would be problematic. This process does not allow for assurance that future iterations of potentially critical procedures will continue to meet the original intent.*

Utah Code 19-3-108.1 authorizes the Director of the Division of Waste Management and Radiation Control to "... issue a permit, license, registration, certification, or other administrative authorization" that designate points of compliance applicable to regulatory requirements and rules promulgated by the Waste Management and Radiation Control Board (under authority created by Utah Code 19-3-103.1) necessary "...to ensure compliance with applicable statutes." The Board promulgated rules that serve as points of compliance for issuance and operation under Radioactive Material Licenses for disposal of low-level radioactive waste in Utah Administrative Code R313-12, R313-15, R313-22 R313-25, R313-37, and R313-70. The Board also concentrated the Director's focus by promulgating rules in Utah Administrative Code R313-14 authorizing the Director to "...assure the radiological safety of the public, radiation workers, and the environment by:

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<sup>1</sup> Hansen, D.J. "Federal Cell Facility Application Request for Information." via DRC-2023-004939 from the Utah Division of Waste Management and Radiation Control to Vern Rogers of EnergySolutions, June 13, 2023.

- (a) ensuring compliance with Utah Radiation Control rules or license conditions;
- (b) obtaining prompt correction of violations;
- (c) deterring future violations; and
- (d) encouraging improvement of licensee, permittee, or registrant performance, including the prompt identification, reporting, and correction of potential safety problems.” [emphasis added].

In accordance with Utah Administrative Code R313-14, EnergySolutions is required to demonstrate to the Director its compliance with the Utah Radiation Control rules and license conditions during its Clive Facility radioactive waste management activities.

To ensure the continuous compliance with applicable rules and license conditions, EnergySolutions has developed a library of waste management procedures (not included in the points of compliance for which the Director is responsible). Procedures define a variety of effective approaches for maintaining compliance with the Utah Radiation Control rules and license conditions and account for generator needs, sources/volumes/forms of radioactive waste authorized for management under Radioactive Material Licenses, available equipment and labor, and other market forces. The effectiveness of these procedures is judged by their ability to support EnergySolutions' compliance with the Utah Radiation Control rules and license conditions. Unexpected deviation from procedure adherence is investigated by EnergySolutions and, where warranted, corrective actions implemented. However, while not a desirable situation, procedural deviation does not automatically equate to non-compliance with Utah Radiation Control rules and license conditions.

***Please provide 1) the process for how procedures will be updated to reflect criteria that might be incorporated into the disposal facility license as Conditions...***

EnergySolutions has a 30-year history of successfully managing policies and procedures for the Clive disposal site. The site management team performs annual and bi-annual reviews of all procedures and notes areas of concern. Reviews look for:

1. Procedures that may no longer apply.
2. Changes in legal or regulatory rules.
3. Market force or industry-wide changes.
4. Effectiveness in implementation.
5. Opportunities to improve, as identified by managers or staff employees.

Once it is determined that a new procedure is necessary, a draft of the proposed new procedure is prepared and.

1. Circulated through an internal legal review.
2. Reviewed for consistency with Utah Radiation Control rules and applicable license conditions.
3. Reviewed for representativeness with in-field practices.
4. Reviewed for operational and industrial safety.
5. Reviewed by facility management.
6. Relevant employees are notified and trained on the new procedure and provided with a copy.

7. Relevant employees are required to sign a statement that they are aware of and have been trained on procedure revisions.
8. Put into the appropriate manual (both hardcopy and online) with the approval and revision date.
9. A courtesy copy of the revised procedure is provided to the Director.

The first step in updating any new procedure is a robust understanding that a need exists for an updated procedure. Updated procedures in response to new criteria that define new license conditions as part of the disposal facility license will be identified by the Division with notice provided to EnergySolutions. These new procedures will be prepared and finalized utilizing EnergySolutions existing practices.

***and 2) provide assurance that in future potential amendments and modifications, EnergySolutions' procedures will continue to meet regulations as set forth in the application.***

The points of compliance to which EnergySolutions is required to demonstrate compliance are established in Utah Administrative Code, Radioactive Material Licenses, Permits, and associated Appendices. Site procedures define various administrative and operational approaches that EnergySolutions uses to remain in compliance. Procedures are regularly reviewed for their accuracy, efficiency, and other opportunities for their improvement.

The process of regulatory change management involves keeping track of industry-relevant regulatory requirements and integrating new requirements into the organization. EnergySolutions has a robust regulatory change management process that starts with an awareness that a relevant regulatory update has occurred (see FCF-AD-PR-100, Licensing/Permitting Compliance in Appendix J to the Application). The new regulatory updates are analyzed to determine:

- Whether new policies are needed
- What changes to current plans or procedures are needed

If it is determined that a new policy or procedure is necessary, a draft of the proposed new procedure will be prepared and;

1. Put through an internal legal review.
2. Reviewed by management and a review committee.
3. Relevant employees are notified of the new procedure and provided with a copy.
4. Relevant employees are required to sign a statement that they are aware of the changes.
5. Put into the appropriate manual both hardcopy and online with the approval and revision date.

EnergySolutions has an internal assurance framework that includes a compliance self-assessment (CSA) step to provide regular evidence from staff on the level of their compliance with existing procedures.

The Division regularly audits EnergySolutions for regulatory compliance. This remains the best assurance that regulations as set forth in the application are being met.

**Appendix AC: Borrow Reclamation Plan**

*The application has presented the implementation of a reclamation plan for a clay Borrow Pit located in Section 29. This land reclamation plan was implemented in 2018.*

*Please provide an evaluation of the reclamation plan to date (successful, unsuccessful, ongoing, etc.).*

Successful implementation of the Borrow Pit reclamation plan in 2018 included topsoil placement (approximately 4,000 yd<sup>3</sup>), grading (cut, fill and grade approximately 53,400 yd<sup>2</sup> to create a finish grade with slopes not exceeding 3H:1V), and seeding with native species of approximately 115,630 yd<sup>2</sup>. To facilitate plant germination, approximately 2,400 feet of run-on control berms were constructed along the eastern, northern, and western limits of the reclamation area. Control berms were repaired, and the area was reseeded again in 2019. Since then, native vegetation has thrived, with minimal observed surficial erosion. In coordination with possible future expansion of support facilities and disposal embankments, the timing for future implementation of Borrow Pit Reclamation Plan is under evaluation for other legacy clay borrow locations in Sections 5 and 29.

**Appendix P: Federal Facility Organizational Layout**

**P-1:** *In the introduction of Appendix P, Federal Cell Facility Organization Layout, EnergySolutions states:*

*“Departments that support the Federal Cell Facility Management include the Federal Cell Facility Compliance and Permitting Department, Federal Cell Facility Engineering Department, Federal Cell Facility Quality Assurance and Control, Plant Administration, Federal Cell Facility Operations, Federal Cell Facility Radiation Safety, and Federal Facility Health and Safety.”*

*However, these Federal Cell Facilities were not listed in the facility descriptions or included in the provided organizational charts. For clarification, please provide updated descriptions of each department’s responsibilities, and an updated organizational structure chart. Additionally, please identify when these departments will be staffed by EnergySolutions and the expected number of staff that will be required to fill these positions.*

EnergySolutions’ organization chart considers waste management at operational and closed embankments, permits, and licenses. The Federal Cell Facility is not currently licensed for operations. Upon licensure, Federal Cell Facility support activities and operations will be assigned the positions as described in Table 1.

**Table 1 - EnergySolutions Federal Cell Personnel Organization**

<b>Current Clive Department</b>	<b>Department Supervisor</b>	<b>Current Responsibilities</b>	<b>Additional. Federal Cell Duties Assigned Upon Receipt of License</b>
Clive Facility Management	General Manager	The General Manager, Clive Facility is responsible for the oversight of the Clive Facility operations including waste acceptance, sampling, management, and disposal; laboratory, engineering, and environmental compliance; and carrying out activities efficiently and safely in accordance with design specifications, quality assurance program requirements, and all applicable regulations.	The General Manager, Clive Facility will also be responsible for the oversight of the Federal Cell Facility operations including federal waste acceptance, sampling, management, and disposal; laboratory, engineering, and environmental compliance; and carrying out activities efficiently and safely in accordance with design specifications, quality assurance program requirements, and all applicable regulations.
Clive Facility Compliance and Permitting	Director, Regulatory Affairs	The Director, Regulatory Affairs oversees compliance with and maintains and facilitates permit and license renewals, modifications, and amendments for the Clive Facility. The Director, Regulatory Affairs is also responsible for the preparation of regulatory reports submitted in accordance with EnergySolutions licenses and permits for the Clive facility.	The Director, Regulatory Affairs will also oversee compliance with and maintains and facilitates renewals, modifications, and amendments for the Federal Cell Facility. The Director, Regulatory Affairs will also be responsible for the preparation of regulatory reports submitted in accordance with EnergySolutions licenses and permits for the Federal Cell Facility.
Clive Facility Engineering	Site Engineer	The Clive Facility Site Engineer performs engineering design drawings, project plans, construction reports, embankment construction project management, and As-Built Drawings while maintaining compliance with required Clive Facility licenses and permits. The Site Engineer is responsible for overseeing quality control and compliance of disposal embankment construction, including the AMRL certified soils laboratory, as well as construction activities that affect compliance with licenses and permits. The Site Engineer provides technical and engineering support for site operations including site layout and design reviews; and approves those designs and specifications with oversight provided by the Quality Assurance Department.	The Clive Facility Site Engineer will also perform engineering design drawings, project plans, construction reports, embankment construction project management, and As-Built Drawings while maintaining compliance with required Federal Cell Facility licenses and permits. The Site Engineer will be responsible for overseeing quality control and compliance of disposal embankment construction, including the AMRL certified soils laboratory, as well as construction activities that affect compliance with licenses and permits. The Site Engineer will provide technical and engineering support for site operations including site layout and design reviews; and approves those designs and specifications with oversight provided by the Quality Assurance Department.

Current Clive Department	Department Supervisor	Current Responsibilities	Additional. Federal Cell Duties Assigned Upon Receipt of License
Clive Facility Quality Assurance	Director, Quality Assurance	The Director, Quality Assurance is responsible for ensuring that the quality assurance requirements outlined in ES-QA-PG-001, Quality Assurance Program are implemented. The Director, Quality Assurance has sufficient authority and autonomy to implement and direct the Quality Assurance Program (QAP); identify quality problems and initiate, recommend, or provide solutions; and verify implementation of solutions independent of undue influences and responsibilities, such as costs and schedules.	The Director, Quality Assurance will also be responsible for ensuring that the quality assurance requirements outlined in FCF-QA-PG-001, Quality Assurance Program are implemented. The Director, Quality Assurance Manager will also implement and direct the Quality Assurance Program (QAP); identify quality problems and initiate, recommend, or provide solutions; and verify implementation of solutions independent of undue influences and responsibilities, such as costs and schedules.
Clive Facility Plant Administration	Manager, Plant Administration and Security	The Manager, Plant Administration and Security is responsible for the overall performance of the Plant Administration organization, which includes the facility security group.	The Manager, Plant Administration and Security will also be responsible for the overall performance of the Plant Administration organization, which includes the facility security group in support of the Federal Cell Facility.
Clive Facility Operations	Manager, Operations	The Manager, Operations is responsible for decontamination activities, container storage/tracking, onsite waste sampling, disposal, and treatment operations of the LLRW and Mixed Waste Facilities. The Manager, Operations works closely with Radiation Safety, Safety and Health, and Quality Assurance to assure that all aspects of site operations are conducted according to applicable regulations.	The Manager, Operations will also be responsible for decontamination activities, container storage/tracking, federal waste disposal, and treatment operations of the Federal Cell Facility. The Manager, Operations will work closely with Radiation Safety, Safety and Health, and Quality Assurance to assure that all aspects of Federal Cell Facility operations are conducted according to applicable regulations.
Clive Facility Health and Safety	Manager, Health and Safety	The Manager, Health and Safety is responsible for developing and managing the Clive Safety and Health (S&H) Program and the Clive Training Program in assuring compliance with all regulatory requirements and guidance.	The Manager, Health and Safety will also be responsible for developing and managing the Federal Cell Facility Safety and Health (S&H) Program and the Federal Cell Facility Training Program in assuring compliance with all regulatory requirements and guidance.



Current Clive Department	Department Supervisor	Current Responsibilities	Additional. Federal Cell Duties Assigned Upon Receipt of License
Clive Facility Radiation Safety	Radiation Safety Officer	The Radiation Safety Officer (RSO) serves as the position of Radiation Safety Officer as defined in UAC R313-12 and is responsible for implementation of and compliance with protocols and procedures of the Radioactive Material Licenses. The RSO supervises the Radiation Safety staff and works very closely with the Operations Manager, Director, Regulatory Affairs, and the Shipping and Receiving Manager. The RSO is responsible for on-site radiation safety including implementation of, and compliance with the Clive Radiation Protection Program and associated procedures. The RSO is responsible for the onsite laboratory and sampling activities. The RSO determines whether adequate radiation instrumentation and equipment are used and whether adequate measurements are made to ensure that all applicable standards for personnel protection against exposure to radiation and radioactive materials are satisfied.	The Radiation Safety Officer will also be responsible for implementation of and compliance with protocols and procedures of the Federal Cell Facility Radioactive Material License. The RSO will supervise the Radiation Safety staff and works very closely with the Operations Manager, Director, Regulatory Affairs, and the Shipping and Receiving Manager in support of the Federal Cell Facility. The RSO will be responsible for on-site radiation safety including implementation of, and compliance with the Federal Cell Facility Radiation Protection Program and associated procedures. The RSO will determine whether adequate radiation instrumentation and equipment are used and whether adequate measurements are made to ensure that all applicable standards for personnel protection against exposure to radiation and radioactive materials are satisfied in support of the Federal Cell Facility.
Clive Shipping/ Receiving	Manager, Shipping and Receiving	The Manager, Shipping and Receiving is responsible for ensuring all shipments received and leaving the site are in compliance with all licenses, permits, and regulations.	The Manager, Shipping and Receiving will also be responsible for ensuring all federal waste shipments received and leaving the Federal Cell Facility are in compliance with all licenses, permits, and regulations.
Clive Facility Security	Manager, Plant Administration and Security	The Manager, Plant Administration and Security establishes and implements requirements to provide for the protection and safety of EnergySolutions personnel, visitors/contractors, EnergySolutions assets, and customer assets for which EnergySolutions has custody, including requirements for the development and implementation of Clive Facility-specific security plans and procedures.	The Manager, Plant Administration and Security will be responsible for establishing and implementing requirements to provide for the protection and safety of EnergySolutions personnel, visitors/contractors, EnergySolutions assets, and customer assets for which EnergySolutions has custody, including requirements for the development and implementation of Federal Cell Facility-specific security plans and procedures.

**P-2: NUREG 1200 4.3.2 Operations states: “Substantive breadth and level of experience and availability of personnel exist to implement the responsibility for technical support for the operation of the facility. The need to supplement the corporate structure with additional experienced personnel for the initial years of operation will be determined on a case-by-case basis.”**

**Please provide how EnergySolutions plans to evaluate the need for additional staff in the initial years of operation.**

EnergySolutions has operated the Clive disposal site for more than 30 years. During that time the company has dealt with numerous changes that have affected staffing needs. EnergySolutions applies several key factors in determining when to augment staff or to secure contractor support.

- Need for an additional technical skill set in existing workforce.
- Changes in waste receipt volume forecasts
- Changes in waste or package, form, or means of transport.
- Employee attrition
- Support for future capital improvements

The company will continue to apply these factors in evaluating the need for additional staff.

#### **Appendix U: Federal Cell Facility Security Procedures**

**U-1: Examples of Federal Cell Facility Security Program and Procedures, Procedure ES-SE-PG-001 Revision 3 Section 4 General identifies the responsibilities of Business Group Leaders, Facility, and Project Managers. In reviewing Subsection 4.2 Responsibilities, it is unclear as to what role a Business Development Leader is assigned.**

**Please define this role’s capacity and list their responsibilities. For clarification, has this position previously been identified as a Business Development Leader? If so, please correct this for consistency.**

Neither the position nor the duties of a Business Development Leader are addressed or considered in ES-SE-PG-001, *Security Program* or FCF-SE-PR-001, *Federal Cell Facility Security Operations Protocol*. In relationship to implementation of the Federal Cell Facility Security Programs and Procedures, Business Group Leaders are responsible to ensure the regularly review, revision, improvement, and implementation of security and safeguard requirements and controls for facilities, sites, and projects within the specific business service line. The Business Group Leader coordinates with the Group’s security representative and Project Leads or Facility General Managers to ensure the security plan and procedures are regularly reviewed, maintained, and improved. The Business Development Leader communicates with Corporate Executive management, customers/generators, and media liaisons in the event of a possible or actual security breach or event.



**U-2: The Federal Cell Facility Site Radiological Security Plan identified in Appendix U, Section 6.2 Restricted Area Access Controls states: “Activities within the Restricted Area shall be monitored by Security, either by presence or by the use of security cameras.”**

**Please provide procedures or documentation which give detailed information describing the role cameras play in the overall security plan, including the operational and functional nature of the security cameras being used and a discussion of how security camera footage will be monitored.**

The Clive Facility uses a variety of means to implement the Federal Cell Facility Site Radiological Security Plan, including fencing, signage and posting, locked access gates, regular security patrols, random vehicle and personnel searches, the continual presence of site security officers, and security cameras. The role of security cameras is to dynamically detect attempts at unauthorized intrusion into the Clive Facility, unauthorized actions within EnergySolutions’ Owner Controlled Property, or unauthorized attempts to access Category 1 and 2 Radioactive Material Quantities of Concern (RAMQC) in compliance to the requirements promulgated in Utah Administrative Code R313-37.

Eleven security cameras are continuously monitored by security officers to observe the outer fenced perimeter, discouraging trespassing, crime, to monitor on-site activities, and to protect company resources from damage. Fifteen additional cameras monitor activities within EnergySolutions’ Clive Facility. Camera footage is permanently archived on Clive Facility servers. Archive footage from security cameras plays the role of evidentiary support for investigation and evaluation of unexpected events, such as attempted intrusion.

Clive Facility staff must be trained and qualify as a Security Officer (Qualification #Q2000) to enforce CL-SE-PR-001 (developed in accordance with the Federal Cell Facility Site Radiological Security Plan) and execute duties of a Security Officer, as required. As prerequisites to qualifying as a Security Officer, individuals must pass a criminal background investigation, pass an illicit drug screening, complete on the job training, and pass with a minimum score of 90% an exam regarding application of the Federal Cell Facility Site Security Plan and CL-SE-PR-001, *Security Operations Protocol*. On the job training is conducted under the supervision of the Security Manager or designee and includes:

- Conducting driving security patrols inside the Licensed Restricted Area;
- Conducting driving security patrols of EnergySolutions’ owner-controlled property outside of the Licensed Restricted Area; and
- Security Control Room activities.

Training on Security Control Room activities includes video feed monitoring from the 11 site security cameras, radio use, use of property access logs, use of Restricted Area gate access logs, operation of automated remote access gates, conducting visitor orientation, broadcasting site-wide weather warnings, and implementation of the Contingency Plan. CL-SE-PR-001 is reviewed biennially for accuracy. Security Officer training is repeated when revisions are made to CL-SE-PR-001 or the Federal Cell Facility Site Radiological Security Plan.

**Appendix T: Federal Cell Facility Personnel Monitoring Procedures**

**T-1: DAQE-AN0107170019, Air Approval Order does not include consideration of a Federal Cell. Please update or provide justification.**

EnergySolutions' tracks sources of potential atmospheric dust and gaseous transport from its Clive Facility operations via Air Approval Order DAQE-AN107170021-19 (attached). The Air Approval Order considers a maximum of 400 acres of dust generating disturbed land via radioactive material disposal (within Section 32), which includes a limit of up to 1,500,000 tons of material disposed in a rolling 12-month period, 100,000 yd<sup>3</sup> of concrete per rolling 12-month period, 7,300 hours of operation for bulldozing and compacting for cover/liner construction per rolling 12-month period, 250,000 tons of material for cover/liner construction per rolling 12-month period, and total area for active waste storage piles not to exceed 8.1 acres. Compliance with the rolling 12-month totals is confirmed by monthly calculating new totals from the previous 12 months using weigh scales, records, and engineering records. Updates to the Air Approval Order are requested to accurately reflect compliance points above the 12-month Order limits.

Operations at the Federal Cell Facility will not disturb land areas more than that currently authorized, will not require disposal of bulk waste, will not commit equipment operations in excess to that authorized in the Order, will not require construction of liner in excess to that authorized in the Order, and will not need management of concrete above that authorized in the Order. Therefore, revision to the Air Approval Order will not be required in consideration of a Federal Cell Facility. The current processes used to confirm monthly compliance with the Order's limits and adjustments, when necessary, will continue to be applied during operation of the Federal Cell Facility.

**T-2: Please provide the Tooele County Conditional Use Permit (CUP) #2700-87 listed in FCF-EN-PR-011.**

EnergySolutions' Tooele County Conditional Use Permit (CUP) #2700-87 is attached.

**T-3: Please provide FCF-QA-PR-015, CG-QA-PR-015, and associated appendices as referenced in FCF-QA-PN-001.**

Clive Facility tracks waste receipt and disposal into its various licensed and permitted embankments via the Electronic Waste Information System (EWIS). EWIS records shipment manifest data and tracks low-level radioactive waste and mixed waste shipments during receipt, treatment, storage, and disposal. The purpose of CL-QA-PN-001, *EWIS Software Quality Assurance Plan* (attached) is to define the software quality assurance controls applicable to regulatory functions performed by the EWIS software. The receipt, management, and disposal of federal waste associated with the proposed Federal Cell Facility will be tracked using EWIS (instead of a unique or separate tracking system initially contemplated as FCF-QA-PN-001). Therefore, CL-QA-PN-001, *EWIS Software Quality Assurance Plan* is applicable to operations at the Federal Cell Facility (instead of FCF-QA-PN-001). Similarly, creation of a unique FCF-QA-PR-015, *Computer Software Management* is unnecessary, as the approach contemplated in CG-QA-PR-015 (attached) is equivalent. The following procedures referenced in CL-QA-PN-001, *EWIS Software Quality Assurance Plan* are also attached:

- CL-AD-PR-060, *EWIS/WITS Administrative Procedure*
- ES-IT-PO-005, *System Backup Policy*
- ES-IT-PN-003, *Information Security Handbook*
- ES-IT-PR-011, *Data Backup Procedure*
- ES-IT-PR-012, *Software Application Development Change Control Procedure*
- CG-QA-PR-015, *Computer Software Management*

**T-4: FCF-EN-PR-011 lists Reference 2.1 as the GWQDP in 3.1.24 Open Cell Time Limition; however, in section 2 References of the same document the FCF CQQA/QC Manuals are listed as 2.1 and does not list GWQDP in the reference list. Please correct.**

Reference 2.5 has been added to FCF-EN-PR-011, *Federal Cell Facility Engineering Field Inspections* (attached) to cite Groundwater Quality Discharge Permit UGW450005. The citation in Section 3.1.24 has been revised to point to Reference 2.5.

**T-5: Please submit a redline strikeout version of the GWQDP for review. The hyperlinked version is the currently approved version and makes no reference to the federal cell application.**

A request to modify Groundwater Quality Discharge Permit UGW450005 in redline strikeout format is hereto attached.

If you have further questions regarding the response to the director's request of DRC-2023-004939, please contact me at (801) 649-2000.

Sincerely,

**Vern C.  
Rogers**

Digitally signed by Vern C. Rogers  
DN: cn=Vern C. Rogers, o=EnergySolutions,  
ou=Waste Management Division,  
email=vcrogers@energysolutions.com, c=US  
Date: 2023.12.28 14:30:00 -0700'

Vern C. Rogers  
Director, Regulatory Affairs

enclosure

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*



Mr. Doug Hansen  
CD-2023-263  
December 28, 2023

**AIR APPROVAL ORDER DAQE-AN107170021-19**



State of Utah

GARY R. HERBERT  
*Governor*

SPENCER J. COX  
*Lieutenant Governor*

Department of  
Environmental Quality

Alan Matheson  
*Executive Director*

DIVISION OF AIR QUALITY  
Bryce C. Bird  
*Director*



DAQE-AN107170021-19

January 25, 2019

Tim Orton  
EnergySolutions, LLC  
299 South Main Street, Suite 1700  
Salt Lake City, UT 84111

Dear Mr. Orton:

Re: Approval Order: Modification to Approval Order DAQE-AN0107170019-11 to Update  
Equipment and Increase Total Disturbed Area Limitation  
Project Number: N10717-0021

The attached document is the Approval Order for the above-referenced project. Future correspondence on this Approval Order should include the engineer's name as well as the DAQE number as shown on the upper right-hand corner of this letter. The project engineer for this action is Ana Williams, who may be reached at (801) 536-4153.

Sincerely,

Bryce C. Bird  
Director

BCB:AW:sa

cc: Tooele County Health Department

**STATE OF UTAH**

**Department of Environmental Quality**

**Division of Air Quality**

**APPROVAL ORDER: Modification to Approval Order  
DAQE-AN0107170019-11 to Update Equipment  
and Increase Total Disturbed Area Limitation**

**Prepared By: Ana Williams, Engineer  
Phone: (801) 536-4153  
Email: [anawilliams@utah.gov](mailto:anawilliams@utah.gov)**

**APPROVAL ORDER NUMBER**

**DAQE-AN107170021-19**

**Date: January 25, 2019**

**EnergySolutions, LLC  
Radioactive Material Disposal Site**

**Source Contact:**

**Tim Orton, Environmental Engineer  
Phone: (801) 532-1330  
Email: [torton@energysolutions.com](mailto:torton@energysolutions.com)**



**Bryce C. Bird  
Director**

## Abstract

EnergySolutions, LLC (EnergySolutions) operates a facility located in Clive, Tooele County, that provides waste management, treatment, and disposal services for low-level and naturally-occurring radioactive wastes (LLRW/NORM), byproduct material such as uranium mill tailing, and mixed radioactive and RCRA hazardous waste. EnergySolutions has requested to replace one (1) emergency engine, replace one (1) emergency fire pump engine, remove one (1) emergency engine from the approved equipment list, and increase total disturbed area for the site from 279 acres to 400 acres. As part of this modification, the UDAQ has updated the HAP emission limitations.

Tooele County is an attainment area of the NAAQS for all criteria pollutants. NSPS (40 CFR 60 Subparts A and III) and MACT (40 CFR 63 Subparts A and ZZZZ) regulations apply to this source. NESHAP (40 CFR 61) regulations and Title V of the 1990 CAA do not apply to this source.

The PTE, in TPY, will change as follows: Point  $PM_{10}$  = -0.02, Fugitive  $PM_{10}$  = +22.99, Point  $PM_{2.5}$  (subset of Point  $PM_{10}$ ) = -0.02, Fugitive  $PM_{2.5}$  (subset of Fugitive  $PM_{10}$ ) = +6.90,  $NO_x$  = -0.22,  $SO_2$  = -0.02, CO = -0.48, VOC = -0.02, and  $CO_2e$  = +37.26.

The PTE, in TPY, will be as follows: Point  $PM_{10}$  = 0.66, Fugitive  $PM_{10}$  = 105.94, Total  $PM_{10}$  = 106.60, Point  $PM_{2.5}$  (subset of Point  $PM_{10}$ ) = 0.34, Fugitive  $PM_{2.5}$  (subset of Fugitive  $PM_{10}$ ) = 28.84, Total  $PM_{2.5}$  (subset of Total  $PM_{10}$ ) = 29.18,  $NO_x$  = 5.06,  $SO_2$  = 0.45, CO = 2.24, VOC = 2.69, HAPs = 2.33, and  $CO_2e$  = 37.26.

This air quality AO authorizes the project with the following conditions and failure to comply with any of the conditions may constitute a violation of this order. This AO is issued to, and applies to the following:

**Name of Permittee:**  
EnergySolutions, LLC  
299 South Main Street, Suite 1700  
Salt Lake City, UT 84111

**Permitted Location:**  
Radioactive Material Disposal Site  
Clive Facility  
Clive, UT 84029

**UTM coordinates:** 321,400 m Easting, 4,506,100 m Northing, UTM Zone 12

UTM Datum: NAD27

**SIC code:** 4953 (Refuse Systems)

### **Section I: GENERAL PROVISIONS**

- I.1 All definitions, terms, abbreviations, and references used in this AO conform to those used in the UAC R307 and 40 CFR. Unless noted otherwise, references cited in these AO conditions refer to those rules. [R307-101]
- I.2 The limits set forth in this AO shall not be exceeded without prior approval. [R307-401]
- I.3 Modifications to the equipment or processes approved by this AO that could affect the emissions covered by this AO must be reviewed and approved. [R307-401-1]
- I.4 All records referenced in this AO or in other applicable rules, which are required to be kept by the owner/operator, shall be made available to the Director or Director's representative upon request, and the records shall include the two (2)-year period prior to the date of the request. Unless otherwise specified in this AO or in other applicable state and federal rules, records shall be kept for a minimum of two (2) years. [R307-401-8]

- I.5 At all times, including periods of start-up, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any equipment approved under this AO, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Director which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. All maintenance performed on equipment authorized by this AO shall be recorded. [R307-401-4]
- I.6 The owner/operator shall comply with UAC R307-107. General Requirements: Breakdowns. [R307-107]
- I.7 The owner/operator shall comply with UAC R307-150 Series. Emission Inventories. [R307-150]

**Section II: SPECIAL PROVISIONS**

**II.A The approved installations shall consist of the following equipment:**

- II.A.1 **EnergySolutions, LLC**  
Radioactive Material Disposal Site
- II.A.2 **Bulk Reagent System**  
Includes five (5) baghouses  
Each with an air to cloth ratio of 5:1
- II.A.3 **Mixed Waste Treatment Building**  
Includes the following:  
Shredders  
Vibrating screens  
Pulvi-Mixer (Tiller)  
  
Controlled by a reverse jet baghouse with HEPA filter  
Air to cloth ratio 2.5:1
- II.A.4 **Mixed Waste Operations Building**  
Controlled by a baghouse with HEPA filter
- II.A.5 **Thermal Desorption Operations System**  
Includes the following:  
One (1) thermal desorption unit  
One (1) refrigerated condensation unit  
One (1) ambient temperature condensation unit  
One (1) LPG furnace rated at 3.0 MMBtu/hr  
Water treatment tanks  
Nitrogen storage tanks  
Miscellaneous material handling equipment  
  
Controlled by three (3) carbon filters (one (1) HEPA filter and two (2) prefilter)



- II.A.6            Batch Plant**  
Includes the following equipment:  
180 cubic yard per hour batch plant controlled by a baghouse  
Cement storage silo controlled by a baghouse  
Cement storage silo controlled by a bin vent  
15 ton per hour screen plant  
Conveyors and cement trucks
- II.A.7            Process Equipment**  
One (1) 100 ton per hour shredder with water sprays
- II.A.8            Mixed Waste Area Silo**  
1,100 cf silo with baghouse
- II.A.9            Railcar Rollover Operations**  
Constructed with enclosures that minimize fugitive dust
- II.A.10           Railcar Digging Operations**
- II.A.11           Diesel-fired Emergency Generator Engine**  
242 kW (324 hp) engine provides emergency power to the Administration Building  
NSPS Applicability: Subpart IIII  
MACT Applicability: Subpart ZZZZ
- II.A.12           Diesel-fired Emergency Generator Engine**  
242 kW (324 hp) engine provides emergency power for the fire suppression pump  
NSPS Applicability: Subpart IIII  
MACT Applicability: Subpart ZZZZ
- II.A.13           Lime Kiln Dust (LKD) Silo**  
1,400 cf portable silo equipped with an Airmax dust collector
- II.A.14           Process and Mobile Equipment**  
Includes the following equipment:  
6-wheel trucks  
Bulldozers  
Front-end loaders  
Backhoes  
Compactors  
Water trucks/tractors  
Dump trucks (10-18 wheel)  
Graders  
Scrapers  
Diesel locomotives  
Concrete mixers less than one (1) cubic yard each  
Propane-fired heaters rated less than 5.0 MMBtu/hr  
Forklifts, cranes, generators, etc.

This equipment listed for informational purposes only

**II.B Requirements and Limitations**

**II.B.1 Clive Facility Requirements**

II.B.1.a The owner/operator shall control all process streams from the Mixed Waste Operations Building with the Mixed Waste Operations Building baghouse and HEPA filter. Emissions from all process streams from the Mixed Waste Operations Building shall be routed to the operating baghouse and HEPA filter before being emitted to the atmosphere. [R307-401]

II.B.1.b The owner/operator shall control all process streams from the Mixed Waste Treatment Building with the Mixed Waste Treatment Building baghouse and HEPA filter. Emissions from all process streams from the Mixed Waste Operations Building shall be routed to the operating baghouse and HEPA filter before being emitted to the atmosphere. [R307-401]

II.B.1.c The owner/operator shall not allow visible emissions from the following emission points to exceed the following values:

- A. 0% opacity for:  
 Baghouses with HEPA filters  
 Thermal Desorption System exhaust  
 Thermal Desorption System fugitives
- B. 10% opacity for:  
 All screens  
 All conveyor transfer points  
 Bulk Reagent System and Waste Receiver Tank  
 Baghouses without HEPA filters  
 Concrete batch plant  
 All silos  
 Shredders with a rating greater than 50 tons per hour  
 Entry/exit and ventilation openings at the covered Railcar Rollover Facilities  
 Transfer points at the Railcar Digging Facility
- C. 20% opacity for:  
 Conveyor drop points  
 All stationary diesel engines  
 Shredders with a rating less than 50 tons per hour  
 All other points

[R307-201]

II.B.1.c.1 Opacity observations of emissions from stationary sources shall be conducted according to 40 CFR 60, Appendix A, Method 9. [R307-401-8]

II.B.1.d The owner/operator shall not allow visible fugitive dust emissions from haul road traffic and mobile equipment in operational areas to exceed 20% opacity at any point. [R307-201]

II.B.1.d.1 Visible emission determinations shall use procedures similar to Method 9. The normal requirement for observations are to be made at 15-second intervals over a six (6)-minute period, however, shall not apply. Visible emissions shall be measured at the densest point of the plume but at a point not less than ½ vehicle length behind the vehicle and not less than ½ the height of the vehicle. [R307-401-8]

II.B.1.e The owner/operator shall only use diesel fuel (fuel oil #1, #2, or diesel fuel oil additives) in the diesel-fired emergency engines. All diesel burned shall meet the requirements of 40 CFR 80.510(b). [40 CFR 60 Subpart III]

II.B.1.e.1 To demonstrate compliance with the fuel oil requirements, the owner/operator shall keep and maintain fuel purchase invoices. The fuel purchase invoices shall indicate that the diesel fuel meets the ultra-low sulfur diesel requirements, or the owner/operator shall obtain certification of sulfur content from the fuel supplier. [40 CFR 60 Subpart IIII]

II.B.1.f The owner/operator may operate emergency engines for the purpose of maintenance checks and readiness testing, provided the tests are performed between the hours of 8:00 am to 5:00 pm Mountain Standard Time. Maintenance checks and readiness testing of such units is limited to 100 hours per rolling 12-month period per engine. There is no time limit on the use of the engines during emergencies. [40 CFR 60 Subpart IIII, R307-410]

II.B.1.f.1 To determine compliance with a rolling 12-month total, the owner/operator shall calculate a new 12-month total by the 20th day of each month using data from the previous 12 months. Records documenting the operation of each emergency generator or fire pump engine shall be kept in a log and shall include the following:

- A. The date and time of day the emergency generator or fire pump engine was used
- B. The duration of operation in hours
- C. The reason for the emergency generator or fire pump engine usage

[R307-401-8]

II.B.1.f.2 To determine the duration of operation, the owner/operator shall install a non-resettable hour meter for each emergency generator and fire pump engine. [40 CFR 60 Subpart IIII]

## II.B.2 **Production Limitations**

II.B.2.a The owner/operator shall not exceed the following process limits:

- A. Amount of material disposed at the site shall not exceed 1,500,000 tons per rolling 12-month period.
- B. The total disturbed area shall not exceed 400 acres. Disturbed area shall be all areas that have had the surface area mechanically altered. Total disturbed area shall not include disturbed areas that have been inactive for at least six (6) months or that have been reclaimed by capping, chemical treatment, or revegetation. Total disturbed area shall not include areas with buildings, parking lots, paved roads, paved areas, evaporation ponds, or other areas with no emissions.
- C. 100,000 cubic yards of concrete per rolling 12-month period
- D. 7,300 hours of operation for bulldozing and compacting for cover/liner construction per rolling 12-month period
- E. 250,000 tons of material for cover/liner construction per rolling 12-month period
- F. The total area for active storage piles shall not exceed 8.1 acres. All inactive storage piles shall be those storage piles that have not had any material added to or removed from them since the last time they were water sprayed and/or chemically treated or they have not had any material added to or removed from them within the last six (6) months.

[R307-401]

- II.B.2.a.1 To determine compliance with a rolling 12-month total, EnergySolutions shall calculate a new 12-month total by the 20th day of each month using data from the previous 12 months. Material disposal and cover liner construction shall be determined by weigh scales and record keeping. Compliance with total disturbed area shall be determined using engineering records. Any time a change in total disturbed area exceeds 28 acres, the total disturbed area shall be recalculated and recorded. The records shall be kept on a monthly basis and for all periods when the plant is in operation. [R307-401-8]
- II.B.3 **Road and Fugitive Dust Requirements**
- II.B.3.a The owner/operator shall maintain a spray bar or hose in place where bulk waste is being off-loaded. The spray bar or hose shall operate whenever the moisture content of the material in the rail cars is below 7%. If a spray bar or hose is used for all waste off-loaded at a specific area of the site, moisture content testing shall not be required for waste entering that area. [R307-401-8]
- II.B.3.a.1 If required, the moisture content test shall be determined according to ASTM Method D-2216, D-4643, or D-3017 on the 40 mesh portion of the sample. Moisture content testing shall be performed on at least every fifth rail car that comes to the site and at least one (1) test shall be run every day that cars are unloaded at the site. The spur located south of the mainline shall be used to store the cars that require spraying. Records of moisture content tests shall be kept for all periods when the plant is in operation. [R307-401-8]
- II.B.3.b The owner/operator shall water spray and/or chemically treat all unpaved roads and other unpaved operational areas that are used by mobile equipment to control fugitive dust. Treatment shall be of sufficient frequency and quantity to maintain the surface material in a damp/moist condition. The opacity shall not exceed 20% during all times the areas are in use or unless it is below freezing. If chemical treatment is to be used, the plan must be approved by the Director. [R307-401]
- II.B.3.b.1 Records of water treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:
- A. Date
  - B. Number of treatments made, dilution ratio, and quantity
  - C. Rainfall received, if any, and approximate amount
  - D. Time of day treatments were made
- [R307-401-8]
- II.B.3.c The owner/operator shall keep disturbed or stripped areas sufficiently moist or chemically treated during the project to minimize fugitive emissions. These controls, or other equivalent control methods, shall remain operational during the project cycle and until the said areas have been reclaimed. The control methods used shall be operational as needed 24-hours per day, 365 days per year or until the area has been reclaimed. If an equivalent control method or chemical treatment is to be used, the plan must be approved by the Director. [R307-401]
- II.B.3.d The facility shall have less than 30 miles of minimally-maintained haul roads in use at any one (1) time. Haul roads are defined as those roads that waste and soil handling equipment (large equipment) may use during the course of operations. Maintained haul roads are those paved roads that are regularly cleaned (swept, scraped, washed down, etc.) when used as a haul road. [R307-401]

II.B.3.d.1 Records of treatment and/or reclamation shall be kept for all periods when the plant is in operation. [R307-401-8]

II.B.3.e The owner/operator shall install water sprays or chemical dust suppression sprays at the following points to control fugitive emissions:

- A. All screens
- B. All unenclosed conveyor transfer points. Enclosed is defined as having three (3) or more sides and a top.

The sprays shall operate whenever dry conditions warrant or as determined necessary by the Director.

[R307-401]

II.B.3.f The owner/operator shall maintain a minimum moisture content of 2% by weight for the material that will be disposed. The moisture content shall be tested if directed by the Director using the appropriate ASTM method. [R307-401]

II.B.3.g The owner/operator shall water the storage piles as dry conditions warrant or as determined necessary by the Director to minimize generation of fugitive dust. [R307-401]

II.B.3.h The owner/operator shall install water sprays or chemical dust suppression sprays on the 100 ton per hour shredder to control fugitive emissions. The sprays shall operate when necessary to ensure the opacity limitations of this AO are not exceeded. If it is below freezing, then the water sprays are not required but EnergySolutions shall implement other methods of controlling fugitive emissions to ensure the opacity limitations of this AO are not exceeded. [R307-401]

II.B.4 **VOCs and HAPs Limitations**

II.B.4.a The emissions of VOCs and HAPs from the Thermal Desorption Unit System and associated operations shall not exceed:

- A. 2.37 tons per rolling 12-month period for VOCs
- B. 2.33 tons per rolling 12-month period for total HAPs
- C. 1.41 tons per rolling 12-month period for bis(2-ethylhexyl)phthalate
- D. 0.45 tons per rolling 12-month period for benzene
- E. 0.88 tons per rolling 12-month period for carbon disulfide
- F. 0.14 tons per rolling 12-month period for polychlorinated biphenyls
- G. 0.24 tons per rolling 12-month period for vinyl chloride
- H. 56.00 pounds per rolling 12-month period for p-phenylenediamine
- I. 1.41 tons per rolling 12-month period for dibutyl phthalate
- J. 1.41 tons per rolling 12-month period for dimethyl phthalate
- K. 27.00 pounds per rolling 12-month period for heptachlor

- L. 0.14 tons per rolling 12-month period for antimony
- M. 1.23 tons per rolling 12-month period for cyanide
- N. 0.14 tons per rolling 12-month period for lindane
- O. 1.09 tons per rolling 12-month period for methyl bromide
- P. 6.00 pounds per rolling 12-month period for mercury
- Q. 5.00 pounds per rolling 12-month period for arsenic
- R. 0.027 pounds per rolling 12-month period for beryllium
- S. 1.84 pounds per rolling 12-month period for chromium
- T. 18.00 pounds per rolling 12-month period for nickel
- U. 0.05 tons per rolling 12-month period for selenium

[R307-401]

II.B.4.a.1 Compliance with the VOC and HAP limitations shall be determined on a rolling 12-month total. Before the 20th day of each month, a new 12-month total shall be calculated using data from the previous 12 months. [R307-401-8]

II.B.4.a.2 The VOC and HAP emissions shall be determined by maintaining a record of VOC- and HAP-emitting materials processed through the Thermal Desorption System each month. The following records shall be retained:

- A. Specific waste stream identification for each waste stream processed through the thermal desorption system
- B. The total amount of waste material associated with each waste stream, prior to processing through the thermal desorption system
- C. The time required to process each waste stream
- D. Estimated weight percentages of known and/or expected HAPs within the waste stream based on generator process knowledge and/or waste profile records
- E. Amounts (concentrations) of VOCs within the waste stream based upon laboratory analysis of the waste prior to thermal desorption processing
- F. The calculated amount of HAP/VOC emitted based upon calculations assuming a carbon filter efficiency of 0.95 and a HEPA efficiency of 0.999
- G. The amount of VOCs or HAPs may be adjusted by quantifying and subtracting the amount of condensate collected from the system.

[R307-401-8]

**Section III: APPLICABLE FEDERAL REQUIREMENTS**

In addition to the requirements of this AO, all applicable provisions of the following federal programs have been found to apply to this installation. This AO in no way releases the owner or operator from any liability for compliance with all other applicable federal, state, and local regulations including UAC R307.

NSPS (Part 60), A: General Provisions

NSPS (Part 60), IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

MACT (Part 63), A: General Provisions

MACT (Part 63), ZZZZ: NESHAP for Stationary Reciprocating Internal Combustion Engines

**PERMIT HISTORY**

This AO is based on the following documents:

Supersedes	AO DAQE-AN0107170019-11 dated March 7, 2011
Is Derived From	NOI dated November 2, 2016
Is Derived From	NOI Addendum dated April 20, 2017
Is Derived From	NOI Addendum dated November 21, 2017
Incorporates	Additional Information dated December 6, 2017
Incorporates	Additional Information dated March 5, 2018
Incorporates	Modeling Analysis dated August 10, 2018
Incorporates	Additional Information dated October 3, 2018

**ADMINISTRATIVE CODING**

The following information is for UDAQ internal classification use only:

Tooele County

CDS B

MACT (Part 63), Attainment Area, NSPS (Part 60)

**ACRONYMS**

The following lists commonly used acronyms and associated translations as they apply to this document:

40 CFR	Title 40 of the Code of Federal Regulations
AO	Approval Order
BACT	Best Available Control Technology
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CDS	Classification Data System (used by EPA to classify sources by size/type)
CEM	Continuous emissions monitor
CEMS	Continuous emissions monitoring system
CFR	Code of Federal Regulations
CMS	Continuous monitoring system
CO	Carbon monoxide
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent - 40 CFR Part 98, Subpart A, Table A-1
COM	Continuous opacity monitor
DAQ/UDAQ	Division of Air Quality
DAQE	This is a document tracking code for internal UDAQ use
EPA	Environmental Protection Agency
FDCP	Fugitive dust control plan
GHG	Greenhouse Gas(es) - 40 CFR 52.21 (b)(49)(i)
GWP	Global Warming Potential - 40 CFR Part 86.1818-12(a)
HAP or HAPs	Hazardous air pollutant(s)
ITA	Intent to Approve
LB/HR	Pounds per hour
MACT	Maximum Achievable Control Technology
MMBTU	Million British Thermal Units
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOI	Notice of Intent
NO <sub>x</sub>	Oxides of nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
PM <sub>10</sub>	Particulate matter less than 10 microns in size
PM <sub>2.5</sub>	Particulate matter less than 2.5 microns in size
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
R307	Rules Series 307
R307-401	Rules Series 307 - Section 401
SO <sub>2</sub>	Sulfur dioxide
Title IV	Title IV of the Clean Air Act
Title V	Title V of the Clean Air Act
TPY	Tons per year
UAC	Utah Administrative Code
VOC	Volatile organic compounds





Mr. Doug Hansen  
CD-2023-263  
December 28, 2023

**TOOELE COUNTY CONDITIONAL USE PERMIT #2700-87**

**BEFORE THE TOOELE COUNTY  
BOARD OF COUNTY COMMISSIONERS**

\*\*\*\*\*

**IN THE MATTER OF:  
ENVIROCARE OF UTAH, LLC.'S  
APPLICATION FOR AN AMENDMENT TO  
CONDITIONAL USE PERMIT #2700-87**

**AMENDMENT OF  
CONDITIONAL USE PERMIT  
#2700-87**

\*\*\*\*\*

**Findings of Fact**

1. Envirocare of Utah, LLC. (hereinafter "Envirocare"), submitted an application on March 10, 2005 to amend their existing Conditional Use Permit #2700-87 to add 402.12 acres in the North ½ of Section 29, T1S, R11W, SLB&M and 320 acres in Section 5, T2S, R11W, SLB&M, to the property already covered by the CUP. The application also requested a rezone of such properties to MG-H.
2. Envirocare owns the properties as demonstrated by a deed of title in fee simple.
3. The areas proposed for expansion of the CUP sit on lake bed clay soil, which is a highly impermeable material.
4. The public benefit will be to use the impermeable soil to line and cap cells where low level radioactive material is landfilled.
5. The nearest established residence from the proposed areas of expansion is approximately 5.2 miles away at the UDOT rest stop on Interstate 80. The next closest residence over 48 miles away.
6. The planning commission found that expansion of Envirocare's existing facility would comply with Chapter 18 of the Uniform Zoning Ordinance of Tooele County as the company is already located in Tooele County and is currently receiving waste from the market with no expansion of that waste stream from what is already being received at the facility now.
7. When the original conditional use permit was granted, the Uniform Zoning Ordinance of Tooele County, Utah, Section 18-1(11)(A) required that a hazardous waste facility be located no closer than ten miles to a residence. The ordinance has since been amended to require only a five mile separation.
8. Envirocare submitted an environmental impact statement for the siting of a facility in Section 29 that was conducted in the last two years, together with the 1993 EIS for the Nuclear Regulatory Agency and the original Vitro Tailings EIS done for the Utah State Department of Health.

9. The county commission appointed an Environmental Impact Board which met on April 1, 2005. In accordance with Section 7-12(2) of the Uniform Zoning Ordinance of Tooele County, Utah, the Board found no significant impact beyond the site for each of the properties proposed for inclusion in the CUP, and voted unanimously to recommend approval of the amendment to the conditional use permit, to include those conditions stated in the main permit and adding a further condition, that the empty raptor nest north of the adjacent railroad tracks be monitored for seven years, and that its condition be reported annually, and that if the nest becomes inhabited then Envirocare would have to maintain the federally required distance between their operations and the nest.

***Statement of Applicable Laws***

1. **Tooele County General Plan, Chapter 3, Plan Goals and Policies, Page III-5 states:**  
Industry is welcome to Tooele County in locations that are suited to both industry and which do not negatively impact other areas and amenities of the county. These locations should be advantageous for the industry, but removed from conflicting residential and commercial land uses of this industry type. The Hazardous Waste Corridor Zone is adequate for existing and future users. The extensive permitting process will adequately regulate existing and new businesses.

2. **Tooele County General Plan, Chapter 8, I-80 Corridor Planning District:  
Page VIII-1:**

Currently, companies located in the area transport, store and/or incinerate hazardous wastes in a specially designated hazardous waste zone. Federal and state permitting processes make the possibility of new hazardous waste industries in the area unlikely but the storage of additional hazardous waste operations will continue until the facilities are at capacity. Long term maintenance of waste sites will be a continuous process.

**Page VIII-3:**

The hazardous waste facilities have provided fee income and tax revenues to the County, as well as a substantial, high-wage employment base. However, there are regulatory limitations to the expansion of these industries. The public has also expressed a desire to limit expansion of these industries; therefore, it is assumed that there will be limited future expansion.

**Page VIII-5:**

The two low level radioactive sites are located south of I-80 near Clive. One is a landfill operation that accepts industrial waste and mixed waste. Mixed waste can be low level radioactive waste, hazardous waste, or both. Only solid wastes, mostly construction wastes, are disposed of there -- no liquids. Radioactive wastes are stored separately from non-radioactive wastes. All cells are specially constructed with multiple liners and special covers. Envirocare is permitted to dispose of 80,000 cubic yards of mixed waste and 4,000,000 cubic yards of normal waste. The company was also recently granted a permit by the federal Nuclear Regulatory Agency to construct a new low-level radioactive disposal facility at the existing site.

Page VIII-6:

The state permits require that various parameters be monitored by the operator and the results reported to the state. Parameters monitored typically include hazardous waste handling manifests, air quality, groundwater, surface water, ambient air quality, emissions from stacks, and other processes. The specific parameters required for each permittee are established at the time the permit is issued. Recently, the State of Utah passed legislation which requires that any new hazardous waste facility proposed within the state must be approved by the legislature, the governor and the county or city in which the facility is located, in addition to obtaining any other permits already required. The effect of this legislative action will be to restrict the development of any new commercial hazardous waste disposal facilities within the state. Given the stringent requirements, it is unlikely that any new hazardous waste disposal facilities will be permitted. The basic sentiment expressed about these operations in community and steering committee meetings for the general plan process were concerns over safety, the desire to limit activities, and the desire to discourage any new companies coming into the area. The permitting process is difficult, demanding and expensive, which will discourage some companies from locating in Tooele County. Safety considerations are necessary for permit approval and continued operation, and these industries are likely to continue being safe.

3. **The Uniform Zoning Ordinance of Tooele County, Utah**  
**Section 7 - 11. Notification required.**

When the planning commission considers an application for a conditional use permit at the work meeting, notification shall be mailed to all landowners appearing on the tax rolls of Tooele County that adjoin the property or are within an area that the planning commission and zoning administrator deem would be impacted. It is the intent to make notification to all landowners or residents in the area that may be directly impacted by the conditional use action.

4. **The Uniform Zoning Ordinance of Tooele County, Utah**  
**Section 7 - 12. Amendment of a conditional use permit.**

(1) A use granted by a conditional use permit shall not be enlarged, changed, extended, increased in intensity or relocated unless a new conditional use permit application is made to, and approved by the planning commission.

(2) Notwithstanding Subsection (1), the zoning administrator may administratively consider, approve, or disapprove modifications or changes that are consistent with the purpose and intent of the Uniform Zoning Ordinance of Tooele County. Such determinations may be made only where the additions, modifications, or changes are determined not to have significant impact beyond the site.

(3) The planning commission may consider, approve with modifications, or disapprove amendments to a conditional use permit where the zoning administrator determines not to make an administrative determination as provided in Subsection (2) and where:

(a) the proposed modification or amendment complies with the intent and purpose of the Uniform Zoning Ordinance of Tooele County; and

(b) reasonable conditions are attached where and to the extent the planning commission finds that their imposition will directly mitigate or eliminate some aspect of the proposed amendment that violates the intent and requirements of this chapter. Impacts must be of the magnitude that without the mitigation or elimination thereof, the amendment to the conditional use permit could not be granted.

**4. The Uniform Zoning Ordinance of Tooele County, Utah  
Section 17-3-2 Permits - Compliance.**

(1) All conditional use permits for development located in the MG-H district shall be reviewed and approved by the Tooele County Commission prior to taking effect.

(2) All activities relating to storage, treatment and disposal of wastes classified as "hazardous wastes" under the Utah Solid and Hazardous Waste Act, Utah Code Annotated 19-6-102, or otherwise regulated as a "waste" under the Toxic Substance Control Act (TSCA), the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), or other federal or state laws and regulations, are hereby declared a public nuisance. Such activities are prohibited except as may be authorized and permitted in an MG-H zoning district, and then only upon strict compliance with all industrial performance standards, ordinances, regulations, laws and permits of Tooele County, the State of Utah, and the United States of America. Any industry desiring to store, treat or dispose of hazardous wastes, having a prior-approved radioactive waste storage, treatment or disposal permit from all regulatory agencies, must nevertheless make separate application for a hazardous waste permit with no regard to prior permitting or studies made in that process.

(3) All wastes regulated by the Radiation Control Act, Title 19, Chapter 3 of the Utah Code Annotated as low-level waste or mixed wastes, or those wastes defined as such in 10 CFR 61.55, may be stored, treated, or disposed of in an MG-H zoning district but only upon strict compliance with all industrial performance standards, ordinances, regulations, laws and permits of Tooele County, the State of Utah, and the United States of America. Such storage, treatment or disposal shall be approved only upon compliance with the application procedure in this Part and in Chapter 18 of the Uniform Zoning Ordinance of Tooele County. Any industry desiring to store, treat or dispose of radioactive wastes, having a prior-approved hazardous waste permit from all regulatory agencies, must nevertheless make separate application for a radioactive waste storage, treatment or disposal permit, with no regard to prior permitting or studies made in that process.

(4) Whenever an applicant proposes that a new hazardous waste or radioactive waste storage, treatment or disposal facility be located within an existing MG-H zone or whenever a new MG-H zone is proposed, the applicant shall indicate how it will implement the special performance standards listed in Chapter 18 of the Uniform Zoning Ordinance of Tooele County, as they relate to the specific waste activity the applicant intends to conduct. The responses and information relative to the special performance standards shall accompany each request for the establishment of a new MG-H district and each request for a conditional use permit. The planning

commission shall ensure that each item specified in Chapter 18 has been fully responded to by the applicant prior to making any recommendation concerning a proposed MG-H zoning district amendment or prior to issuing a conditional use permit for a waste activity to be located in an MG-H zone. If an MG-H zone is established in response to the information provided pursuant to Chapter 18, such information shall establish the basis of an application for a conditional use permit but shall be updated or supplemented by additional relevant information if so required by the planning commission or Tooele County Commission.

### ***Decision***

Having heard the arguments concerning the application and having reviewed all documentation submitted therewith, and considering the recommendations given by the planning commission and the Environmental Impact Board, Commissioner Lawrence moved to approve Envirocare's application for amendment to CUP #2700-87 to allow expansion into the North ½ of Section 29, T1S, R11W, SLB&M and the North ½ of Section 5, T2S, R11W, SLB&M, with the conditions as approved in the existing CUP, and with one additional condition: that the vacant raptor nest on the north side of the railroad tracks near Envirocare's property be monitored for a period of seven years, and that if the nest becomes inhabited then Envirocare's operations be moved back to the distance required by federal law. Commissioner Johnson seconded the motion. The three commissioners voted, "Aye." The motion passed unanimously. The application to amend CUP #2700-87 stands APPROVED.

The conditions attached to this Conditional Use Permit (updated from the original permit for clarity and typographical purposes) are restated as follows:

1. The original impact mitigation agreements that were imposed upon the State of Utah, Department of Health and the Department of Energy (DOE) for the Vitro tailings continue. All prior requirements for reclamation closure and post-closure monitoring shall continue for an indefinite period of time and not be discontinued until such time that a joint determination is made by the planning commission;
2. The original impact mitigation agreement requirements, as imposed upon the State of Utah, Department of Health and the Department of Energy (DOE) for the Vitro tailings, are to be continued by Envirocare of Utah, LLC. Specifically:
  - a. Release of Radiation. Exposure to radiation shall be minimized by dampening exposed contaminated material or covering it with sealants, tarps, or plastic sheeting to prevent fugitive dust emissions. There shall be a cessation of operations and handling of materials during periods of heavy wind, where protection could be damaged by wind force. Protective equipment for persons at the site shall be worn as required by the controlling occupational health agency. All equipment, personnel, and vehicles shall be properly decontaminated and/or cleaned prior to leaving the site.
  - b. Water. Surface water shall be protected by the use of on-site evaporation ponds for the isolation of construction-process water that exceeds the permissible discharge standards of the State. All run-on and run-off waters are to be contained on-site through the construction of dykes, ponds, and basins;

- c. Noise and Other Objectionable Elements. Noise shall be attenuated by the use of mufflers on vehicles and equipment. Personnel shall be equipped with protective equipment whenever an equipment's muffler is defective. The performance standards of the Tooele County Zoning Ordinance shall be in force at all times.
- d. Transportation. Rail transportation is preferred, and when trucks haul materials, it shall be restricted to high capacity roads leading to the Clive repository. Schedules and routes shall ensure the elimination or mitigation of safety problems to the general public. The road to the Clive repository is to be dust-free and all-weather surfacing.
- c. Seismic Events. Construction methods for the disposal area shall be made with the standards outlined in the original environmental impact statement in order to mitigate potential damage to the repository through seismic disturbances. Modification to this condition may be made through the State of Utah, Bureau of Radiation Control's facility design plan approval.
- f. The terms and conditions of the agreement between the County and Envirocare of Utah, LLC on July 9th, 1987 shall be maintained. Failure to comply shall cause the immediate suspension of this permit and all activities will cease.
- g. Envirocare of Utah, LLC shall provide evidence that all required Federal and state permits and licenses for environmental health and occupational health are in compliance prior to commencement of locating any low level radioactive wastes within the County.
- h. The following elements, unless waived by the planning commission, are to be included when the county commission reviews and approves the Bureau of Radiation Control operating license for the Envirocare low level radioactive waste repository:
  - (1) Environment Health. Compliance with the zoning ordinance; minimizing fugitive dust emissions; providing adequate restroom and shower on-site and off-site facilities; maintaining employee safety standards as required by Federal and state regulations and laws; fuel tanks and flammable materials located in accordance with NFPA; the use and crossing of county roads shall be done so as to hold Tooele County harmless, and all damage to county roads are to be repaired at the applicant's expense; all Federal and state licensing requirements shall be adhered to; all Federal and state environmental health permits required for the operation shall be obtained prior to any modification, alteration and /or implementation.
  - (2) Transportation Impacts. The traffic ramps at the Clive overpass of I-80 are temporary structures and subject to removal at the completion of the Vitro project. Conversion to permanent structures must be addressed. Cost sharing for the conversion from temporary to permanent is to be done on a "contributed traffic basis" through ADT's of each activities' use. Envirocare of Utah, LLC would then be conditioned to participate financially at some point in the future.
  - (3) Reclamation and Bonding. The on-site and related vicinity properties are assessed by the State for bonding. All activities for borrow and cover materials will be governed by the planning commission's established procedures for temporary gravel pit reclamation and bonding.


3. Warning signs, fences, and berms shall be placed on the perimeter of the property to protect the public and act as barriers to access, fugitive dust, noise, glare, and view.
4. No adverse drainage which would create soil instability or erosion shall be permitted. All drainage shall be contained on site.
5. Maximum slopes shall be in accordance with MSHA.
6. In consideration for those areas where material is being extracted and not used for cells, the applicant shall post a reclamation guarantee for the area of disturbance giving financial assurance in a form approved by Tooele County, guaranteeing the satisfactory reclamation of all disturbed areas within 30 days of the issuance of this permit. The amount of reclamation shall not be less than \$1,000.00 per acre, with a \$10,000.00 minimum and shall be adjusted upon the renewal of the operations plan to meet projected costs of reclamation based upon time, material and equipment needed to clean-up and remove structures. Slopes (to include mine dumps) shall be graded to no greater than a 3:1 finished slope or in relation to the contour of adjacent undisturbed land. Envirocare shall contour, redistribute and stabilize topsoil, re-vegetate, monitor, and reseed if necessary. The release of the financial assurance and obligations for reclamation shall not be made until the Department of Engineering consults with BLM, NRCS or the Soil Conservation District, Tooele County Attorney and approves the release in writing.
7. All facilities and activities shall comply with applicable zoning, health, building, plumbing, mechanical, and electrical codes. All structures erected, placed, built, or installed shall have a building permit;
8. All fuel tanks and flammable materials shall be located above ground, in such locations, with containment, and under such conditions as to conform to the requirements of the national fire codes (NFPA).
9. All crossing of state and county roads shall be done in such a manner as to hold Tooele County harmless from any and all legal proceedings as a result of the applicant's use of such roads. The applicant shall make provisions to place suitable road signs, restraints and flagging personnel at work-sites and road crossings as approved by the Manual on Uniform Traffic Control Devices and the Department of Engineering;
10. All damage to state and county roads shall be repaired at the applicant's expense under the direction of the Department of Engineering.
11. The applicant shall maintain on file, proof of liability insurance for the operation at the Tooele County Department of Engineering.
12. Tooele County reserves the right to limit and restrict the time activities of the extraction operations should the planning commission deem those activities are a public nuisance.



13. The owner or operator shall install such improvements to access county or state roads, to include acceleration, deceleration and left turn lanes as approved prior to operation.
14. All activities shall be maintained and operated in such a way as to minimize fumes, dust, and smoke emissions.
15. Sufficient restroom facilities shall be provided at each location for employee use.
16. The initial land area for extraction to be bonded for is 320 acres which will equate a bond amount of not less than \$320,000.00 which amount may be reduced as areas are reclaimed and approved in accordance with this permit.
17. The operation plan for this conditional use permit expires on January 26, 2010 and pit operations shall only work under an approved five year operation plan.
18. Upon expiration of the previous plan, a new five year plan shall be submitted, otherwise closure and reclamation operations shall begin within six months.
19. Envirocare shall monitor the raptor nest north of the railroad tracks for seven years for activity and report their findings in their annual report. If the nest become inhabited, Envirocare's operations shall be moved back to the distance required by federal law.

Dated this 18<sup>th</sup> day of April, 2005.

  
Dennis Rockwell, Chairman  
Tooele County Commission

  
Matthew Lawrence  
Tooele County Commission

  
Colleen Johnson  
Tooele County Commission

# TOOELE COUNTY BOARD OF COUNTY COMMISSIONERS

\*\*\*\*\*

IN THE MATTER OF:

**ENERGY SOLUTIONS.**

**APPLICATION FOR: CONDITIONAL  
USE PERMIT - CUP #2700-87  
ADDING METEOROLOGICAL  
MONITORING TOWER.  
SECTION 29, T1S, R11W, CLIVE.**

FINDINGS OF FACT, AND DECISION

\*\*\*\*\*

## *Facts*

1. Energy Solutions has requested a modification to their conditional use permit to move a meteorological tower from Section 32 to a location east of their administration building in Section 29.
2. The moving of this tower would improve air monitoring that is required for their operations.
3. The relocation of the tower does not affect any waste stream going into the controlled area in Section 32.
4. The Tooele County Planning Commission made a recommendation to approve this amendment on July 19, 2006.

## *Applicable Law*

1. Uniform Zoning Ordinance of Tooele County, Chapter 7 - 5, Determination.
  - (1) The planning commission, or upon authorization, the zoning administrator, shall approve a conditional use permit if reasonable conditions can be imposed to mitigate the reasonably anticipated detrimental effects of the proposed use in accordance with applicable standards in which a conditional use permit is required by the use regulations of that zoning district or elsewhere in these ordinances.
  - (2) In authorizing any conditional use the planning commission or zoning administrator shall impose such requirements and conditions as are necessary for protection of adjacent properties and the public welfare. The land use authority may impose conditions that are found necessary to ensure that the use is compatible with other uses in the vicinity, and that the negative impact of the proposed use on the surrounding uses and public facilities is minimized.
2. Uniform Zoning Ordinance of Tooele County, Section 18-1-3, Existing permit amendment procedure.
  - (1) Any hazardous industry facility with a Tooele County permit issued before September 26, 2005 may make application to amend its conditional use permit. The amendment shall not be to accept wastes for which the facility is not already approved. An amendment may be made to expand

to land adjacent the immediate area utilized in the storage, treatment, and disposal of those approved waste streams at the time the conditional use permit was issued within existing MG-H zoning onto the rest of the property owned in fee title.

3. Uniform Zoning Ordinance of Tooele County, Section 18-1-7, Action of the Board of County Commissioners.

(1) The Board of County Commissioners shall take into consideration the recommendations of the planning commission and the environmental impact board in making a decision to amend a conditional use permit.

(3) No facility shall be permitted until such time as a properly executed and binding impact mitigation agreement and bond is accepted by the Board of County Commissioners. Prior to the execution of such an agreement, the applicant shall identify, with the concurrence of Tooele County, the impacts that the proposed facility will have upon Tooele County, and will submit a plan to mitigate such impacts. All amendments to the use permits authorized under this section or other sections dealing with the MG-H zone shall also be reviewed and approved by the Board of County Commission.

### ***Decision and action***

On August 1, 2006, the Tooele County Board of County Commissioners, having received a recommendation from the Tooele County Planning Commission, approves the amendment to allow a meteorological monitoring station in Section 29, T1S, R11W, SLB&M as an amendment to CUP#2700-87 with a finding that having the current conditions in place, there is no requirement to impose any new conditions for the locating of this tower.

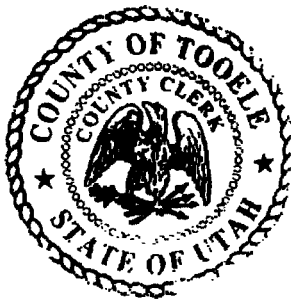
Approved this 1st day of August, 2006

ATTEST:

TOOELE COUNTY

  
DENNIS D. EWING, Clerk

  
COLLEEN JOHNSON, for the Chair





Mr. Doug Hansen  
CD-2023-263  
December 28, 2023

**CL-QA-PN-001, *EWIS SOFTWARE QUALITY ASSURANCE PLAN***

# EWIS Software Quality Assurance Plan

**Revision 1**

Authored By: *Wayne Johns* 1/7/13  
Wayne Johns, Environmental Coordinator; EWIS Software Date  
Owner

Reviewed By: *Vern Rogers* 7 Jan. 2013  
Vern Rogers; Environmental Engineer, Independent Reviewer Date

Reviewed By: *Curtis R. Kirk* 1/10/13  
Curtis Kirk, Quality Assurance Manager Date

Reviewed By: *Rick Chalk* 1-10-13  
Rick Chalk, Manager, Health Physics and Safety (RSO); Date  
Nuclear Safety Manager

Reviewed By: *Sean McCandless* 1/7/13  
Sean McCandless, Manager, Compliance and Permitting

Approved By: *James Miller* 1/10/13  
James Miller, VP & GM, Clive Facility; Responsible Manager Date

- Non-Proprietary
- Proprietary
- Restricted Information
- Safeguards Information
- Sensitive Security Information

- New
- Title Change
- Revision
- Rewrite
- Cancellation

Effective Date JAN 14 2013

**DOCUMENT CONTENTS**

<b>1</b>	<b>Purpose and Scope.....</b>	<b>3</b>
<b>2</b>	<b>Software Classification Level.....</b>	<b>3</b>
<b>3</b>	<b>Supporting Information .....</b>	<b>3</b>
<b>4</b>	<b>Organizational Responsibilities .....</b>	<b>4</b>
<b>5</b>	<b>Standards, Practices and Conventions.....</b>	<b>5</b>
<b>6</b>	<b>Documentation .....</b>	<b>5</b>
<b>7</b>	<b>Software Configuration Management.....</b>	<b>6</b>
<b>8</b>	<b>Reviews and Audits .....</b>	<b>6</b>
<b>9</b>	<b>Test Methods .....</b>	<b>6</b>
<b>10</b>	<b>Code Control .....</b>	<b>7</b>
<b>11</b>	<b>Media Control .....</b>	<b>7</b>
<b>12</b>	<b>Support Software Control .....</b>	<b>7</b>
<b>13</b>	<b>Supplier Control .....</b>	<b>7</b>
<b>14</b>	<b>Training.....</b>	<b>8</b>
<b>15</b>	<b>Evaluation of Existing Software.....</b>	<b>8</b>

## 1 Purpose and Scope

The purpose of this plan is to define the software quality assurance controls applicable to regulatory functions performed by the EWIS software.

EWIS is legacy software that was developed in 1998 by converting the original Waste Information System (WIS) to an Oracle application and adding the capability to compare manifests against profile limits. EWIS records shipment manifest data and tracks Mixed Waste shipments during receipt, treatment, storage and disposal. EWIS also provides process reporting to management. Operating procedures are used as Operations & Maintenance manuals for the EWIS systems.

EWIS regulatory functions are defined as:

1. RML #UT 2300249, condition 8A undisposed activity limit and 29B waste receipts reporting
2. RML #UT 2300249, condition 9B prohibition of disposal of waste exceeding Class A
3. RML #UT 2300249, condition 29D and 29E maximum embankment concentrations for select radionuclides
4. RML #UT 2300249, condition 35A prohibition of disposal of concentrated depleted uranium
5. RML #UT 2300478 condition 10.2.c and 10.9.c disposal limit on Ra-226 and Th-230 concentration in upper layers of the disposal cell

This document meets the intent of CG-QA-PR-015, Computer Software Management.

## 2 Software Classification Level

EWIS is classified as Non-Safety Level C software in accordance with CG-QA-PR-015, Computer Software Management. This is due to the role EWIS plays in assuring regulatory compliance (CG-QA-PR-015, Appendix A).

## 3 Supporting Information

### 3.1 References

- 3.1.1 CL-AD-PR-060, *EWIS/WITS Administrative Procedure*
- 3.1.2 ES-IT-PO-005, *System Backup Policy*
- 3.1.3 ES-IT-PN-003, *Information Security Handbook*
- 3.1.4 ES-IT-PR-011, *Data Backup Procedure*
- 3.1.5 ES-IT-PR-012, *Software Application Development Change Control Procedure*
- 3.1.6 CG-QA-PR-015, *Computer Software Management*

- 3.1.7 U.S. Nuclear Regulatory Commission, "Licensing Requirements for Land Disposal of Radioactive Waste, Code of Federal Regulations", Title 10, Part 61
- 3.1.8 Radioactive Material License No. UT2300249
- 3.1.9 Radioactive Material License No. UT2300478
- 3.1.10 State-Issued Part B Permit No. UTD 982598898

### 3.2 Acronyms/Definitions

Note : Unlisted acronyms are defined in reference 3.1.6.

**Bulk Waste Facility (BWF):** An area at the Clive Disposal facility, that is not CWF or MWF waste, where waste can be removed from its container for disposal.

**Containerized Waste Facility (CWF):** An area at the Clive Disposal facility where the waste is disposed without being removed from its container.

**EWIS: Electronic Waste Information System:** is the waste tracking database used by Clive to collectively describe three separate sets of tables within one database: EWIS-Bulk Waste Facility (EWIS-BWF), EWIS-Containerized Waste Facility (EWIS-CWF), and Waste Information Tracking System (WITS). EWIS-BWF is used to receive waste for disposal at the BWF and CWF. EWIS-BWF is also used to track waste at the MWF. WITS is used at the BWF to track waste after it is accepted by Shipping and Receiving. EWIS-CWF is used to receive and track waste received at the CWF.

**Mixed Waste Facility (MWF):** EnergySolutions has a license for the disposal of low level radioactive waste and a permit for the treatment and disposal of Hazardous Waste. MWF is an area at the Clive Disposal facility that treats and disposes of waste that is regulated by both documents.

**TaskMan:** Is a database used to administer Software Support Requests and document Software Change Requests.

## 4 Organizational Responsibilities

The **Software Owner** is responsible for preparing the Software Quality Assurance Plan SQAP and Software Requirements Specifications (SRS). The Software Owner reviews the Software Verification and Validation Report SVVR.

The **Independent Reviewer** reviews the SQAP. The Independent Reviewer validates and verifies the software and prepares the SVVR documenting this review.

The **QA Manager** reviews the SQAP and SVVR.



The **RSO** reviews the SQAP, SRS, and SVVR. The RSO performs the role of "Nuclear Safety Manager" as contemplated in Appendix B to CG-QA-PR-015.

The **Manager, Waste Disposal Operations** reviews the SVVR. The Manager, Waste Disposal Operations performs the role of "Operations Manager" as contemplated in Appendix B to CG-QA-PR-015.

The **Responsible Manager** approves the SQAP, SRS, and SVVR.

## 5 Standards, Practices and Conventions

EWIS-CWF and EWIS-BWF are Oracle applications, version 10. The user interface was developed in Oracle Forms, version 10 and Oracle Business Intelligence Publisher (BiPub), version 10. EWIS-WITS is written using Oracle PL/SQL that generates HTML and Javascript.

## 6 Documentation

In accordance with CG-QA-PR-015, Appendix A the following documentation is required for non-safety Level C software. The minimum reviews required for the following documentation are specified in Section 4.

### 6.1 **Software Quality Assurance Plan (SQAP)**

This document is the SQAP.

### 6.2 **Software Requirement Specification (SRS)**

SRS shall clearly and precisely describe each of the essential requirements (functions, performances, design constraints, and attributes) of the software and the external interfaces. In accordance with section 3.3 of CG-QA-PR-015, the SRS is not a quality record.

### 6.3 **Software Verification/Validation Report (SVVR)**

In accordance with Appendix A to CG-QA-PR-015, a Software Verification/Validation Plan is not required for non-safety level C software. The SVVR shall include at a minimum the elements provided in Attachment 6.5 to CG-QA-PR-015.

### 6.4 **Software Installation and Checkout (SIC)**

In accordance with section 4.8.1 of CG-QA-PR-015, the SIC is only required for safety-related software installation and acceptance. Since EWIS is non-safety level C software, SIC is not required.

### 6.5 **Software Change Request (SCR)**

SCR are documented in accordance with ES-IT-PR-012.

## 7 Software Configuration Management

### 7.1 *Basis Document*

The EWIS software baseline is the version promoted with TaskMan Software Change Request 3885 on April 24, 2012. Existing basis documentation is contained in the configuration change documentation contained in the "TaskMan" database.

### 7.2 *Configuration Item*

The configuration items for the EWIS software includes Oracle systems software, Oracle forms, packages, sequences, procedures, and executable code used to run or define the Oracle application as well as the supporting documentation are subject to configuration control.

### 7.3 *Change Control*

SCRs are prepared, reviewed, and approved according to CL-AD-PR-060. Software change requests are submitted and developed as described in procedure ES-IT-PR-012.

### 7.4 *Configuration Status Accounting*

Software change requests are documented and tracked to resolution using the TaskMan database. A completed TaskMan request assigns a unique number to the request, describes what was done, describes the code change, and includes the promotion instructions, with the promotion date. This information is used to identify the EWIS configuration.

## 8 Reviews and Audits

SQA reviews and audits shall be verified by approval of required documentation referenced in Section 6. Formal reviews or surveillances may be conducted periodically by the SCCC or the QA organization.

## 9 Test Methods

### 9.1 *Test methods and results will include the following:*

- Known analytical solutions
- Hand calculations, and
- Comparable proven and validated computer programs.

## 10 Code Control

Support data bases reside in the program directory, and are generally text files. These text files can be modified or become corrupt. User shall verify that data files are current and have not been modified prior to use of software. If data base files are found to be corrupt, the SCCC shall reinstall the software from backup server. Input and output data files are saved on the EnergySolutions West Jordan server and are backed-up in accordance with IT procedures.

## 11 Media Control

### 11.1 *Software Tools and System Software*

11.1.1 Development is done using Tool for Oracle application developer (TOAD) software which is developed and distributed by Quest Software. The software configuration and version may vary.

11.1.2 System software, including Oracle and LINUX, is used for development of EWIS.

### 11.2 *Software Backup and Restore*

EnergySolutions provides for software backup and restoration by the use of daily incremental, weekly partial and monthly full backups of all software applications and operating system software. EnergySolutions backup requirements are detailed in ES-IT-PO-005 and ES-IT-PR-012.

### 11.3 *Security Access*

The EnergySolutions Information Technology Program provides both physical as well as cyber security access controls at the Clive Site. The Clive Site supports 24/7 physical security for the site including roving patrols, key cards and cypher locks. In addition, user access is controlled by assigned username and password. The EnergySolutions information security program is detailed in ES-IT-PN-003.

## 12 Support Software Control

12.1 The adequacy of TOAD will be demonstrated during test of the overall EWIS system. The version of the Oracle developer suite used to change Oracle Forms will be verified by comparison of the Oracle Forms before and after the EWIS baseline change.

12.2 The adequacy of Oracle and LINUX system software will be demonstrated during test of the overall EWIS system.

## 13 Supplier Control

This section is not applicable.

## 14 Training

- 14.1 Training on this SQAP shall be provided to personnel fulfilling the roles identified in Section 4 above. Training on this SQAP is not required for end users of EWIS.
- 14.2 Training requirements for end users of EWIS are addressed in CL-AD-PR-060.

## 15 Evaluation of Existing Software

### 15.1 *Software Summary*

The EWIS software is legacy software that was developed in 1998 by converting the original Waste Information System (WIS) to an Oracle application and adding the capability to compare manifests against profile limits. EWIS records shipment manifest data and tracks Mixed Waste shipments from receipt, treatment, and storage through disposal. The software interface was developed using Oracle forms for EWIS and HTML for WITS.

### 15.2 *Description of Primitive Baseline Configuration Item*

The EWIS primitive baseline consists of the Oracle application which is currently in operation and backed up on the Salt Lake City wjutprodmt server. The wjutprodmt server contains all binary files which include screen, menu, library, and template files. The files necessary for the execution of EWIS are not available to the user and are under password access control. Baseline testing is documented using software support requests, which are stored in the TaskMan database application.

### 15.3 *Describe Intended Usage and Functional and Performance Requirements*

The EWIS program was designed to import manifest information stored in flat files. The manifest information is validated for consistency and for compliance with profile, license, and permitting requirements. EWIS initiates license required waste sampling. EWIS tracks waste location and waste status during processing to disposal.

### 15.4 *Describe Adequacy of Existing Design and Programming Documentation*

There is no formal design documentation, although the Oracle database provides application information regarding process and logic flow, input/output forms and data architecture. Each department is responsible for providing feedback and requesting support to develop EWIS and EWIS reports to meet the department's waste tracking needs. The changes are documented in TaskMan. The Oracle forms provide sufficient information regarding process and logic flow to support maintenance activities.

### 15.5 *Describe Adequacy of Existing User Documentation*

The EWIS Software User Manual consists of Site Operating procedures. The operating procedures focus primarily on the transfer of information and not on how EWIS processes. The existing user documentation is adequate to support the user interface with the EWIS software.

**15.6 *Describe Adequacy of Existing Test Documentation to Demonstrate Acceptable Performance Based on Defined Software Requirements:***

No formal test documentation exists. However, the software has been in continuous use for 14 years. The EWIS SVVR is intended to demonstrate software performance and to detect and mitigate potential failure modes.

**END OF DOCUMENT**



Mr. Doug Hansen  
CD-2023-263  
December 28, 2023

**CL-AD-PR-060, *EWIS/WITS ADMINISTRATIVE PROCEDURE***

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# EWIS/WITS Administrative Procedure

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Revision 3

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Authored By:

Curtis Kirk, Clive Facility QA Manager

Date

Reviewed By:

Sean McCandless, Manager, Compliance & Permitting

Date

Approved By:

Thomas A. Brown, Radiation Safety Officer (RSO)

Date

Approved By:

James Miller, Vice President & General Manager, Clive

Date

- Non-Proprietary
- Proprietary
- Restricted Information
- Safeguards Information
- Sensitive Security Information

- New
- Title Change
- Revision
- Rewrite
- Cancellation

Effective  
Date

**Table of Contents**

1 PURPOSE AND SCOPE..... 3

    1.1 Purpose..... 3

    1.2 Scope..... 3

2 REFERENCES ..... 3

3 GENERAL..... 3

    3.1 Definitions..... 3

    3.2 Responsibilities..... 4

    3.3 Precautions and Limitations ..... 5

    3.4 Document Control and Records ..... 5

4 REQUIREMENTS AND GUIDANCE ..... 5

5 ATTACHMENTS AND FORMS ..... 6



## 1 PURPOSE AND SCOPE

### 1.1 Purpose

To establish requirements for the operation, maintenance, training and verification of data entry into the Electronic Waste Information System (EWIS/WITS).

### 1.2 Scope

This procedure applies to all EnergySolutions personnel inputting and retrieving data from EWIS/WITS.

## 2 REFERENCES

- 2.1 ES-QA-PR-005, Records
- 2.2 CG-QA-PR-015, Computer Software Management
- 2.3 ES-IT-PO-005, System Backup Policy

## 3 GENERAL

### 3.1 Definitions

3.1.1 *Electronic Waste Information System (EWIS)* – EWIS is a centralized relational database management systems application that provides information on EnergySolutions customers, their waste streams, and the waste material sent to the EnergySolutions Clive Facility for management and disposal. The information contained in the database is obtained from required hard copy quality assurance documentation, electronic imports, and real-time data entry.

3.1.2 *Waste Information Tracking System (WITS)* – WITS is a bolt-on application to EWIS used to track the real-time movement and status of waste and containers throughout the waste lifecycle. Additional features include: movement; constraints; transaction history; splitting waste from the container; bulk movements; and reporting.

**NOTE: For all intents and purposes, WITS and EWIS are the same system as they share the same database tables. Henceforth, the two will be referred to as EWIS/WITS.**

3.1.3 *EWIS/WITS Reports and/or Bi Publisher* – A set of database queries that allow users to compile data into pre-formatted reports.

3.1.4 *Authorized User* – An individual who, at the request of their manager, is granted access to the EWIS/WITS program by the EWIS/WITS System Administrator. The Authorized User shall be trained and qualified in accordance with applicable site procedures.

3.1.5 *EWIS/WITS Committee* – A committee consisting of departmental managers or representatives. The committee reviews and prioritizes

**EWIS/WITS Administrative Procedure**

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changes to the EWIS/WITS system.

- 3.1.6 *Helpdesk* – The IT Helpdesk is the first responder to computer, network, and other technical related issues. The helpdesk is set up to track the status of each issue reported from beginning to end.
- 3.1.7 *Task Manager System (TaskMan)* – TaskMan is EnergySolutions' software change management application for tracking any change made to in-house systems that requires development resources. TaskMan is set up to track the status of each issue reported throughout the software development life-cycle.

**3.2 Responsibilities**

- 3.2.1 The EWIS/WITS Committee Chairman shall provide oversight for the EWIS/WITS Committee.
- 3.2.2 The Vice President & General Manager, Clive Facility shall designate, the individual assigned as the EWIS/WITS Committee Chairman.
- 3.2.3 The EWIS/WITS System Administrator (ESA) is the individual with administrative access to the EWIS/WITS database and data. This individual shall establish and implement security restrictions, ensure system security, implement changes/upgrades and ensure system back-up. The ESA shall review and implement any activity that impacts the database structure of the EWIS/WITS database, such as tables, views, procedure, packages, functions, clustering, etc.
- 3.2.4 Departmental Managers are ultimately responsible for the quality of data entered by their department. Departmental Managers shall provide the ESA with a request for Authorized Users within their department in accordance with Information Technology protocol.
- 3.2.5 Each Authorized User is responsible for entering accurate and factual information into the EWIS/WITS database. The Authorized User is also responsible for reporting any data discrepancy, irregularities or problems with the EWIS program to the helpdesk for tracking and resolution.
- 3.2.6 The EWIS/WITS Committee shall meet as needed to resolve issues that affect multiple departments or issues that determine the fundamental structure of EWIS/WITS. The Committee shall review and approve requests for new or modified EWIS/WITS reports, investigate issues, and recommend changes to the ESA.
- 3.2.7 The Systems Engineer shall be responsible to provide adequate server space and maintenance to the Oracle database on which the EWIS/WITS system resides. The Systems Engineer shall also ensure the system is backed-up in accordance with Reference 2.3.

**EWIS/WITS Administrative Procedure**

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**3.3 Precautions and Limitations**

3.3.1 Only Authorized Users shall view, enter, or modify data in the EWIS/WITS Database. Authorized users shall have been provided access to the EWIS/WITS system and shall be qualified and trained in accordance with site procedures.

3.3.2 Changes to the EWIS/WITS system shall be in accordance with Reference 2.2

**3.4 Document Control and Records**

3.4.1 Raw data entered into EWIS/WITS is obtained from hard copy quality records, logbooks, contracts, Radioactive Waste Profile Records, shipment manifests, licenses, and other documents. Each of these data sources is in itself a Quality Assurance record/document and shall be handled in accordance with Reference 2.1

**4 REQUIREMENTS AND GUIDANCE****4.1 EWIS Committee**

4.1.1 The following departments, at a minimum shall have a member on the EWIS/WITS Committee:

- Quality Assurance;
- Health Physics (Radiation Safety Officer (RSO) or designee);
- Information Technology;
- Technical Services;
- Shipping & Receiving;
- Laboratory;
- Compliance & Permitting;
- Waste Operations.

**EWIS/WITS Administrative Procedure**

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- 4.2 Personnel Access to EWIS/WITS
  - 4.2.1 Each Departmental Manager shall submit a request for EWIS/WITS access for each required employee within their department in accordance with Information Technology protocol.
  - 4.2.2 The ESA shall review, approve, and grant access based on the information submitted by the responsible Manager.
- 4.3 Changes to the EWIS/WITS System
  - 4.3.1 Authorized Users shall contact their departmental Manager to request any change to the format, function, or content of EWIS/WITS.
  - 4.3.2 Any request to modify EWIS/WITS (bug, data fix, enhancement, report, etc.) that requires development resources shall be submitted via the TaskMan application.
  - 4.3.3 When modifications are requested, the ESA shall present the request to the EWIS/WITS Committee for review and prioritization as necessary. The ESA will oversee testing and implementation.  
**NOTE: A formal EWIS/WITS Committee Meeting is not always required. Notification to the EWIS/WITS Committee and approval of requests may be made via email.**
  - 4.3.4 The proposed modification will not be implemented until the modification has been made, tested in the TaskMan system and found to be working properly.

**5 ATTACHMENTS AND FORMS**

None



Mr. Doug Hansen  
CD-2023-263  
December 28, 2023

**ES-IT-PO-005, *SYSTEM BACKUP POLICY***

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## System Backup Policy

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**Revision 5**

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Authored By: Signature on file March 15, 2016  
Jonathan Kerby, Information Security Officer Date

Reviewed &  
Approved By Signature on file March 15, 2016  
Diane Gibson, Chief Information Officer Date

- New
- Title Change
- Revision
- Rewrite

Effective  
Date 3/28/2016

**Table of Contents**

- 1. OVERVIEW, PURPOSE AND SCOPE.....3
  - 1.1 Overview.....3
  - 1.2 Purpose.....3
  - 1.3 Scope.....3
- 2. GENERAL.....3
  - 2.1 Definitions.....3
  - 2.2 Data to be Backed Up .....3
- 3. REQUIREMENTS AND GUIDANCE .....3
  - 3.1 Weekly and Daily Backup Schedule.....3
  - 3.2 Configuration Changes .....4
  - 3.3 Backup Verification .....4
  - 3.4 Backup Error Handling .....4
  - 3.5 Media Retention.....4
  - 3.7 Off-Site Storage of Full Backup Media .....5
- 4. ENFORCEMENT .....5
  - 4.1 Violations.....5

**1. OVERVIEW, PURPOSE AND SCOPE**

**1.1 Overview**

The Company recognizes that the data contained within its information systems is essential to achieving its business goals and objectives. In the event of data loss, whether caused inadvertently by a user or by a large-scale disruption of business, backup copies of critical data must be retrievable and restorable in a reasonable period of time.

**1.2 Purpose**

This policy describes the measures employed by the Company’s staff to routinely and uniformly backup Company data.

**1.3 Scope**

All Critical Systems and Network Administrators for critical systems are subject to these measures.

**2. GENERAL**

**2.1 Definitions**

**Company** – EnergySolutions LLC and/or any of its affiliates, divisions or subsidiaries.

**Information Security Officer** – Company employee assigned responsibility for safeguarding Company networks and information.

**IT Administrator or IT Engineer** – Company employee assigned responsibility for implementation, maintenance and management of Company networks and network servers.

**Backup Coordinator** - IT Administrator or IT Engineer assigned to ensure successful completion of backups, restore tests and management of backup logs.

**2.2 Data to be Backed Up**

All production systems that contain data that cannot be easily replicated or restored must be backed up routinely. These systems are identified as Critical Systems.

**3. REQUIREMENTS AND GUIDANCE**

**3.1 Weekly and Daily Backup Schedule**

IT Administrators or IT Engineers who are designated to be in charge of the backup system are required to run a full backup of all Critical Systems that provide the Recovery Point Objective (RPO) of one business day. To meet the RPO, the backup schedule for Critical Systems with changing data is a Weekly Full/Incremental with



full backups run at the close of business on Fridays and incremental backups run at the close of business for all other business days. The schedule for Critical Systems that contain static data consists of a Quarterly Full Backup.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>Weekly</b>	Incremental	Incremental	Incremental	Incremental	Full		

	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter
<b>Quarterly</b>	Full	Full	Full	Full

**3.2 Configuration Changes**

All Company servers will be backed up before any changes to the configuration are made. .

**3.3 Backup Verification**

Scheduled backup job summary reports are run daily and provided to the IT Administrators or IT Engineers responsible for the backup system. The summary reports are also saved to a server share. These reports are considered to be evidence of successful completion of backup processes.

**3.4 Backup Error Handling**

In the event of backup inconsistencies or backup failure, IT Administrators or IT Engineers will be notified as soon as possible. Additional backups will be attempted within one day. Logs of failed backups will be maintained along with the record of successful completion.

**3.5 Media Retention**

Weekly Full Backup media will be retained for a period of 180 days, after which, the media will be overwritten by new backup data sets.

**EXCEPTIONS:**

Email backup media will be retained for a period of one (1) month after which media will be overwritten.

Workstation backup media will be retained for two (2) weeks after which media will be overwritten.

**3.6 Quarterly Restore Test**

IT Administrators or IT Engineers who are designated to be in charge of the backup system are required to run a restore of randomly selected backup media on a quarterly basis to ensure that the backup system is continuing to function properly. Results from this restore shall be documented and maintained by the Backup Coordinator.

### **3.7 Off-Site Storage of Full Backup Media**

Primary backup sets will be stored at the local backup repository. A secondary copy of the backup sets will be maintained at a backup repository located elsewhere other than primary repository.

## **4. ENFORCEMENT**

### **4.1 Violations**

Violation of this policy must be reported to the Information Security Officer immediately and may be grounds for disciplinary action up to and including termination.

Records Classified as

# **Business Confidential**

have been removed from this  
public file.

For assistance, please  
contact the GRAMA  
Coordinator.

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## System Backup Policy

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**Revision 5**

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Authored By: Signature on file March 15, 2016  
Jonathan Kerby, Information Security Officer Date

Reviewed &  
Approved By Signature on file March 15, 2016  
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- New
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- Revision
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Effective  
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**Table of Contents**

1. OVERVIEW, PURPOSE AND SCOPE.....3

    1.1 Overview.....3

    1.2 Purpose.....3

    1.3 Scope.....3

2. GENERAL.....3

    2.1 Definitions.....3

    2.2 Data to be Backed Up .....3

3. REQUIREMENTS AND GUIDANCE .....3

    3.1 Weekly and Daily Backup Schedule.....3

    3.2 Configuration Changes .....4

    3.3 Backup Verification .....4

    3.4 Backup Error Handling .....4

    3.5 Media Retention.....4

    3.7 Off-Site Storage of Full Backup Media .....5

4. ENFORCEMENT .....5

    4.1 Violations.....5

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Mr. Doug Hansen  
CD-2023-263  
December 28, 2023

**ES-IT-PR-012, *SOFTWARE APPLICATION DEVELOPMENT*  
*CHANGE CONTROL PROCEDURE***

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# Software Application Development Change Control Procedure

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**Revision 4**

Authored By:	<u>Signature on File</u> Matt Dukes, Information Technology Development Manager	<u>4/18/2023</u> Date
Reviewed By:	<u>Signature on File</u> Scott Hughes, Information Security Officer	<u>4/18/2023</u> Date
Approved By	<u>Signature on File</u> Daryl Grantham, Information Technology VP	<u>4/18/2023</u> Date
Approved By	<u>Signature on File</u> Steve Barnard, VP Information Technology	<u>4/18/2023</u> Date

- Non-Proprietary
- Proprietary
- Restricted Information
- Safeguards Information
- Sensitive Security Information

- New
- Title Change
- Revision
- Rewrite
- Cancellation

**Table of Contents**

1 PURPOSE AND SCOPE..... 3  
    **1.1 Purpose..... 3**  
    **1.2 Scope..... 3**  
2 REFERENCES ..... 3  
3 GENERAL..... 3  
    **3.1 Definitions..... 3**  
    **3.2 Responsibilities..... 4**  
4 SOFTWARE APPLICATION DEVELOPMENT PROCESS..... 6  
5 SOFTWARE RETIREMENT..... 10  
6 TIMEFRAME FOR APPLICABILITY ..... 10  
7 ATTACHMENTS..... 10

# Software Development Change Control Procedure

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## 1 PURPOSE AND SCOPE

### 1.1 Purpose

The Company utilizes software applications and automated processes to provide an effective and efficient work environment. This procedure establishes a framework for communicating and approving proposed changes to developed application software using Agile/Scrum templates and internal software management tools to record the chain of custody as software requests pass from requirements through development to production deployment.

### 1.2 Scope

This procedure covers all software development and maintenance activities performed by the Information Technology Department.

## 2 REFERENCES

- 2.1 ES-IT-PR-018 Oracle Change Management
- 2.2 ES-IT-PR-013 Infrastructure Change Control Procedure
- 2.3 DOE O 414.1D Ch2 Quality Assurance
- 2.4 DoE O 200.1A Information Technology Management
- 2.5 NIST SP 800-171

## 3 GENERAL

### 3.1 Definitions

- 3.1.1 Company – EnergySolutions LLC and/or any of its parent companies, affiliates, divisions or subsidiaries.
- 3.1.2 Scrum – Development protocol and process used in software management
- 3.1.3 Product Owner – originator of a Software Change Request.
- 3.1.4 Sprint – set period of time during which specific work has to be completed and made ready for review
- 3.1.5 Product Backlog - a list of features or technical tasks which the team maintains and which, at a given moment, are known to be necessary and sufficient to complete a project or a release: If an item on the backlog does not contribute to the project's goal, it should be removed; On the other hand, if at any time a task or feature becomes known that is considered necessary to the project, it should be added to the backlog.
- 3.1.6 Sprint Backlog - list of tasks the team needs to perform in order to deliver the functionality it committed to deliver during the sprint.

## Software Development Change Control Procedure

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- 3.1.7 Backlog Grooming – Scoring the inventory of requested items and insuring they are properly prioritized for sprint scheduling during sprint planning.
- 3.1.8 Velocity - metric that predicts how much work an Agile software development team can successfully complete within a sprint.
- 3.1.9 Fibonacci Scoring - a series of numbers where a number is found by adding up the two numbers before it. Starting with 0 and 1, the sequence goes 1, 2, 3, 5, 8, 13, 21, 34
- 3.1.10 User Story – A change request for new functionality
- 3.1.11 Bug – A request submitted reporting an issue with a software feature or process
- 3.1.12 Feature – A collection of User Stories
- 3.1.13 Release – A packaged unit of work (usually an Epic or Feature) is compiled and versioned for publication into another instance of the representative software or framework.
- 3.1.14 Epic – A collection of Features

### 3.2 Responsibilities

#### 3.2.1 Stakeholder

- Any individual who has a vested interest in a software service or product managed by the development team.
- Provides needs and assessments to the Product Owner as it relates to their particular product or service
- Perform external testing (in conjunction with product owner)
- Indicates completion of a request in conjunction with the Product Owner

#### 3.2.2 Information Technology (IT)

- Manage software application development process
- Manage software change control process
- Fulfill software change request

#### 3.2.3 Product Owner

3.2.3.1 Responsible for maximizing the value of the product resulting from work of the Development Team. How this is done may vary widely across organizations, Scrum Teams, and individuals.

3.2.3.2 Sole person responsible for managing the Product Backlog.

## Software Development Change Control Procedure

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Product Backlog management includes:

- Clearly expressing Product Backlog items;
- Ordering the items in the Product Backlog to best achieve goals and missions;
- Optimizing the value of the work the Development Team performs;
- Ensuring that the Product Backlog is visible, transparent, and clear to all, and shows what the Scrum Team will work on next; and, ensuring the Development Team understands items in the Product Backlog to the level needed.
- The Product Owner may do the above work, or have the Development Team do it. However, the Product Owner remains accountable.

### 3.2.4 Scrum Master

- Servant-leader for the Scrum Team. The Scrum Master helps those outside the Scrum Team understand which of their interactions with the Scrum Team are helpful and which aren't. The Scrum Master helps everyone change these interactions to maximize the value created by the Scrum Team.
- Remove roadblocks and assist the development team in completing their sprint

### 3.2.5 Development Team

- Individuals responsible for executing the requested software change or design as it appears in the Sprint Plan.
- Responsible for scoring the requested software change or design and insuring that the request is broken down in executable units of work within the sprint cycle.
- Responsible for collecting test acceptance from consumer of the requested software change based on the test plan given with the software change

### 3.2.6 V&V Owner

3.2.6.1 A Verification and/or Validation will be required by a subject matter expert (SME) or group of experts other than the system owner or requester in the event that changes are to be made to:

- Financial Calculations

## Software Development Change Control Procedure

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- Revenue Calculation
- Invoice Calculation
- Burial Fees and Taxes Calculation
- Revenue Split percentages
- Radiological Calculations
- Isotopic Tolerances
- Measurements/Units
  - Curie
  - Becquerel
  - Pound
  - Kilogram
- This determination will be made by the Product Owner in collaboration with the Stakeholder or their designee.

### 4 SOFTWARE APPLICATION DEVELOPMENT PROCESS

#### 4.1 Software Management

4.1.1 A graded approach is used in the determination of the software management tools to be used. Criteria for the selection of a management tool set follow:

4.1.1.1 ServiceDesk: Software requests that require less than 4 hours of development effort and do not impact database structure, coding structure and do not affect any financial calculations, system function or transaction process may utilize ServiceDesk system as the software management tool.

4.1.1.2 Scrum/Agile Tool: Software that enables the Development Team to manage software tasks using the Scrum/Agile methodology. Items that reside here are managed through a Product Owner and are treated as version controlled items to be managed under the protocols of the Agile / Scrum

#### 4.2 Software Change Request Process

4.2.1 The software change request is issued by a stakeholder and can either be captured in ServiceDesk or direct communication with any team member. Ultimately the request is managed by the Product Owner to work with the stakeholder(s) and development team(s) to get the change request

## Software Development Change Control Procedure

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implemented.

- 4.2.2 If the request falls under the category of a ServiceDesk request, as determined by the Product Owner, it will be assigned as a maintenance item under the purview of the rules governing ServiceDesk tasks. ServiceDesk requests usually consist management or troubleshooting tasks and other smaller units of work that do not require coding that revolves around versioning of software or major features of software.
- 4.2.3 If the request falls under the category of a Scrum/Agile process item:
  - 4.2.3.1 The Product Owner will close the Service Desk Ticket with a reference to the User Story to where the work is being transitioned.
  - 4.2.3.2 The Product Owner captures the request in the Product Backlog and then works within the company of stakeholders to establish a priority for the task as it relates to the needs of the company.
  - 4.2.3.3 The Product Owner gathers the necessary scope and requirements for the given task. This may involve breaking a larger task into several smaller ones (i.e. a Feature into Stories)
  - 4.2.3.4 The Product Owner establishes Acceptance Criteria per item to confirm the functionality change.
  - 4.2.3.5 The Scrum team assists the Product Owner in Backlog Grooming to identify dependencies and establish a level of effort.
  - 4.2.3.6 The Scrum team accepts the Acceptance Criteria.
- 4.2.4 Sprint Planning takes the refined backlog and begins to populate the sprint plan with items the product owner has defined as priority. Resources are aligned to insure the sprint plan falls within the calculated velocity of the team. This insures the need and expectations are closely aligned and software changes advance through the process.
- 4.2.5 The sprint process begins and requests are taken by the development team to be completed. The request (user story) moves through the following phases of the agile process: Planned, Active, Test, Resolved and Closed
- 4.2.6 The developer takes the request from Planned and moves it to Active and begins working on the requested change. The developer may or may not work with the product owner and/or the requester to collect more detail on the request. It is up to the developer to determine if the scope of the task fits to the scoring and what was communicated during the refinement and planning processes. If the developer feels the requirements have changed



**Software Development Change  
Control Procedure**

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or the communications did not provide the level of detail required, the Scrum Master is notified and has the option to kick the task back to the product owner to be rescored and prioritized in order to maintain appropriate delivery of the request. Ultimately it is the responsibility of the developer and the scrum master to insure the sprint is completed and product is delivered.

- 4.2.7 Once the developer has satisfied the request fulfilment, they will move the request to testing. Testing is a peer based process where the request has:
  - 4.2.7.1 Test Plan based on the Acceptance Criteria
  - 4.2.7.2 Documentation indicating the requester executed testing and has delivered an acceptance document of the results
- 4.2.8 Once testing has been completed, the Scrum Master will review the story to insure:
  - 4.2.8.1 Tasks are all closed.
  - 4.2.8.2 Code has been checked into the repository.
  - 4.2.8.3 Test Plan.
  - 4.2.8.4 Acceptance Document from requester that testing was successful based on test plan and acceptance criteria.
- 4.2.9 The change is moved to Resolved where the Product Owner confirms the Acceptance Criteria has been satisfied.
- 4.2.10 The Product Owner accepts the story and marks as Closed.
- 4.2.11 In the event of a SOX centric change there may be an additional review and validation by a functional owner of the change required. (see attachments)

**4.3 Software Release Process**

- 4.3.1 Requests that have been completed and placed in a Closed state are subject to be released into production. This means that the request has gone through the Scrum process and the code has been checked into version control.
- 4.3.2 The Product Owner will determine the release schedule and packaging of the product to be released.
- 4.3.3 The Development team will prepare an environment with all included item items in the Release.
- 4.3.4 The Development team performs integration testing for the release.
- 4.3.5 All Scrum team members confirm deployment to the release environment.
- 4.3.6 Items are packaged by feature and features are packaged for release

candidates into Epics.

4.3.7 The Product Owner will request for a Release once all features and stories have been completed as well as SME (Subject Matter Expert) product training. This request done via email. This Release will have the items that the product owner wishes to be pushed to the pre-release instance also known as the UAT instance of the hosting software.

4.3.8 The product owner will conduct their pre-release testing and training. Training documentation should be retained on our company KB.

4.3.8.1 In the event that pre-release testing exposes an issue:

- A bug fix is submitted and upon closure the Release is updated with the hot fix to resolve the issue.

4.3.9 Once the pre-release process has been completed and the product owner is satisfied the objectives have been met, the product owner will mark the epic as “Ready for Production” to have the UAT instance packaged into a Release for publication to production.

4.3.10 The Product Owner will work with the business units and development team to schedule the Release to production.

4.3.11 Once the product has been published

4.3.11.1 Items are updated as done and the feature or item is closed out as a completed scope of work within the Scrum tool.

4.3.11.2 All related documentation for the feature or request should be captured in the respective item within the Scrum tool or Scrum documented protocol.

4.3.11.3 Within Scrum tool a release number is assigned in the event that the scrum tool has not assigned the respective release number generated by the Release process.

#### 4.4 Software Testing Guidelines

4.4.1 Scrum process initiated

4.4.2 Developer in cooperation with Product Owner or requester, compiles a test plan and documentation for test execution based on the acceptance criteria given in the scope of work for the user story.

4.4.3 Developer executes test plan and validates their results.

4.4.4 Developer moves the item to Test.

4.4.5 Test plan is executed by peer and/or requester and results documented.

4.4.6 Upon success the item is moved to Resolved.

4.4.7 The Product Owner will confirm the Acceptance Criteria has been

## Software Development Change Control Procedure

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satisfied.

4.4.8 See attachments section for any manual forms referenced in this process.

### 4.5 Software Code Source Control

GIT Data Repository using feature branches for version control and software release management or other forms of code control.

## 5 SOFTWARE RETIREMENT

5.1 The goal of the Retirement Phase is the removal of a software application from the production environment.

5.2 Software is removed from production for several reasons, including:

- The software is being replaced.
- The software is no longer supported.
- The software is no longer needed to support the current business model.
- The system is redundant. Organizations that grow by mergers and/or acquisitions often end up with redundant systems as they consolidate operations.
- The system has become obsolete.

5.3 Software retirement is accomplished by:

- Information Preservation – Where required by law or regulation, records maintained by the software must be retained in accordance with the appropriate retention schedule.
- Media Sanitization – All data is deleted, erased, and written over, as necessary.
- Hardware and Software Disposal - Hardware is disposed of as directed by the e-Waste policy. The disposition of commercial software is performed in compliance with the requirements of the software license.


## 6 TIMEFRAME FOR APPLICABILITY

This procedure is effective as of May 1, 2023 in perpetuity, and will be reviewed annually by Information Technology management.

## 7 ATTACHMENTS

NONE

QUALITY ASSURANCE PROCEDURE

						
Owner:	J. Hernandez – Approval on File		<b>Computer Software Management</b>			
Approver:	C. Boardman – Approval on File					
Doc. No.:	IG-QAP-19.1	Rev.	0	Effective:	4/1/2014	Page 1 of 21

**1. PURPOSE**

This procedure establishes the process for the acquisition, development, modification, maintenance and use of computer programs (software) as applied to the design, construction, operation, modification, repair, and maintenance of nuclear facilities by the EnergySolutions International (IG) and affiliate business units.

**2. SCOPE**

This procedure applies to software products which are used to produce or manipulate data, and which are used directly in the design, analysis and operation of systems, structures and components. The procedure is applicable to both safety software and non-safety software using a graded approach based on the nature and complexity of the software.

**2.1 Exemption**

Software that meets the following criteria is exempt from the formal control requirements of this procedure.

Licensed software that is purchased with and integral to, the operation of measuring and test equipment that is not altered by the user organization, and where the functionality of the system is demonstrated through calibration over the operational range.

System software (e.g., operating systems, administrative and management systems, system utilities, compilers, assemblers, translators, interpreters, query languages, word processing programs, spreadsheets, database managers, and graphing programs) or other software that does not generate data that are used in the formulation of conclusions.

Spreadsheet or other system software applications that are wholly incorporated into technical reports, calculation notes or other documentation where the calculations, mathematical formulas, and input data can be exactly verified during the technical review of the report are exempted from this procedure. Such calculations are treated as and considered to be manual calculations because the assumptions, formulas, inputs and outputs are documented and verified as part of the calculation package technical review

**3. TERMS AND DEFINITIONS**

**Acquired Software:** Software supplied through procurement. Acquired software includes Commercial Off-the-Shelf (COTS) software such as operating systems, database management systems, compilers, software development tools, commercial calculation software and spreadsheet tools such as MathCad and Microsoft’s Excel. It also includes procured custom software or software services, e.g., needed for operations of supplied equipment.

**Baseline:** A computer software, documentation, or both, that has been formally reviewed and agreed upon, that thereafter serves as the basis for use and further development, and that can be changed only by using an approved change control process.

**Commercial Off-the-Shelf Software (COTS):** Software that is commercially available, ready-made and available for sale, lease, or license to the general public and which requires no modification or maintenance in order to fit its intended purpose.



Mr. Doug Hansen  
CD-2023-263  
December 28, 2023

**IG-QAP-19.1 (CG-QA-PR-015), *COMPUTER SOFTWARE MANAGEMENT***

QUALITY ASSURANCE PROCEDURE



Owner:	J. Hernandez – Approval on File		<b>Computer Software Management</b>			
Approver:	C. Boardman – Approval on File					
Doc. No.:	IG-QAP-19.1	Rev.	0	Effective:	4/1/2014	Page 1 of 21

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System software (e.g., operating systems, administrative and management systems, system utilities, compilers, assemblers, translators, interpreters, query languages, word processing programs, spreadsheets, database managers, and graphing programs) or other software that does not generate data that are used in the formulation of conclusions.

Spreadsheet or other system software applications that are wholly incorporated into technical reports, calculation notes or other documentation where the calculations, mathematical formulas, and input data can be exactly verified during the technical review of the report are exempted from this procedure. Such calculations are treated as and considered to be manual calculations because the assumptions, formulas, inputs and outputs are documented and verified as part of the calculation package technical review


**3. TERMS AND DEFINITIONS**

**Acquired Software:** Software supplied through procurement. Acquired software includes Commercial Off-the-Shelf (COTS) software such as operating systems, database management systems, compilers, software development tools, commercial calculation software and spreadsheet tools such as MathCad and Microsoft’s Excel. It also includes procured custom software or software services, e.g., needed for operations of supplied equipment.

**Baseline:** A computer software, documentation, or both, that has been formally reviewed and agreed upon, that thereafter serves as the basis for use and further development, and that can be changed only by using an approved change control process.

**Commercial Off-the-Shelf Software (COTS):** Software that is commercially available, ready-made and available for sale, lease, or license to the general public and which requires no modification or maintenance in order to fit its intended purpose.

QUALITY ASSURANCE PROCEDURE

	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

**Computer Program:** A combination of computer instructions and data definitions that enables computer hardware to perform computational or control functions.

**Configurable Software:** Commercially available software or firmware that allows the user to modify the structure and function of the software in a limited way to suit user needs. An example is software associated with programmable logic controllers.

**Configuration Item (CI) (software):** A collection of hardware, software, and documentation elements treated as a unit for the purpose of configuration control.

**Configuration Management (software):** The controls and reporting processes applied to identifying and defining system CIs and to the acquisition, release, O&M, change, and retirement of these items throughout the system's life cycle.

**Design/Technical Output:** Drawings, specifications, and other documents used to define technical Error:

- 1) The difference between a computed, observed, or measured value or condition and the true, specified, or theoretically correct value or condition, e.g., computed result shows a different measurement than actual value;
- 2) An incorrect step, process, or data definition, e.g., incorrect instruction for a computer program;
- 3) A human action that produces an incorrect result, e.g., incorrect action by the programmer or user. (IEEE standard 610.12 1990)

**Legacy Software:** Software developed by EnergySolutions or its subcontractors prior to release of this procedure, or software that was acquired from national code centers (e.g., RSIC) that was not developed in accordance with a formal QA program meeting the requirements of American Society of Mechanical Engineers (ASME) NQA-1-2008, Subpart 2.7, Quality Assurance Requirements for Nuclear facility Applications.


**Major Change:** A modification resulting in a change to software functionality or performance requirements. Such changes usually impact data or logic flow through multiple software modules, or increase the size and complexity of the software control logic.

**Minor Change:** Any change that is considered maintenance in nature and does not a) add new features and/or content, b) change function, or c) change accuracy of the software. This includes:

- Reformatting information on user interfaces and displayed or printed output that does not change content.
- Clarifications to displayed or printed information that do not add or delete input or output data, change the software compatibility, or change the scope/applicability or intent of the software application.

**Safety Software:** Safety Software includes Safety System Software (Level A), Safety and Hazard Analyses and Design Software (Level B), and Safety Management and Administrative Controls Software (Level C).

**Software:** Computer programs and associated documentation and data pertaining to the operation of a computer system.

	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

**Software Manager [also known as Computer Program Manager (CPM)]:** Competent individual designated by the Group Engineering Manager to control the acquisition, development, testing, performance, corrections, modification and retirement of assigned software

**Software Tool:** A computer program used in the development, testing, analysis, or maintenance of a program or its documentation. Examples include comparators, cross-reference generators, compilers, configuration and code management software, decompilers, disassemblers, editors, flowcharters, test case generators, and timing analyzers.

**System Software:** Software used to facilitate the O&M of a computer system and its associated programs (e.g., operating systems, compilers, object modules, assemblers, interpreters, diagnostics, and utilities).


**System Software Application:** A computer program designed to fulfill the specific needs of a user which is developed using system software.

#### 4. REQUIREMENTS

##### 4.1 Design


- 4.1.1 The software design process shall be documented, approved by the responsible design organization, and controlled.
- 4.1.2 Software design requirements shall be identified and documented and their selection reviewed and approved. The software requirements shall identify the operating system, function, interfaces, performance requirements, installation considerations, design inputs, and any design constraints of the computer program.
- 4.1.3 The software design shall be documented and shall define the computational sequence necessary to meet the software requirements. The documentation shall include, as applicable, numerical methods, mathematical models, physical models, control flow, control logic, data flow, process flow, data structures, process structures, and the applicable relationships between data structures and process structures.
- 4.1.4 The software design shall be translated into computer program(s) using the programming organization's or design organization's programming standards and conventions.
- 4.1.5 Software design verification shall be performed by a competent individual(s) or group(s) other than those who developed and documented the original design, but who may be from the same organization.
- 4.1.6 The results of design verification shall be documented with the identification of the verifier indicated. Software verification methods shall include any one or a combination of design reviews, alternate calculations, and tests performed during computer program development.
- 4.1.7 The extent of verification and the methods chosen are a function of the complexity of the software, the degree of standardization, the similarity with previously proved software, and the importance to safety.



	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

**4.2 Testing**

- 4.2.1** Computer program test procedures shall provide for demonstrating the adherence of the computer program to documented requirements. The procedures shall also provide for evaluating technical adequacy through comparison of test results from alternative methods such as hand calculations, calculations using comparable proven programs, or empirical data and information from technical literature.
- 4.2.2** Testing shall demonstrate that the computer program:
- Properly handles abnormal conditions and events as well as credible failures.
  - Does not perform adverse unintended functions.
  - Does not degrade the system either by itself, or in combination with other functions or configuration items.
- 4.2.3** In-use test procedures shall be developed and documented to permit confirmation of acceptable performance of the computer program in the operating system. In-use test procedures shall be performed after the computer program is installed on a different computer, or when there are significant changes in the operating system.
- 4.2.4** Test records shall be established and maintained to indicate the ability of the item or computer program to satisfactorily perform its intended function or to meet its documented requirements.
- 4.2.5** Verification Test records for software shall document, where applicable:
- Computer program tested.
  - Operating environment.
  - Test equipment and calibrations, where applicable.
  - Date of test.
  - Tester or data recorder.
  - Simulation models used, where applicable.
  - Test problems.
  - Results and applicability.
  - Action taken in connection with any deviations noted.
  - Person evaluating test results.
- 4.2.6** In-Use Test Records shall document:
- Computer program tested.
  - Computer hardware tested.
  - Test equipment and calibrations, where applicable.
  - Date of test.
  - Tester or data recorder.
  - Acceptability.
- 4.2.7** Test results shall be documented and evaluated by a responsible authority to ensure that test requirements have been satisfied.


	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

**4.3 Configuration Management**

- 4.3.1 A software baseline shall be established at the completion of each activity of the software design process. Approved changes created subsequent to a baseline shall be added to the baseline.
- 4.3.2 A labeling system for configuration items shall be implemented that: (a) uniquely identifies each configuration item; (b) identifies changes to configuration items by revision; (c) provides the ability to uniquely identify each configuration of the revised software available for use.
- 4.3.3 Changes to software shall be formally documented. The documentation shall include: (a) a description of the change, (b) the rationale for the change, and (c) the identification of affected software baselines.
- 4.3.4 Only authorized changes shall be made to software baselines. The change shall be formally evaluated and approved by the organization responsible for the original design, unless an alternate organization has been given the authority to approve the changes.
- 4.3.5 The change shall be appropriately reflected in documentation, and traceability of the change to the software design requirement shall be maintained. Appropriate acceptance testing shall be performed for the change. Such testing shall provide assurance that the changes have not caused unintended adverse effect and that the modified system still meets program requirements.
- 4.3.6 The status of configuration items resulting from software design shall be maintained current. Configuration item changes shall be controlled until they are incorporated into the approved product baseline. The controls shall include a process for maintaining the status of changes that are proposed and approved, but not implemented. The controls shall also provide for notification of this information to affected organizations.

**4.4 Training**

- 4.4.1 Personnel performing safety software acquisition, evaluation, design, development, testing, or operation shall be qualified to perform their duties either through a combination of training and equivalent experience.
- 4.4.2 Training shall be commensurate with the scope, complexity, and importance of the tasks and the education, experience and proficiency of the individual.
- 4.4.3 Completion of training, education and/or qualification requirements for staff involved in the acquisition, development, testing, use and evaluation of safety software shall be documented and reviewed periodically.


	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

**5. PROCEDURE**

**5.1 Software Planning**

Step No.	Performer	Action
5.1.1	All Personnel	Notify management of computer software or system software applications required to support quality-related activities including design analysis, safety analysis, or compliance-related decisions or software used to operate systems, structures or components.
5.1.2	Engineering Manager	<p>Determine the need for safety software.</p> <p>Assign a Software Manager for each computer program or system software application to be developed or acquired.</p>
5.1.3	Software Manager	<p>Determine the software classification of each computer program or software application based on the classification criteria shown in Form IG-QAP-19.1-1, <i>Software Classification</i>. The classification criteria forms the basis for determining the applicable lifecycle documentation requirements based on the risk associated with the intended use of the software.</p> <p>Using Form IG-QAP-19.1-2, <i>Software Evaluation Report</i> develop the Software Evaluation Report and the applicable Software Quality Plan using Form IG-QAP-19.1-3, <i>Software Quality Plan</i>.</p> <p>Use Form IG-QAP-19.1-4, <i>Computer Software Listing</i> to establish and maintain a Safety Software Inventory for each safety software application that identifies:</p> <ul style="list-style-type: none"> <li>• Software Name,</li> <li>• Version,</li> <li>• Software Classification,</li> <li>• Assigned Software Manager.</li> </ul>
5.1.4	Software Manager or Designee	<p>Acquire legacy or Commercial Off-the-Shelf (COTS) software in accordance with section 5.3 of this procedure.</p> <p>Develop new or revise existing legacy software in accordance with IG-QAP-19.2, <i>Custom Software</i>.</p>

QUALITY ASSURANCE PROCEDURE


	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

Step No.	Performer	Action
5.1.5	Software Manager or Designee	<p>Place software under configuration control in accordance with section 5.4 of this procedure.</p> <p>Establish and maintain a baseline for each software application which includes the following configuration items (CIs):</p> <ul style="list-style-type: none"> <li>• Copies of software and Source code listings (if applicable).</li> <li>• Supporting design, test, and user documentation.</li> <li>• Installation &amp; Checkout Documentation.</li> <li>• PR/CR Form.</li> <li>• Software Tools and System software.</li> </ul>
5.1.6	Software Manager or Designee	<p>For Safety Level A software prepare Form IG-QAP-19.1-5, <i>Software Safety Analysis Report</i>, prior to approval of the software for use in accordance with section 5.2 of this procedure.</p>

**5.2 Software Safety Analysis Report**

Step No.	Performer	Action
5.2.1	Software Manager or Designee	<p>Prepare Form IG-QAP-19.1-5, <i>Software Safety Analysis Report</i> for each Level A safety software application. Include a description of the adequacy of safeguards for the safety software application, which shall include (but is not limited to) the following:</p> <ul style="list-style-type: none"> <li>• Fault tolerant and self diagnostic features.</li> <li>• Complex or faulty algorithms/logic.</li> <li>• Lack of proper handling of incorrect data/inputs or error conditions.</li> <li>• Buffer overflow.</li> <li>• Incorrect sequence of operations due to either logic or timing faults.</li> <li>• Process faults.</li> <li>• Remote hardware faults.</li> <li>• Instrumentation failure due to error or loss of power.</li> <li>• Influence of external systems.</li> <li>• Separation of safety modules from non-safety modules.</li> <li>• Adequacy of system design to fulfill requirements of the originating documents.</li> <li>• Software safety resolution strategies to eliminate or mitigate potential hazards.</li> </ul>

QUALITY ASSURANCE PROCEDURE


	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

Step No.	Performer	Action
5.2.2	Engineering Manager	Assign independent technical reviewer to review the Software Safety Analysis Report (SSAR) in accordance with IG-QAP-03.09, <i>Document Review Process</i> .
5.2.3	Independent Technical Reviewer	Review the SSAR and evaluate the technical adequacy of the design approach and ensure internal completeness, consistency, clarity, and correctness of the software.
5.2.4	Engineering Manager	Approve the SSAR, and enter the SSAR baseline in the Software Configuration Management system
5.2.5	Software Manager or Designee	Update Form IG-QAP-19.1-4, <i>Computer Software Listing</i> to reflect changes in configuration status, and notify affected organizations when new or revised software and associated CIs are approved for use.

**5.3 Procurement and Supplier Management**


Step No.	Performer	Action
5.3.1	Software Manager	<p>Procure software and software services in accordance with the requirements of IG-QAP-04.3, Procurement Document Control.</p> <p>The Quality level designator shall be the following:</p> <ul style="list-style-type: none"> <li>• Safety Level A: QL-1.</li> <li>• Safety Level B: QL-2.</li> <li>• Safety Level C: QL-2.</li> <li>• Non-Safety Level D: QL-3.</li> <li>• Non-Safety Level E: No quality level</li> </ul> <p><i>Note Safety Level B or C COTS software which is not available from a QA qualified supplier may be procured provided the software is dedicated for use in accordance with IG-QAP-07.5, Commercial Grade Dedication.</i></p>

QUALITY ASSURANCE PROCEDURE

	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

Step No.	Performer	Action
5.3.2	Software Manager	<p>Specify in procurement documents applicable quality assurance (QA) requirements for software development and software services and identify all documentation, plans, and procedures to be supplied by the vendor using a graded approach as shown in Form IG-QAP-19.1-1, <i>Software Classification</i>.</p> <p>Procurement documents shall identify requirements for Supplier reporting of software errors to the purchaser.</p> <p>Contracts for custom safety software development shall include the following documentation, as a minimum:</p> <ul style="list-style-type: none"> <li>• Requirements documentation.</li> <li>• Design and implementation documentation.</li> <li>• Verification and validation documentation.</li> <li>• Change documentation.</li> <li>• User documentation.</li> </ul>
5.3.3	Assigned Software Engineer	<p>For acquisition of legacy or Commercial-Off-The-Shelf (COTS) software, or updates to existing COTS software, implement the software in accordance with IG-QAP-19.3, <i>Installation and Use of Acquired Software</i>.</p> <p>For EnergySolutions changes to COTS software, legacy software or design of new software, implement the change or new design in accordance with IG-QAP-19.2, <i>Custom Software</i>.</p> <p>For procurement of contracted software design implement the change in accordance with Section 5.4 of this procedure.</p>
5.3.4	Engineering Manager	<p>Review and Approve procurement documents to ensure they include provisions for review and approval of supplier QA programs for safety software, and the reporting of software errors and failures to the Software Manager.</p>
5.3.5	Software Manager or Designee	<p>Assign personnel responsible to review, evaluate, accept and install acquired software upon receipt.</p>
5.3.6	Software Manager or Designee	<p>Evaluate and validate acquired software for its intended use, and install in accordance with IG-QAP-19.3, <i>Installation and Use of Acquired Software</i>.</p>

QUALITY ASSURANCE PROCEDURE

	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0


Step No.	Performer	Action
5.3.7	Software Manager or Designee	<p>Prior to use, for existing software that has been previously verified by another EnergySolutions organization, evaluate software acceptability for use in International work and documents results in Form IG-QAP-19.1-2, <i>Software Evaluation Report</i>.</p> <p>If specified documentation is not available or is inadequate, the Software Evaluation Report shall define the documentation requirements and compensatory measures for ensuring that the software will perform its intended function.</p>
5.3.8	Software Manager or Designee	<p>Submit the applicable software baseline elements to the <i>Software Manager</i> for incorporation into the software baseline, in accordance with section 5.4 of this procedure.</p> <p>For changes to existing software baselines, prepare Form IG-QAP-19.1-6, <i>Problem Report/Change Request</i> and process in accordance with Section 5.5 which describes the change, the reason for the change, and the affected configuration items.</p>
5.3.9	Software Manager or Designee	Update the Computer Software Listing to reflect changes in configuration status, and notify affected organizations when new or revised software and associated CIs are approved for use.

**5.4 Configuration Management**

Step No.	Performer	Action
5.4.1	Software Manager or Designee	<p>Implement a labeling system for configuration items that:</p> <ul style="list-style-type: none"> <li>• Uniquely identifies each configuration item (CI).</li> <li>• Identifies changes to configuration items by revision or version identifier.</li> <li>• Provides the ability to uniquely identify each approved configuration of the software baseline available for use.</li> </ul>

**Note:** Configuration items include, as appropriate:

- Documentation (e.g., design requirements, user instructions, test plans, test reports, etc.);
- Computer programs (e.g., source, object, backup files); and
- Support software.

	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0


Step No.	Performer	Action
5.4.2	Software Manager or Designee	Maintain a software baseline that includes the following: <ul style="list-style-type: none"> <li>• A listing of the approved baseline elements (e.g., configuration items) and unique identifiers assigned</li> <li>• The status of proposed, in-process or approved changes to the baseline elements.</li> <li>• A history of changes to the software, including descriptions of the changes made between versions.</li> </ul>
5.4.3	Software Manager or Designee	Update the Safety Software Inventory to reflect changes in configuration status, and notify affected organizations when new or revised software and associated CIs are approved for use.

**5.5 Problem Reporting and Corrective Action**

Step No.	Performer	Action
5.5.1	Users	Document software problems detected during the use of the software by completing Form IG-QAP-19.1-6, <i>Problem Report/Change Request</i> .
5.5.2	Software Manager or Designee	Review software problem to determine if the problem is an error or an opportunity for improvement. Control software errors in accordance with IG-QAP-15.1, <i>Control of Nonconforming Items</i> .
5.5.3	Software Manager or Designee	Report software problems to affected user organizations, and provide recommended compensatory actions on the PR/CR.
5.5.4	Software Manager or Designee	Determine the effect of the software problem on previous use(s) and the need for corrective action based on sufficient information obtained from the affected users.
5.5.5	Software Manager or Designee	Document on the PR/CR recommended corrective action that identifies, evaluates, documents and (if required) corrects the problem.
5.5.6	Engineering Manager	Review and approve the PR/CR.
5.5.7	Software Manager or Designee	Implement the approved corrective action.
5.5.8	Assigned Software Engineer	Complete the PR/CR when changes are implemented and validated and submit the PR/CR and supporting documentation to the Software Manager for review and approval.



QUALITY ASSURANCE PROCEDURE

	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

Step No.	Performer	Action
5.5.9	Software Manager or Designee	Complete the PR/CR when changes are implemented and validated and submit the PR/CR and supporting documentation to the Software Manager for review and approval.


**5.6 Software Personnel Training**

Step No.	Performer	Action
5.6.1	Engineering Manager	Establish training requirements for Software Managers, engineers, programmers, test personnel.  Indoctrination and training of personnel involved in the design, development, test, evaluation and/or use of software shall be commensurate with the scope, complexity, importance of the assigned activities, and the education, experience, and proficiency of the person.
5.6.2	Project Manager	Request software-specific user training for project personnel assigned responsibility to perform software analysis.
5.6.3	Software Manager or Designee	Provide indoctrination and training of authorized users to ensure that proper data are entered, proper options and menus are selected and that the results of the software can be interpreted correctly.

**5.7 Access Control**

Step No.	Performer	Action
5.7.1	Project Manager	Submit IT request to allow access to software for specified users. Include in the access request the specific computer platform and operating system assigned to the specified user.
5.7.2	User	Complete required training in accordance with Section 5.6 of this procedure and notify Software Manager.
5.7.3	Software Manager or Designee	Establish access controls for assigned software for all authorized users. Provide level of access and specify permissions allowed at each security level to prevent unauthorized access.

QUALITY ASSURANCE PROCEDURE

	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

**5.8 Software Retirement**

Step No.	Performer	Action
5.8.1	Project Manager	Notify users of software products that are to be terminated.
5.8.2	User	Complete pending calculations using the software and notify the Software Manager when complete.
5.8.3	Software Manager or Designee	Remove access controls for software that is to be retired and delete the software application and support software from the authorized platforms to prevent routine use of the software.

**6. RECORDS**


Records generated through implementation of this procedure shall be identified, classified, and stored in accordance with the following:

Identification	Classification	Protection/Storage
<ul style="list-style-type: none"> <li>• Software Evaluation Report</li> <li>• Software Quality Plan</li> <li>• Safety Software Analysis Report</li> <li>• PR/CR</li> <li>• User training</li> <li>• Procured Custom Software Documentation</li> </ul>	<ul style="list-style-type: none"> <li>• Q Records</li> </ul>	<ul style="list-style-type: none"> <li>• <b>In-process:</b> Reasonable level of protection.</li> <li>• <b>Temporary:</b> 1-hour fire rated container.</li> <li>• <b>Permanent and Nonpermanent:</b> in accordance with contract requirements or IG-QAP-17.1, <i>Quality Assurance Records</i>.</li> </ul>
<ul style="list-style-type: none"> <li>• Computer Software Listing</li> </ul>	<ul style="list-style-type: none"> <li>• Non-Q Records</li> </ul>	<ul style="list-style-type: none"> <li>• <b>In-process:</b> Reasonable level of protection.</li> <li>• <b>Temporary:</b> 1-hour fire rated container.</li> <li>• <b>Permanent and Nonpermanent:</b> in accordance with contract requirements or IG-QAP-17.1, <i>Quality Assurance Records</i>.</li> </ul>

**7. REFERENCES**

- 7.1 ASME NQA-1-2008, Subpart 2.7, *Quality Assurance Requirements for Nuclear facility Applications*
- 7.2 IEEE Standard 610.12-1990, *IEEE Standard Glossary of Software Engineering Terminology*
- 7.3 IG-QAP-03.9, *Document Review Process*
- 7.4 IG-QAP-04.3, *Procurement Document Control*
- 7.5 IG-QAP-07.5, *Commercial Grade Dedication*
- 7.6 IG-QAP-15.1, *Control of Nonconforming Items*
- 7.7 IG-QAP-17.1, *Quality Assurance Records*
- 7.8 IG-QAP-19.2, *Custom Software*
- 7.9 IG-QAP-19.3, *Installation and Testing of Acquired Software*

QUALITY ASSURANCE PROCEDURE


	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

**8. APPENDICES**


- Appendix 1 Form IG-QAP-19.1-1, *Software Classification*
- Appendix 2 Form IG-QAP-19.1-2, *Software Evaluation Report*
- Appendix 3 Form IG-QAP-19.1-3, *Software Quality Plan*
- Appendix 4 Form IG-QAP-19.1-4, *Computer Software Listing*
- Appendix 5 Form IG-QAP-19.1-5, *Software Safety Analysis Report*
- Appendix 6 Form IG-QAP-19.1-6, *Problem Report/Change Request*

**9. REVISION HISTORY**

Revision	Reason for Revision
0	Initial issue for ES International - rebranded from AG-QAP-19.1 rev 0

	Computer Software Management		
	Doc No.	IG-QAP-19.1	Rev: 0

### Appendix 1 – Software Classification Matrix

	Software Classification Matrix	Page 1 of 1
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Software Identification <input style="width: 90%;" type="text"/>	Version <input style="width: 90%;" type="text"/>
Classification <input style="width: 95%;" type="text"/>	

COTS Documentation	Software Classification				
	A	B	C	D	E
Software Inventory (CSL)	X	X	X	X	X
Software Quality Plan	X	X	X	X	
Software Requirement Specification					
Software Evaluation Report	X	X	X	X	
Software Design Description					
Software Implementation Document					
Software User Documentation	X	X			
Software Verification/Validation Plan					
Software Verification/Validation Report	X	X	X	X	X
Software Safety Review	X	X	X		
Software Installation & Checkout (CSU)	X	X	X	X	X
Developed Documentation					
Software Inventory (CSL)	X	X	X	X	X
Software Quality Plan	X	X	X	X	
Software Requirement Specification	X	X	X	X	
Software Evaluation Report	X	X	X	X	
Software Design Description	X	X	X		
Software Implementation Document	X				
Software User Documentation	X	X			
Software Verification/Validation Plan	X	X	X	X	X
Software Verification/Validation Report	X	X	X	X	X
Software Safety Review	X	X	X		
Software Installation & Checkout (CSU)	X	X	X	X	X


Software Classification Criteria	
Safety Level A	Safety System Software: Software for a nuclear facility that performs a safety function as part of a structure, system or component.
Safety Level B	Safety and Hazard Analysis software and Design software: Software that is used to classify, design or analyze nuclear facilities. This software is not part of a Structure, System or Component (SSC), but helps to ensure the proper accident or hazards analysis of nuclear facilities or an SSC that performs a safety function.
Safety Level C	Safety Management and Administrative Control software: Software that performs a hazard control function in support of nuclear facility or radiological safety management programs or technical safety requirements, or other software that performs a control function necessary to provide adequate protection from nuclear facility or radiological hazards. This software supports eliminating, limiting or mitigating nuclear hazards to workers, the public, or the environment.
Non-Safety Level D	Software used in general service applications where software failure or application error could result in the potential for high impact risk, or where results are the sole source of quality related information that is provided to external customers.
Non-Safety Level E	Software used in general service applications where software failure or application error could result in the potential for medium to low project risk, but where results are not the sole source of quality-related information that is provided to external customers.

Approvals			
<b>Prepared By</b>	<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>
<b>Software Manager</b>	Name	Signature	Date
<b>Approved By</b>	<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>
<b>Engineering Manager</b>	Name	Signature	Date
<b>Approved By</b>	<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>
<b>QA Manager</b>	Name	Signature	Date

QUALITY ASSURANCE PROCEDURE

	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

**Appendix 2 – Software Evaluation Report**

	<b>Software Evaluation Report</b>	Page 1 of 1
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Document Number  Rev


System/Software Name <input type="text"/>	Version <input type="text"/>
<input type="checkbox"/> Major Change	<input type="checkbox"/> Minor Change

1. Describe purpose of software and software source.
2. Describe mathematical models and design basis.
3. Describe/List primitive baseline configuration items, including required system software tools.
- 3a. If documentation from Item 3 is not available, justify exceptions and specify compensatory actions required to demonstrate acceptance for use.
  - Explain the need for continued use of the software.
  - Explain the consequence of not using the software.
  - Describe the risk associated with continued use of the software (review risk evaluation report and determine if a new or updated report is needed).
  - Describe interior actions taken to mitigate the risk.
  - Describe actions to be implemented.
  - Identify implementation due date.
4. Describe adequacy of existing design and user documentation to support software operation/maintenance including necessary user training.
5. Describe adequacy of existing test documentation to demonstrate acceptable performance based on defined software requirements. (Define new test cases required to fully demonstrate performance and to support regression testing.)


**Approvals**

<b>Prepared By</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>Software Manager</b>	Name	Signature	Date
<b>Approved By</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>Engineering Manager</b>	Name	Signature	Date
<b>Approved By</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>QA Manager</b>	Name	Signature	Date

Form IG-QAP-19.1-2 3/14

	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

### Appendix 3 – Software Quality Plan

	<b>Software Quality Plan</b>	Page 1 of 1
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SQP-


Rev

Software Application <input type="text"/>	Software Classification <input type="text"/>
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Purpose of the Software and the software products to which this plan applies. <input type="text"/>
Organizations responsible for performing work, achieving software quality, tasks, and responsibilities. <input type="text"/>
Required documentation. <input type="text"/>
Applicable Standards, Conventions, Techniques or Software Engineering Methods. <input type="text"/>
Required software reviews. <input type="text"/>

Approvals			
Prepared by Software Manager	<input type="text"/> Name	<input type="text"/> Signature	<input type="text"/> Date
Approved by Engineering Manager	<input type="text"/> Name	<input type="text"/> Signature	<input type="text"/> Date
Approved by QA Manager	<input type="text"/> Name	<input type="text"/> Signature	<input type="text"/> Date

Form IG-QAP-19.1-3 3/14

	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

### Appendix 4 – Computer Software Listing

	<b>Computer Software Listing</b>	Page 1 of 1
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CSL-  Rev


Software Application <input type="text"/>	Software Classification <input type="text"/>
---	--

Program Information	
Program Name	<input type="text"/>
Description	<input type="text"/>
Software Classification	<input type="text"/>
Software Manager	<input type="text"/>


Version Records						
Version	Status	Description	Date	Master File		
				Media	Source Code	Executable
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Approvals			
Approved by	<input type="text"/>	<input type="text"/>	<input type="text"/>
Group	<input type="text"/>	<input type="text"/>	<input type="text"/>
Engineering Manager	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Name	Signature	Date

Form IG-QAP-19.1-4 3/14

	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

**Appendix 5 – Software Safety Analysis Report**

	<b>Software Safety Analysis Report</b>	Page 1 of 1
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SSAR-  Rev

Software Identification <input type="text"/>	Version <input type="text"/>	Software Classification <input type="text"/>
--	------------------------------	--

Software summary.

---

Describe fault tolerance and self-diagnostic features.

---

Describe adequacy of existing design (capability to preclude improper handling of incorrect data/inputs, buffer overflows, loss of power, or process/hardware faults).

---

Describe adequacy of flow logic including separation of safety/non-safety modules.


---

Define software safety resolution strategies to eliminate or mitigate potential hazards.


Approvals			
Prepared by Software Manager	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Name	Signature	Date
Approved by Engineering Manager	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Name	Signature	Date
Approved by QA Manager	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Name	Signature	Date

Form IG-QAP-19.1-3 3/14



	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

**Appendix 6 – Problem Report/Change Request**

	<b>Problem Report/Change Request</b>	Page 1 of 2
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Problem Report/Change Request Number [ ]

Title [ ]		
Software Identification [ ]	Version [ ]	Software Classification [ ]
Author [ ]	Phone [ ]	Date Initiated [ ]

Problem     
  Enhancement     
  Temporary

Description [ ]

Priority   
  Emergency   
  High   
  Medium   
  Low

Approvals   
  Quality   
  Safety   
  Environmental   
  Client   
  NA

Disposition/Corrective Action [ ]

Impact/Risk [ ]

Software Manager [ ]      Phone [ ]

Attachments [ ]      Related PR/CR [ ]

Affected Hardware [ ]


Affected Documents		
Document Title	Log Engineer	Date Complete


Affected Software		
Software Title and Version Number	Log Engineer	Date Complete

Testing Requirements (includes both V&V and any required post-installation testing). [ ]

Approval to Develop Change and V&V			
Software design, development, testing and V&V may proceed.			
Cognizant System Engineer	[ ]	[ ]	[ ]
	Name	Signature	Date
Software Manager	[ ]	[ ]	[ ]
	Name	Signature	Date
Engineering Manager	[ ]	[ ]	[ ]
	Name	Signature	Date
[ ]	[ ]	[ ]	[ ]
Other	Name	Signature	Date

QUALITY ASSURANCE PROCEDURE

	<b>Computer Software Management</b>		
	Doc No.	IG-QAP-19.1	Rev: 0

	<b>Problem Report/Change Request</b>	Page 2 of 2
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Problem Report/Change Request Number [ ]

Title [ ]		
Software Identification [ ]	Version [ ]	Software Classification [ ]
Author [ ]	Phone [ ]	Date Initiated [ ]

**Authorization to Install Software Change**

The software changes described above have been successfully developed, V&V satisfactorily completed, and installation and production use of the software change is authorized for the effective date listed below (all signatures N/A if PRCR is to be cancelled). Software is promoted to production status.

<b>Cognizant System Engineer</b>	[ ]	[ ]	[ ]
	Name	Signature	Date
<b>Software Manager</b>	[ ]	[ ]	[ ]
	Name	Signature	Date
<b>Engineering Manager</b>	[ ]	[ ]	[ ]
	Name	Signature	Date
<b>Owner</b>	[ ]	[ ]	[ ]
	Name	Signature	Date

**Closeout of PR/CR**

By signing below, the signatories concur that the system hardware/software changes have been implemented as noted in this PR/CR, the appropriate testing has been successfully completed, and all applicable documentation has been updated as required or that this PR/CR is to be cancelled.

Closeout     Cancellation

<b>Cognizant Engineer</b>	[ ]	[ ]
The following have been completed:	Date	
• Documentation updated.	[ ]	[ ]
• Users notified.	[ ]	[ ]
• Change installed on all systems.	[ ]	[ ]
• Baseline updated.	[ ]	[ ]
• Post installation testing.	[ ]	[ ]
<b>Software Manager</b>	[ ]	[ ]
	Name	Signature      Date
<b>Remarks</b>	[ ]	

Form IG-QAP-19.1-6 3/14



Mr. Doug Hansen  
CD-2023-263  
December 28, 2023

**FCF-EN-PR-011, *FEDERAL CELL FACILITY ENGINEERING***  
***FIELD INSPECTIONS***



Mr. Doug Hansen  
CD-2023-263  
December 28, 2023

**FEDERAL CELL FACILITY MODIFICATION REQUEST  
GROUNDWATER QUALITY DISCHARGE PERMIT UGW450005**



**Federal Cell Facility  
Modification Request**

**Groundwater Quality Discharge Permit UGW450005**

**December 28, 2023**

**By**  
**EnergySolutions, LLC**  
299 South Main Street, Suite 1700  
Salt Lake City, UT 84111

**For**  
**Utah Division of Waste Management and Radiation Control**  
Post Office Box 144880  
195 North 1950 West  
Salt Lake City, UT 84114-4880

**FEDERAL CELL FACILITY MODIFICATION REQUEST**

<b>SECTION I. BACKGROUND</b>	<b>1</b>
<b>SECTION II. PERMIT MODIFICATION</b>	<b>3</b>
<b>SECTION III. FEDERAL CELL FACILITY WASTE AND LEACHATE CHARACTERISTICS</b>	<b>6</b>
<b>SECTION IV. FEDERAL CELL FACILITY DISCHARGE CONTROLS</b>	<b>8</b>
<b>SECTION V. DEMONSTRATION OF PERMIT COMPLIANCE</b>	<b>10</b>
<b>SECTION VI. REMEDY OF UNLIKELY FEDERAL CELL FACILITY NON-COMPLIANCE</b>	<b>11</b>
<b>SECTION VII. REFERENCES</b>	<b>12</b>

**LIST OF APPENDICES**

<b>Appendix</b>	<b>Title</b>
A	Proposed DU Permit Language for Modification of Permit UGW450005
B	Proposed DU Modification Language for Water Monitoring Quality Assurance Plan
F	Proposed Modification Language for Post-Closure Monitoring Plan
J	Proposed Modification Language for BAT Performance Monitoring Plan
K	Proposed Modification Language for BAT Contingency Plan

## SECTION I. BACKGROUND

The purpose and scope of the project proposed in this modification request is to design, construct, operate, and close a dedicated Federal Cell Facility for the disposal of federally generated depleted uranium (DU), a subset of low-level radioactive waste (LLRW). The lifecycle of the new Federal Cell Facility from regulatory modification of Ground Water Quality Discharge Permit UGW450005 (GWQDP) through embankment construction and DU burial to final cover construction and closure is subject to market-forces affecting availability of DU and may encompass approximately 20 years.

The Division of Waste Management and Radiation Control (DWMRC) regulates activities in the State of Utah that involve radioactive materials, some types of radioactive waste and radiation. As part of this responsibility, the DWMRC enforces requirements promulgated by the State of Utah in Utah Code §19-5, “*Water Quality Act*.” Requirements applying to groundwater resource protection are contained in Utah Administrative Code UAC R317-6, “*Ground Water Quality Protection*.”

The Radiation Control Act includes specific requirements addressed herein that are prerequisite to receiving license authority to dispose of concentrated DU. In order to be licensed to dispose of concentrated DU, Utah Code §19-3-103.7(3) requires that the DWMRC director: (a) approve a depleted uranium performance assessment (DU PA); (b) agree to a Federal Cell Facility designation; and (c) enter into an agreement wherein the DOE accepts perpetual management of the Federal Cell Facility, title to the land on which the Federal Cell Facility is located, title to the waste in the Federal Cell Facility, and financial stewardship for the Federal Cell Facility and the waste in the Federal Cell Facility.

The framework for the technical analysis of the disposal of radioactive waste was developed in the 1980s with the U.S. Nuclear Regulatory Commission’s issuance of Title 10 of the Code of Federal Regulations 10 CFR 61, “Licensing Requirements for Land Disposal of Radioactive Waste.” Part 61 establishes a waste classification scheme based on the role that radionuclide concentrations and waste forms play in the long-term performance of disposal facilities. When initially suggested for 10 CFR 61.55, concentrated DU was considered Class A LLRW. Although included in the draft analysis, depleted uranium was removed from the final Part 61 rule, because the nominal amounts of depleted uranium in need of disposal were not found to create elevated risk to human health and the environment. Additionally, there were no commercial facilities producing large quantities of DU at that time, and the Nuclear Regulatory Commission (NRC) did not regulate DU in storage at federal facilities; instead, it was controlled and managed by DOE as a potential future resource. Because Utah is an Agreement State with the NRC, the Utah licensing regulations for land disposal of low-level radioactive wastes closely follow the NRC’s Part 61 regulations.

In October 2008, DOE’s Savannah River Site sent 5,408 drums of DU to the Clive Facility for authorized disposal under Radioactive Material License UT 2300249 (from a total inventory of 33,000 drums needing final disposition). DOE also informed EnergySolutions that the agency intended to dispose of the large quantity of DU expected to be generated by facilities in Ohio and Kentucky [~700,000 megagrams (Mg) or 700,000 metric tons]. Because depleted uranium concentration limits were excluded when the final Part 61 rules were promulgated, the State of Utah initiated formal rulemaking on March 2, 2010 to amend UAC R313-25 and Radioactive Material License UT 2300249, significantly limiting further disposal of concentrated DU until a site-specific DU PA could be completed.



In 2011, EnergySolutions submitted a Depleted Uranium Performance Assessment and requested approval from the director. EnergySolutions and the DRC/DWMRC director have worked in good faith on the DU PA in the ensuing years. After a long period of technical discussion, the director determined in 2018 that EnergySolutions should apply for a unique radioactive material license for a dedicated Federal Cell Facility as the ultimate destination of DOE’s concentrated DU.

In May 2019, Utah House Bill 220 promulgated additional requirements in Utah Code §19-3-103.7 for disposal of more than one metric ton of concentrated DU. These requirements include: “(a) an approved performance assessment; (b) designation of a federal cell by the director; and (c) pursuant to an agreement acceptable to the director, that the United States Department of Energy accepts perpetual management of the federal cell, title to the land on which the federal cell is located, title to the waste in the federal cell, and financial stewardship for the federal cell and the waste in the federal cell.”

- 1) In 2011, EnergySolutions commissioned and submitted to the director version 1.0 of a DU PA. The DU PA was created as a systems-level model using the GoldSim probabilistic modeling platform and evaluates the range of likely impacts of DU disposal in the new Federal Cell Facility. Updates to the DU PA since 2011 have led to adaptive decision making, resulting in an improved cover design and revised DU placement within the Federal Cell Facility. The DU PA version 3.0 is included with this application. In addition to compliance with UAC, the utility of such an analysis is to inform construction, operational and other administrative decisions regarding the Federal Cell Facility. With downward pathways influencing groundwater concentrations, and upward pathways influencing dose and uranium hazard, the performance assessment seeks to optimize construction and placement logistics.
- 2) This application for a radioactive material license authorizing disposal of concentrated DU in a designated Federal Cell Facility is being submitted to the director to comply with Utah Code §19-3-103.7
- 3) In 2019, EnergySolutions and DOE entered into an agreement that establishes covenants and restrictions related to DOE acceptance of the long-term stewardship of the Federal Cell Facility. This agreement requires transfer of “...perpetual management of the federal cell, title to the land on which the federal cell is located, title to the waste in the federal cell, and financial stewardship for the federal cell and waste in the federal cell.”

EnergySolutions herein requests Ground Water Quality Discharge Permit UGW450005 be modified to authorize disposal of DU in a new, designated Federal Cell Facility.

A proposed method for modifying the Permit to address operation of the Federal Cell Facility is summarized in Section II and presented in redline in Appendix A. In Section III of this Permit Modification Request, EnergySolutions describes the waste and leachate characteristics of material for disposal in the proposed Federal Cell Facility. Section IV presents the inherent and additional proposed discharge controls to adverse groundwater quality effects. Similarly, Section V describes the proposed changes to the sampling and analysis plan to demonstrate compliance with Permit conditions. Finally, Section VI suggests extension of the Permit-required measures to be taken to remedy unlikely non-compliances of the Federal Cell Facility with the Permit.

## SECTION II. PERMIT MODIFICATION

Modification to Permit UGW450005 to reflect authorized construction and operation of the Federal Cell Facility is proposed in Appendix A. The technical and regulatory basis for the proposed modification of the requirements found in Groundwater Quality Discharge Permit UGW450005 are herein described to reflect construction and operation of the proposed Federal Cell Facility Radioactive Material License Application. The Permit was issued pursuant to UAC R317-6, which requires any persons who operates a facility or modifies an existing or new facility that discharges water or would probably result in a discharge of water, to obtain a Groundwater Quality Discharge Permit.

The Permit requires that the environmental impacts to groundwater from the Federal Cell Facility be kept within tolerable risk levels and treats the shallow aquifer below the Federal Cell Facility as if it is vulnerable to contamination originating from the Federal Cell Facility. Groundwater protection parameters and Ground Water Protection Levels (GWPLs) are used in the monitoring of site performance to demonstrate regulatory compliance with requirements listed in Part I.C of the Permit. Furthermore, since shallow groundwater below the Federal Cell Facility is defined as Class IV (in accordance with UAC R317-6-4.7), alternate GWPLs are allowed, if they present no significant hazard, and are protective of public health and the environment. Alternate GWPLs levels at compliance wells are listed in the Permit. Groundwater protection parameters will be monitored during and after Federal Cell Facility operations, and appropriate records and data submitted for each compliance monitoring well, and parameter to the Director, to demonstrate compliance with regulatory requirements.

Potential contamination from the Federal Cell Facility is minimized by proper design, construction, operation, and maintenance of the Federal Cell Facility that receives DU. Design criteria and the operational practices proposed for the Federal Cell Facility are intended to reduce the change of leakage to shallow groundwater from the Federal Cell Facility. Groundwater monitoring wells are proposed strategically down-gradient from the Federal Cell Facility to demonstrate environmental protection. The sampling of individual parameters at the down-gradient compliance monitoring wells illustrated in Engineering Drawing 14004-C01 (see Appendix C to the amendment request) and statistical methods will be used to track changes in water quality during the Federal Cell Facility active life and a post-closure period to determine if a release from the Federal Cell Facility has occurred. The concentrations of specific indicator parameters from compliance monitoring wells will be compared to GWPLs listed in the Permit. Compliance monitoring will be based on a comparison to Utah Water Quality Standards for drinking water, or alternate (background) concentrations for water quality compliance parameters. Exceedances of the compliance monitoring GWPLs leads to verification sampling and/or additional evaluation to characterize the nature and extent of the effects on groundwater.

EnergySolutions is specifically requesting modification of the Permit to incorporate construction and operation of the Federal Cell Facility. The justification for the request is that monitoring for these parameters ensures compliance with water quality regulations, and relies on a Permit condition, requirements contained in UAC R317-6 (Administrative Rules for Ground Water Quality Protection), and the Permittee's evaluation of groundwater quality data.

EnergySolutions monitors background quality of the site's groundwater wells already constructed adjacent to waste disposal areas. In accordance with UAC R315-308-2(2), EnergySolutions agrees will monitor performance of the Federal Cell Facility to a target depth of 30 to 40 feet below ground surface (bgs),

appropriately screened to yield groundwater samples from the uppermost aquifer below the proposed Federal Cell Facility. Based on abundant background groundwater quality samples collected between 1989 and December 2020, EnergySolutions proposes that the upper boundary of background ground water quality be defined as the mean concentration plus the second standard deviation for contaminant in the upgradient wells GW-57, GW-28, GW-58, and GW-63. EnergySolutions similarly proposes that groundwater monitoring wells GW-26, GW-94, GW-95, GW-27 and GW-27-D serve as Federal Cell Facility downgradient compliance wells (in accordance with UAC R315-308-2(2)).

Federal Cell Facility adoption in the Permit is reflected in modifications requested for the following parts:

- Part I.C Ground Water Protection Levels: - Depleted Uranium destined for the proposed Federal Cell Facility will be the form and chemical content of material authorized for disposal by the new Federal Cell Facility Radioactive Material License. Therefore, this Permit Modification Request contemplates no specific changes to the existing Ground Water Quality Standards (GWQS) and ground water protection levels (GWPLs) already established in accordance with UAC R317-6-4 for activities conducted pursuant to the new Federal Cell Facility Radioactive Material License. A modification to Permit I.C is requested to include the Federal Cell Facility in applicability of the DU GWPLs.
- Part I.D Best Available Technology (BAT) Design Standard: – Modifications proposed to Permit Part I.D include reference to the authorized Federal Cell Facility engineering design and specifications; BAT reflection of foundation, DU and final cover system specifications; Federal Cell Facility geographic location restrictions; and definition of DU.
- Part I.E BAT Performance and Best Management Practice Standards: – Modifications proposed to Permit Part I.E cite the applicable waste capacity proposed in the Federal Cell Facility; prohibition against Federal Cell Facility disposal of hazardous waste (as defined by UAC R315-2-3); and the penalty against failure to construct the Federal Cell Facility in accordance with the approved design.
- Part I.F Compliance Monitoring: – Modifications proposed to Permit Part I.F include existing up and down gradient Federal Cell Facility wells in the monitoring and sample frequency requirements promulgated in Permit Part I.F.
- Part I.G Non-Compliance Statute: – Modifications proposed to Permit Part I.G include the upgradient and existing down gradient Federal Cell Facility wells in the need to correct the noncompliance and the well classifications of Probable Out-of-Compliance and Out-of-Compliance statuses.
- Part I.H Reporting Requirements: – Modifications proposed to Permit Part I.H include the upgradient and existing down gradient Federal Cell Facility wells in the reporting requirements promulgated in Permit Part I.H.
- Part I.I Compliance Schedule: – Modifications proposed to Permit Part I.I include background water quality determination for the upgradient and existing down gradient Federal Cell Facility wells.
- Appendix B: Water Monitoring Quality Assurance Plan: Monitoring of the Federal Cell Facility groundwater has been suggested in Appendix B.
- Appendix F: Post-closure Monitoring Plan for LARW and 11e.(2) Disposal Cells: – The Federal Cell Facility post-closure monitoring plan has been suggested for Appendix F.
- Appendix J: Best Available Technology (BAT) Performance Monitoring Plan: – Priority management of stormwater collected within the Federal Cell Facility are proposed in Section 4.21 of Appendix J.

- Appendix K: Groundwater Quality Discharge Permit BAT Contingency Plan: – Contingency actions for noncompliance of the Federal Cell Facility with BAT Performance Standards are proposed in Section 4.21 of Appendix K.

### SECTION III. DU WASTE AND LEACHATE CHARACTERISTICS

Only DU waste acceptance criteria compliant federally generated waste that is manifested and received for management at EnergySolutions' Federal Cell Facility will be considered for disposal at the Federal Cell Facility. DU waste forms contemplated in this disposal authorization request must be those authorized for disposal are reflected in the Federal Cell Facility Waste Characterization Plan (Appendix F to the Federal Cell Facility Application).

As is reflected in Appendix O of the Federal Cell Facility Application, detailed assessment of the proposed Federal Cell Facility demonstrate that the DU concentrations of individual nuclides can be disposed in EnergySolutions' proposed Federal Cell Facility without exceeding the applicable ground water protection levels (GWPL). Authorized DU disposal criteria previously authorized for the Class A West embankment are proposed for the Federal Cell Facility such that groundwater concentrations at the compliance well do not exceed applicable GWPLs.

Any unlikely leachate from the Federal Cell Facility will reflect the natural groundwater chemistry of the shallow aquifer beneath the proposed Federal Cell Facility. Groundwater pH typically varies from 7.00 to 7.50. However, at locations of surface water infiltration, pH values approach pH 8.0. Federal Cell Facility groundwater is also extremely saline, with an average Total Dissolved Solids (TDS) concentration in shallow regions ranging from 14,786 to 60,718 mg/L. TDS concentrations in deeper groundwater have been measured at 49,800 mg/L.

Since DU historically manifested and received for management at EnergySolutions' LLRW Class A West facility may be considered for disposal at the Federal Cell Facility, radiological characteristics of the leachate observed at Class A West compliance wells serves as reasonable surrogates to that expected below the Federal Cell Facility. However, no statistically significant radiological detection trends have been measured at the Class A West compliance wells or lysimeters.<sup>1,2</sup>

The Federal Cell Facility's naturally occurring groundwater constituents are present in detectable concentrations. The naturally occurring constituents radium-226 (Ra-226), radium-228 (Ra-228), isotopic uranium, and total uranium are typically normally distributed. The variability of concentrations of these constituents is limited spatially and temporally, and concentrations are controlled by natural geochemical processes (EnergySolutions, 2019). Total uranium concentrations in the Federal Cell Facility shallow groundwater are typically less than 0.030 mg/L. The sum of the Ra-226 and Ra-228 concentrations in Federal Cell Facility shallow groundwater typically ranges from 1.0 to 4.0 pico-Curies per liter (pCi/L), with background concentrations commonly exceeding the universal Groundwater Protection Limit (GWPL) of 5.0 pCi/L observed. Potassium-40 is naturally occurring and typically detected in Clive Facility groundwater. Similarly, thorium-230 and thorium-232 are also naturally occurring, with de minimis groundwater concentrations. Other radiological LLRW compliance parameters are not naturally occurring

<sup>1</sup> Sobocinski, R.W. "GWQDP No. UGW450005 – Submittal of 2020 Annual 11e.(2), LARW, Class A West, and Mixed Waste Groundwater Monitoring Report." (via-CD-2021-028). Report to the Director of the Utah Division of Waste Management and Radiation Control. Feb. 25, 2021.

<sup>2</sup> Sobocinski, R.W. "2019 Biennial Collection Lysimeter Video Inspection: GWQDP No. UGW450005, Part I.E.11 and Appendix C." (via CD19-00216) Report to the Director of the Utah Division of Waste Management and Radiation Control. October 21, 2019.

(carbon-14, iodine-129, neptunium-237, strontium-90, technetium-99, and tritium [H-3]). However, these isotopes are typically not detectable in Clive groundwater except for isolated occurrences.

Non-radiological constituents present in Federal Cell Facility's groundwater are major inorganics (metals and anions), minor and trace inorganics (trace metals, bromide, cyanide, fluoride, iron, and nitrate/nitrite). The dominant dissolved constituents are sodium and chloride. Calcium, magnesium, potassium, sulfate, and bicarbonate are other naturally occurring major inorganics (comprise approximately 99% of the dissolved solids in the Federal Cell Facility groundwater). Minor and trace inorganics naturally present in Federal Cell Facility groundwater are metals and anions (in concentrations less than 10 mg/L and often much less than 1.0 mg/L). Infrequently, fluoride, bromide, nitrate/nitrite, arsenic, barium, molybdenum, and selenium are detected. Arsenic and molybdenum concentrations generally increase from east to west in the Federal Cell Facility groundwater. Nitrate-nitrite concentrations are strongly correlated with areas of temporary mounding and surface water infiltration. Selenium concentrations beneath the Federal Cell Facility are typically less than 0.03 mg/L. However, background selenium concentrations also exceed 0.04 mg/L in wells where surface water recharge is not present. Thallium concentrations in Federal Cell Facility groundwater are generally non-detectable at a reporting level of 0.0020 mg/L.

#### SECTION IV. FEDERAL CELL FACILITY DISCHARGE CONTROLS

The geology at the Federal Cell Facility region create several naturally-present discharge controls. EnergySolutions' Federal Cell Facility has been proposed in northwestern Utah within the Great Salt Lake Desert in the northern section of the Great Basin (approximately 64 kilometers west of the Great Salt Lake). Beneath the Federal Cell Facility, sediments consist predominantly of interbedded silt, gravel, sand, and tight impermeable clays. (EnergySolutions, 2019). The natural presence of multiple tight clay lenses within hydrostratigraphic units beneath the Federal Cell Facility generally inhibit downward movement to the Federal Cell Facility groundwater of any unlikely leachate created from infiltration and contact with DU, (EnergySolutions, 2019). This uppermost unsaturated unit found from the ground surface to a depth of 6 to 16.5 feet bgs (comprised of silt and tight clays) has vertical hydraulic conductivities generally ranging from  $2.2 \times 10^{-8}$  to  $1.6 \times 10^{-6}$  cm/sec, (arithmetic mean of  $2.9 \times 10^{-7}$  cm/sec and geometric mean of  $7.8 \times 10^{-8}$  cm/sec) (EnergySolutions, 2019). The natural presence of these layers of tight clays act to control any unlikely leachate discharge from the Federal Cell Facility from reaching any underlying aquifers.

Similarly, the general climate at the Federal Cell Facility also serves as a natural barrier to leachate generation and downward migration. The climate of the area is characterized by cold winters, warm to hot summers, and large temperature extremes, particularly in the summer. Storm systems pass over the area generally moving from west to east. Air masses moving through this area are generally maritime polar, with occasional maritime tropical in the fall and early winter. The general climate of the area is driven by its elevation, relative location with respect to the average storm track, distance from moisture sources and large mountain barriers. The Sierra Nevada Range along the Nevada/California border is a significant barrier to storm systems as they pass from the Pacific Ocean into the western United States. This mountain barrier is, in large part, the reason for desert conditions in much of the Intermountain west, including the Great Salt Lake Desert. Precipitation in the region averages of 8.56 inches annually (as measured between 1993 and 2020). By comparison, a much larger long-term annual average pan evaporation rate of 53.11 inches has been observed (implying 6-times the amount of water is evaporated than falls as precipitation). In fact, the precipitation which falls from high-based thunderstorms frequently evaporates before hitting the ground due to the extremely elevated evatranspiration potential (or potentially meeting disposed DU). The natural limitation on precipitation from becoming deep infiltration further controls any unlikely leachate discharge from the Federal Cell Facility from reaching any underlying aquifers.

Groundwater will not need to be directed away from the Federal Cell Facility, since the lowest top of Federal Cell Facility foundation elevation is more than 13 feet above the highest recorded elevation for the upper, unconfined aquifer. The lowest top of foundation elevation will be at approximately 4,260 feet above sea level (see Engineering Drawing 14004-C02); the highest recorded elevation for the upper, unconfined aquifer, based on available data from the 20 most recent years for wells installed within Section 32 of the Restricted Area, is 4,251.3 feet above sea level.

In addition to the discharge controls inherent with the Federal Cell Facility's regional geology and meteorology, EnergySolutions reflects Best Available Technology in the discharge control provided by the Federal Cell Facility foundation and final cover designs and construction specifications (as proposed in the Federal Cell Facility Construction Quality Assurance / Quality Control manual – see Appendix C of the Federal Cell Facility Radioactive Material License Application) (CQA/QC Manual). Construction of the Federal Cell Facility commences by excavation to foundation and construction of a 2-foot thick compacted clay liner of in-situ hydraulic conductivity of at least  $1 \times 10^{-6}$  cm/sec. Similarly, eventual Federal Cell Facility

closure is accomplished by compaction of at least 1 foot of temporary soil, 2 foot of clay, 18-inches of coarse frost protection, 1 foot of fine grained low permeability silty clay, and 12-inches of gravel amended top soil on the top slope and compaction of at least 1 foot of temporary soil, 2 foot of clay, 18-inches of coarse frost protection, 1 foot of Type B coarse filter material, and 18 inches of Type A rip rap on the side slopes. The impermeability of the closed Federal Cell Facility final cover strictly limits the amount of precipitation that infiltrates the cover and encounters DU. The Federal Cell Facility Radioactive Material License also limits placement of DU to waste regions that are below native grade and beneath the embankment's top slope.

Overland flow of precipitation into the operational Federal Cell Facility is prevented by construction of an up-gradient armored diversion ditch system and run-on control berms (construction specifications for run-on berms are provided in the CQA/QC Manual in Appendix C of the Application, Work Element – General Requirements, specification “*Run-on Control During Project*”). Construction specifications for these berms are selected to channel surface flow away from the Federal Cell Facility resulting from a Probably Maximum Flood. Similarly, the Federal Cell Facility excavation and DU placement work elements of the CQA/QC Manual (see Appendix C to the Application) restrict precipitation that falls directly into the Federal Cell Facility and comes into direct contact with DU during active Federal Cell Facility operation and construction from flowing beyond the boundaries of the Federal Cell Facility. The Federal Cell Facility will also be subject to prioritized stormwater management requirements during operations as presented in proposed modification to Condition I.E.7 of GWQDP UGW450005. As there are no surface water features within 5 miles of the Federal Cell Facility, Federal Cell Facility drainage in terms of non-contact precipitation runoff and sheet flow will be directed southwest away from the Owner Controlled Property.

The Federal Cell Facility will be incorporated into EnergySolutions' existing Clive owner-controlled, restricted area property and surrounded by a security fence consisting of a wire-mesh field fence (six-foot chain link fencing, constructed in accordance with the CQA/QC Manual – Work Element – *Permanent Chain Link Fences*). Furthermore, the entire owner-controlled property at the Clive Facility is security patrolled (24 hours a day for 7 days a week) to minimize intrusion. Federal Cell Facility access will be controlled, in accordance with Site Security Plan prepared as Appendix U to the Application. These physical and administrative barriers prevent discharge from being created because of any inadvertent intrusion into the DU.



## SECTION V. DEMONSTRATION OF PERMIT COMPLIANCE

The Permit requires that the environmental impacts to groundwater be kept within tolerable risk levels and treats the shallow aquifer below the Federal Cell Facility as if it is vulnerable to contamination originating from DU within the Federal Cell Facility. Groundwater monitoring wells GW-26, GW-94, GW-95, GW-27 and GW-27-D will be used as compliance monitoring points to demonstrate compliance with that groundwater protection parameters and Ground Water Protection Levels (GWPLs), as requirements listed in Part I.C of the Permit. Since shallow groundwater below the Federal Cell Facility is defined as Class IV, alternate GWPLs are requested, where such request presents no significant increase in discharge hazard and are protective of public health and the environment, (per UAC R317-6-4.7). Groundwater protection parameters will be monitored during and after Federal Cell Facility operations, and appropriate records and data submitted for each compliance monitoring well, and parameter to the Director, to demonstrate compliance with regulatory requirements.

Unlikely DU-discharge from the Federal Cell Facility will be minimized by the design, construction, operation, and maintenance of the Federal Cell Facility. Since the risk of contamination cannot be eliminated (despite EnergySolutions' stringent Federal Cell Facility design criteria and the operational practices), groundwater monitoring wells are strategically proposed down-gradient from the Federal Cell Facility to demonstrate continued environmental protection. To determine if a release from the Federal Cell Facility has occurred, the sampling of individual parameters at the down-gradient compliance monitoring wells and statistical methods applied to the sampled data will track changes in water quality during the Federal Cell Facility active life and a post closure period. The concentrations of specific indicator parameters from compliance monitoring wells will be compared to required GWPLs.

Federal Cell Facility compliance with the waste buffer protections required by Part I.F.1.g of the Permit and CQA/QC Manual – Work Element: *Annual As-Built Report* will also be demonstrated by preparation and submission of an annual "As-Built" Report to document interim construction. The Federal Cell Facility analysis will be included in the report submitted annually for the Director's approval. Similarly, an "As Built" Report will be prepared for the new upgradient background monitoring well will be submitted to the Director, describing the physical characteristics of the casing, screen, sand pack, annular seals, surface casing and cap, and slug test results.

Monitoring of in-cell DU storage areas for leaks or spills will be included in EnergySolutions' demonstration of BAT compliance. Compliance with DU-contact stormwater requirements of Part 1.F.24 of the Permit will be demonstrated by documentation of the occurrence and location of stormwater accumulation and its removal. Noncompliance observed at down-gradient Federal Cell Facility compliance wells GW-26, GW-94, GW-95, GW-27 and GW-27-D shall be managed in accordance with Part I.G of the Permit. Permit non-compliances will be reported in accordance with Parts I.G and I.H of the Permit.

**SECTION VI. REMEDY OF UNLIKELY FEDERAL CELL FACILITY NON-COMPLIANCE**

EnergySolutions recognizes that any Permit noncompliance will constitute a violation of Utah Administrative Code and may be grounds for enforcement action and/or permit modification or termination. As such, EnergySolutions will provide the Director with advanced notice of any planned changes in the Federal Cell Facility that may result in non-compliance. Director approval prior to conducting any modification to the approved engineering design, specifications, or construction of the Federal Cell Facility will be received. Similarly, EnergySolutions agrees to take all reasonable actions to minimize and prevent discharge to the groundwater in violation of the Permit. These actions include proper operation and maintenance of support facilities and control systems which achieve Federal Cell Facility compliance with the Permit. EnergySolutions further agrees to operate and maintain adequate laboratory controls and quality assurance procedures in support of the Federal Cell Facility.

In the unlikely event down-gradient Federal Cell Facility compliance will groundwater concentrations exceed Permit requirements, the Contingency Plan (promulgated in Appendix A of the Permit) describes the actions that EnergySolutions will take to return to and maintain compliance. According to the Permit's Contingency Plan, EnergySolutions will take the following actions when analyses (and subsequent confirmatory analyses) exceed applicable groundwater protection levels:

- A) Ensure that the Federal Cell Facility is being operated in compliance with the applicable standards of the associated Radioactive Material License and Groundwater Quality Discharge Permit. Repairs will be conducted when structural defects are observed with Federal Cell Facility cover, foundation or DU placement.
- B) Remove accumulated leachate within the Federal Cell Facility footprint (eliminating this groundwater discharge source)
- C) Compile a detailed and comprehensive Federal Cell Facility operational history, reviewing all activities that may have contributed to an unpermitted groundwater discharge. The history will include description of any spills that occurred in or adjacent to the Federal Cell Facility during offloading or transfer of DU; direct DU contact water discharge; conditions or run-on and run-off control berms; contact water accumulations; control of the Federal Cell Facility construction specifications; DU disposal operations; and Federal Cell Facility subsidence.

If the Director determines that groundwater remediation is required following an apparent Permit non-compliance, EnergySolutions will prepare and submit a Groundwater Remediation Plan that includes:

- A) A schedule and action description during which EnergySolutions will characterize the physical, chemical, and radiological extent of the suspected groundwater contamination. The Remediation Plan will include a description of any new wells proposed to characterize the potential groundwater contamination plume and the affected subsurface zone hydrogeologic characteristics.
- B) An implementation schedule and proposed Corrective Action Program that EnergySolutions will use to prevent suspected subsurface contaminants from exceed applicable GWPLs at the down-gradient compliance well monitoring locations. As appropriate, corrective actions may include contaminant removal, in-situ treatment or other means preapproved by the director.
- C) A description of the remediation monitoring program that accurately demonstrates the effectiveness of the Remediation Plan.
- D) Justification of the proposed means of application of the corrective actions to possible sources of suspected groundwater contamination.

**SECTION VII. REFERENCES**

EnergySolutions. "Comprehensive Groundwater Quality Evaluation Report – Waste Disposal Facility Clive, Utah." EnergySolutions Technical Report prepared for submission to the Utah Division of Waste Management and Radiation Control via CD19-0139. July 2, 2019.

**APPENDIX A**  
**PROPOSED DU LANGUAGE**  
**FOR MODIFICATION OF PERMIT UGW450005**

**PART I. SPECIFIC PERMIT CONDITIONS**

**I.C Ground Water Protection Levels**

I.C.1 Ground Water Protection Levels, LARW Cell, Federal Cell Facility and Class A West Cell  
 Based on the types of wastes to be disposed an evaluation of indicator isotopes and their mobility, and the Ground Water Quality Standards (GWQS); ground water protection levels (GWPLs) are defined as either the GWQS or the Background Concentration as listed in Tables 1A and 1B of this Permit. Ground water quality in any compliance monitoring well at the LARW cell, Federal Cell Facility and Class A West cell shall comply with the GWPLs found in Table 1A, unless other GWPLs have been cited on a well and contaminant-specific basis in Table 1B, below.

**Table 1A: Ground Water Protection Levels (GWPL) – Universal to All LARW, Class A West, Federal Cell Facility and Evaporation Pond Wells**

Parameter	GWPL	Parameter	GWPL <sup>(1)</sup>
<i>Field Parameters</i>		<i>Radiologic Parameters – Alpha Emitters <sup>(2)</sup> (pCi/l)</i>	
pH (units)	6.5 – 8.5	Neptunium-237 <sup>(3)</sup>	7
		Strontium-90	42
		Thorium-230	83
<i>Dissolved Metals (mg/l)</i>		Thorium-232	92
		Uranium-233	26
Uranium – total <sup>(1)</sup>	0.03	Uranium-234	26
		Uranium-235	27
		Uranium-236	27
		Uranium-238	26
		<i>Radiologic Parameters – Beta/Gamma Emitters <sup>(4)</sup> (pCi/l)</i>	
		Carbon-14	3,200
		Iodine-129 <sup>(5)</sup>	21
		Technetium-99	3,790
		Tritium	60,900
		<i>Combined Radiologic Parameters (pCi/l)</i>	
		Radium-226 + Radium-228 <sup>(6)</sup>	5

1. Total uranium GWQS of 0.03 mg/l from EPA final MCL in National Primary Drinking Water Regulations Final Rule for Radionuclides (December 7, 2000 Federal Register, Vol. 65, No. 236, p. 76708). Total uranium mass concentration will be calculated from isotopic uranium data.
2. All GWPL values for alpha-emitting radionuclides based on 1E-4 lifetime cancer mortality risk concentration levels provided in 1991 EPA draft MCL values for drinking water (July 18, 1991 Federal Register, Vol. 56, No. 138, pp. 33078-9, 33100-3, and Appendix C).
3. Neptunium-237, as determined by Total Radioactive Neptunium, EPA Method 907.0.
4. All GWPL values for beta/gamma emitting radionuclide parameters based on a 4 millirem/year equivalent dosage, as per 1991 EPA draft MCL values for drinking water (July 18, 1991 Federal Register, Vol. 56, No. 138, pp. 33078, 33103, and Appendix B).
5. Iodine-129, as determined by Total Radioactive Iodine, EPA Method 902.0.
6. GWQS of 5 pCi/l for combined radium-226 + radium-228 from final EPA MCL in National Primary Drinking Water Regulations Final Rule for Radionuclides (December 7, 2000 Federal Register, Vol. 65, No. 236, p. 76708).

**Table 1B: Ground Water Protection Level Exceptions<sup>(1)</sup> – LARW, Class A West, Federal Cell Facility and Evaporation Pond Wells**

Well ID	Parameter	GWPL <sup>(2)</sup>	Well ID	Parameter	GWPL <sup>(2)</sup>
<i>Inorganic/Metal Parameters (mg/l)</i>					
GW-94	Uranium – total	0.035			
GW-95	Uranium – total	0.0320			
GW-100	Uranium – total	0.117	P3-95 SWC	Uranium – total	0.180
	Thallium	0.00422			
GW-24	Selenium	0.0634			
GW-103	Selenium	0.0580			
GW-137	Total Uranium	0.0371			
GW-138	Selenium	0.0695			
GW-141	Selenium	0.0705			
<i>Radiologic Parameters (pCi/l)</i>					
GW-20	Ra-226+Ra-228	5.49	GW-100	Uranium-234	68.6
				Uranium-238	43.0
GW-24	Ra-226+Ra-228	5.81			
			GW-105	Ra-226+Ra-228	6.03
GW-29	Ra-226+Ra-228	5.59			
			GW-58	Uranium-234	31.2
GW-56R	Ra-226+Ra-228	5.31			
			GW-36	Uranium-234	36.4
GW-64	Ra-226+Ra-228	5.63			
			GW-112	Ra-226+Ra-228	6.72
GW-77	Ra-226+Ra-228	5.46			
			P3-95 SWC	Uranium-234	48
GW-84	Ra-226+Ra-228	6.01		Uranium-238	79
				Ra-226+Ra-228	7.63
GW-85	Ra-226+Ra-228	7.77			
			GW-66R	Ra-226 + Ra-228	5.47
GW-86	Ra-226+Ra-228	6.19	GW-137	Ra-226+Ra228	5.54
			GW-138	Ra-226+Ra228	5.51
GW-88	Ra-226+Ra-228	5.04			
GW-89	Ra-226+Ra-228	5.04			
GW-90	Ra-226+Ra-228	5.85			
GW-91	Ra-226+Ra-228	5.92			
GW-93	Ra-226+Ra-228	5.54			

1. Table 1B exceptions constitute specific wells and parameters determined to have natural background ground water quality concentrations above GWQS, or as otherwise specified below. Background concentration is

defined as the mean concentration plus the second standard deviation for any contaminant in any individual well. GW-100, GW-24, GW-103, GW-137, GW-138, and GW-141 are currently in an accelerated monitoring status for some dissolved metals and will remain in the Permit until such time as the Director determines to remove them. This table may be blank if no GWPL exceptions are set for LARW, DU, Class A, and Pond wells.

2. The number of significant figures used for all GWPLs determined by laboratory results previously reported by the Permittee.

**I.D Best Available Technology (BAT) Design Standard**

**I.D.1 Discharge Technology Performance Criteria**

Best available technology for the facility will incorporate discharge technology based on the use of earthen materials in both the bottom liner and final cover (as reflected in the approved design). However, under no circumstances shall the facility cause ground water at the compliance monitoring wells (Part I.F.1) to exceed the ground water protection levels in Part I.C for the following minimum periods of time:

Disposal Cell	Contaminant Group	Performance Standard*
LARW, <u>Federal Cell Facility</u> , and Class A West	Heavy metals Inorganics Organics Mobile and non-mobile Radionuclides	200 years 200 years 200 years 500 years
11e.(2)	Heavy metals Inorganics Organics	200 years 200 years 200 years
Mixed Waste	Mobile and non-mobile	500 years

\* Said performance standards shall be measured from the following initial startup dates: 1988 [LARW Cell], 1992 [Mixed Waste Cell], 1994 [11e.(2) Cells], and 2000 [Class A West Cell] and 2023 [Federal Cell Facility]

If after review of any environmental monitoring data collected at the facility, the Director determines that the ground water protection levels in Part I.C of the Permit may be exceeded at the compliance monitoring wells before completion of the above-minimum time periods, said potential shall constitute a violation of the Best Available Technology requirements of this Permit.

**I.D.5 Authorized Federal Cell Facility Engineering Design and Specifications**

Construction of the Federal Cell Facility will be in accordance with the best available technology design standard and engineering plans summarized in Table 2D and the specifications listed in the Construction Quality Assurance / Quality Control Manual.

**Table 2D: Approved Federal Cell Facility Engineering Design Drawings**

Drawing	Last Revision Date	Subject
14004-L01, Rev. 1	December 28, 2023	Federal Waste Facility, General Facility Layout
14004-C02, Rev. 4	December 28, 2023	Federal Waste Facility, Cross Sections



Said Federal Cell Facility engineering design shall include, but is not limited to, the following elements:

- a) Cover System –The cover system shall include the following materials, as described from the top down:
  - 1) Top Slope:
    - i) 12 inches of gravel amended native vegetated finer grained low permeability silty clay and clay silt.
    - ii) 12 inches of finer grained low permeability silty clay and clay silt material.
    - iii) 18 inches of material that ranges in size from 16 inches to clay sized particles.
    - iv) 12 inches of compacted clay with a hydraulic conductivity of  $5 \times 10^{-8}$  cm/s.
    - v) 12 inches of compacted clay with a hydraulic conductivity of  $1 \times 10^{-6}$  cm/s.
  - 2) Side Slope:
    - i) 18 inches of Type-A rip rap ranging in size from 2 to 16 inches (equivalent to coarse gravel to boulders) with a nominal diameter of 12 inches (with 100% passing a 16-inch screen and not more than 15% passing a 4½-inch screen).
    - ii) 12 inches of Type B filter material with particles size ranging from 0.3125 to 3.0 inches in diameter (coarse sand to fine cobble) and a minimum hydraulic conductivity of 42 cm/sec.
    - iii) 18 inches of material ranging in size from 16 inches to clay size particles.
    - iv) 12 inches of compacted clay with a hydraulic conductivity of  $5 \times 10^{-8}$  cm/s.
    - v) 12 inches of compacted clay with a hydraulic conductivity of  $1 \times 10^{-6}$  cm/s.
  - 3) A 12-inch compacted thickness of sacrificial soil with a minimum Residual Moisture Content of 3.5 % (by weight). Such Residual Moisture Content shall be the asymptotic value measured by ASTM Methods D-3152 and D-2325 at soil tensions above 15 bars, If the fines content (#200 sieve) of the sacrificial soil is greater than or equal to 15%, residual moisture content testing is not required.
- b) Fill material (as defined in the Federal Cell Facility Construction Quality Assurance / Quality Control Manual) placed between native grade and the design fill height.
- c) Federal Cell Facility Waste Layer – the DU Waste shall not extend above native grade.
- d) Top Clay Foundation – a foundation will be established by removal of approximately 10 feet of native material prior to DU placement and compaction of at least 12 inches of clay liner shall have a field hydraulic conductivity of  $5.0 \times 10^{-8}$  cm/sec or less.

- e) Bottom Clay Foundation – a foundation will be established by removal of approximately 10 feet of native material prior to DU placement and compaction of at least 12 inches of clay liner shall have a field hydraulic conductivity of 1.0E-6 cm/sec or less.

I.D.5 Disposal Cell Location Restrictions

The LARW, 11e.(2), Federal Cell Facility, and Class A West disposal cells shall be restricted to the following locations in Section 32, Township 1 South, Range 11 West, SLBM, all as specified on the currently approved engineering plans, drawings, and the approximate Latitude and Longitude Coordinates provided in Table 3 below:

**Table 3: Authorized LARW, 11e.(2), Federal Cell Facility and Class A West Disposal Cell Locations**

Disposal Cell	Edge of Waste Position	Coordinates	
		Latitude	Longitude
LARW	NW Corner	40° 41' 11.382" N	113° 06' 51.318" W
	SW Corner	40° 40' 52.908" N	113° 06' 51.203" W
	SE Corner	40° 40' 52.960" N	113° 06' 36.734" W
	NE Corner	40° 41' 11.434" N	113° 06' 36.848" W
11e.(2)	NW Corner	40° 41' 54.846" N	113° 06' 55.564" W
	SW Corner	40° 40' 55.055" N	113° 07' 24.761" W
	SE Corner	40° 40' 54.845" N	113° 06' 55.564" W
	NE Corner	40° 41' 12.380" N	113° 06' 55.346" W
Class A West	NW Corner	40° 41' 39.609" N	113° 07' 24.754
	SW Corner	40° 41' 14.230" N	113° 07' 24.702" W
	SE Corner	40° 41' 14.191" N	113° 06' 55.369" W
	NE Corner	40° 41' 39.569" N	113° 06' 55.463" W
<u>Federal Cell Facility</u>	<u>NW Corner</u>	<u>40° 41' 13.549" N</u>	<u>113° 07' 25.298" W</u>
	<u>SW Corner</u>	<u>40° 40' 52.609" N</u>	<u>113° 07' 26.071" W</u>
	<u>SE Corner</u>	<u>40° 40' 52.213" N</u>	<u>113° 07' 07.563" W</u>
	<u>NE Corner</u>	<u>40° 41' 13.153" N</u>	<u>113° 07' 06.788" W</u>

This description does not include the Mixed Waste facility, located east of the LARW Cell, which is authorized under a separate State-issued Part B Permit from the Utah Division of Solid and Hazardous Waste.

I.D.7 Definition of Federal Cell Facility waste

Federal Cell Facility Waste is defined in the Waste Characterization Plan associated with Appendix F of the Application.

**I.E BAT Performance and Best Management Practice Standards**

I.E.1 Waste Restrictions

- e) Allowed Federal Cell Facility Waste – any change affecting the non-radiologic content of the waste to be disposed of in the Federal Cell Facility, including additional types or concentrations of non-radiologic contaminants, above and beyond those defined, shall require prior approval from the Director, after

submittal of satisfactory technical justification to demonstrate that the requirements of this Permit will be met.

I.E.2 Prohibited Wastes

- a) Hazardous Waste – the disposal of hazardous waste as defined by the Utah Hazardous Waste Management Rules (UAC R315-2-3) is prohibited in the Class A West, Federal Cell Facility and 11e.(2) Disposal Cells. LLRW or 11e.(2) waste that exceeds the regulatory concentration levels of the Toxic Characteristic Leaching Procedure (TCLP) as defined in 40 CFR Part 261 Subpart C, Table 1 is prohibited, unless specifically authorized in Table 6 below, or with prior written approval from the Director. Waste samples shall be collected in accordance with the currently approved Waste Characterization Plan (Radioactive Material License, Condition 58); the 11e.(2) Byproduct Material License (UT 2300478) Renewal Application, Revision 5, and analyzed for those exclusive parameters listed in Table 6, below; or for PCB/Radioactive Waste, the currently approved State-issued Part B Permit.
- c) Chelating Agents – the disposal of any waste containing chelating agents shall be limited to the Mixed Waste Cell and is prohibited in the Class A West, Federal Cell Facility and 11e.(2) Disposal Cells. The disposal of any waste in the Mixed Waste Cell containing chelating agents more than 22% by weight is prohibited.

I.E.3 Failure to Construct as per Approval

Failure to construct any portion of the Federal Cell Facility, Class A West or 11e.(2) facility in compliance with the approved engineering design and specifications or in a manner inconsistent with the Federal Cell Facility CQA/QC Manual (Appendix C to the Application) or LLRW and 11e.(2) CQA/QC Manual Plan (Radioactive Materials License UT 2300249, Condition 44) shall be cause for the Director to require excavation of the materials and remedial construction, retrofit of the embankment or any other mitigative action to prevent the release of pollutants to soil or ground water.

I.E.7 General Stormwater Management Requirements

The Permittee shall contain all stormwater runoff at the Class A West, Federal Cell Facility and 11e.(2) Disposal Cells which has contacted the waste (i.e., contact stormwater). The Permittee shall not begin pumping pumpage or removal of stormwater that falls inside the restricted-area that has not contacted the waste (i.e., non-contact stormwater) before beginning removal of contact stormwater, and:

- a) Within 24 hours of discovery of an accumulation of contact stormwater, the Permittee shall immediately begin pumpage and removal of said stormwater in accordance with the stormwater priority schedule listed in Appendix J, BAT Performance Monitoring Plan.
- b) The Permittee shall pump and remove contact stormwater in an uninterrupted manner until it is completely removed from said location. The Permittee may utilize equipment, which cannot be used at higher priority locations, at lower priority locations in accordance with Appendix J of this Permit, BAT Performance Monitoring Plan. All contact stormwater accumulated and pumped shall be disposed of in the evaporation ponds. However, contact stormwater from the Class A West, Federal Cell Facility and 11e.(2) disposal cells may be used for minimal

engineering and dust control purposes on the waste in the Class A West disposal cell and for dust suppression activities at the Shredder and Rotary Dump Facilities.

I.E.10 DU, LLRW and 11e.(2) Waste Management Performance Requirements

- f) Federal Cell Facility Waste Management – the following locations are approved for management and storage of Federal Cell Facility\_Waste Management:
  - o Intermodal Unloading Facility
  - o Decontamination Facilities (Box Wash, Track #4 Rail Car Wash facility, Intermodal Container Wash Building)
  - o Federal Cell Facility
  - o Rail Digging Facility (bulk waste transfer only, waste storage prohibited)
  - o Shredder Facility
  - o West Rotary Dump Facility
  - o East Side Rotary Facility

I.E.12 Stormwater Drainage Works Performance Criteria

All stormwater drainage works constructed and operated at the LARW, Class A West, Federal Cell Facility and 11e.(2) facilities shall be performed in accordance with the following criteria:

**APPENDIX B**

**Proposed DU Modification of the Water Monitoring Quality Assurance Plan**

## B.1 PROJECT AND QUALITY ASSURANCE PROJECT PLAN DESCRIPTION

### PROJECT DESCRIPTION

The purpose of this Water Monitoring Quality Assurance Plan (WMQAP) is to present the field collection and analytical methodology to be used during groundwater monitoring at the EnergySolutions radioactive and mixed waste disposal facility in Tooele County, Utah. This WMQAP is prepared as required by EnergySolutions' permits and licenses including:

- State of Utah, Department of Environmental Quality (DEQ), Division of Waste Management and Radiation Control (DWMRC) Water Quality (DWQ), Groundwater Quality Discharge Permit (GWQDP)
- State of Utah, DEQ, DWMRC Division of Radiation Control radioactive material licenses

This WMQAP is prepared following the guidance in the RCRA Groundwater Monitoring Technical Enforcement Guidance Document (TEGD) (EPA, 1986 and EPA, 1992).

### BACKGROUND

EnergySolutions operates a radioactive waste and mixed waste disposal facility in Tooele County, Utah. The goal of the EnergySolutions facility is to efficiently and economically dispose of low-level radioactive waste and mixed waste in a manner that is protective of human health and the environment. The EnergySolutions facility occupies Section 32 of T1S, R11W Salt Lake Base and Meridian (SLBM), and is divided into five main disposal areas: the low-activity radioactive waste (LARW) Cell (closed in 2005), the Class A West (CAW) Cell, ~~the Class A North Cell~~, the Federal Cell Facility, 11e.(2) Cell, and the RCRA Mixed Waste Cell. Each of these disposal areas is accountable to various regulatory agencies. This WMQAP, however, is applicable to the DWMRC and the DWQ. Any significant changes to, or significant deviations from, this approved WMQAP should not be made without the approval of the DWMRC.

## B.2 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section describes EnergySolutions' and the contracted laboratories' various responsibilities.

### ENERGYSOLUTIONS, PROJECT STAFF

All groundwater monitoring is conducted under the direction of EnergySolutions' Director of Regulatory Affairs (DRA) Compliance and Permitting (DRA). The DRA DCP will assure that all quality control (QC) requirements are established at the beginning of the project and maintained throughout the project. The Groundwater Program Manager, Staff Hydrogeologist, Groundwater Sampling Technicians, Health Physics Specialists and Technicians, Environmental Manager, Environmental Technicians, and other qualified personnel may assist the DRA DCP. Specific responsibilities of the DRA DCP or associates include:

- Acquiring and applying technical and corporate resources as needed to ensure the projects are completed on schedule.
- Developing and meeting ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task.
- Reviewing and analyzing overall task performance with respect to planned requirements.
- Approving all deliverables, including interim and final reports.
- Representing the project team at meetings and public hearings.
- Establishing and maintaining communication between technical staff, QC coordinator, health and safety coordinator, and regulatory agencies.
- Ensure compliance with all applicable regulations.

EnergySolutions' Groundwater Program Manager, Staff Hydrogeologist or designee will perform data management and validation. These responsibilities include:

- Ensuring that the laboratory implements the requirements of the WMQAP.
- Coordinating with the laboratory on all quality assurance (QA)/QC matters.
- Coordinating data validation.
- Providing updates to the DRA DCP regarding the QA/QC data.

The EnergySolutions field team members are experienced professionals who possess the degree of specialization and technical competence required to complete their respective tasks effectively and efficiently. All field team members will review and thoroughly understand all aspects of the procedures germane to their responsibilities presented in the WMQAP prior to initiating any field activity.

### CERTIFIED ANALYTICAL LABORATORY, PROJECT STAFF

A certified and accredited analytical laboratory (AWAL) shall be the contract laboratory for organic and inorganic non-radiological analyses. The AWAL QA Manager is responsible for the following:

- Development and implementation of the AWAL analytical portion of this WMQAP.
- Preparation of written documents that define QA/QC procedures and review and approval of laboratory QC procedures
- Supervision of sample control operations, and oversight of inter-laboratory testing programs and laboratory certifications.
- Spot-checking data sets to ensure that the appropriate QC measures have been taken and performing audits to evaluate the effectiveness of the laboratory QA/QC program.

The AWAL QA Manager will report unacceptable findings to the Laboratory Director for corrective action.

The AWAL Project Manager will serve as the primary AWAL contact person for *EnergySolutions* and will ensure that the laboratory meets project requirements. The AWAL Project Manager is also responsible for the following:

- Scheduling sample analyses and ensuring that results adhere to the WMQAP requirements.
- Monitoring the progress and timeliness of the work, reviewing work orders and laboratory reports, and processing any changes in the scope of work.
- Ensuring that project-specific corrective action is taken when necessary to address problems identified by the QC results or QA audit findings and ensuring that all corrective action is documented.

**CERTIFIED ANALYTICAL LABORATORY, PROJECT STAFF**

A certified and accredited laboratory (TAR) shall be the contract laboratory for radiological analyses and potentially contaminated conventional chemistry water samples. Potentially contaminated samples would include pond samples, Mixed Waste Leachate samples, and collection lysimeter samples. The TAR QA Managers are responsible for the following:

- Development and administration of the laboratory’s standard operating procedures (SOPs) and for development and implementation of the TAR analytical portions of this WMQAP.
- Preparation of written documents that define QA/QC procedures and review and approval of laboratory QC procedures.
- Supervision of sample control operations, and oversight of inter-laboratory testing programs and laboratory certifications.
- Spot-checking data sets to ensure that the appropriate QC measures have been taken and performing audits to evaluate the effectiveness of the laboratory QA/QC program through audits.

The QA Manager will report unacceptable findings to the Laboratory Director for corrective action.

The TAR Project Managers are the primary TAR contacts for *EnergySolutions* and will ensure that laboratories meet project requirements. The TAR a Project Managers are also responsible for the following:

- Scheduling sample analyses and ensuring that results adhere to the WMQAP requirements.
- Monitoring the progress and timeliness of the work, reviewing work orders and laboratory reports, and processing any changes in the scope of work.
- Ensuring that project-specific corrective action is taken when necessary to address problems identified by the QC results or QA audit findings and ensuring that all corrective action is documented.



### B.3 QUALITY ASSURANCE OBJECTIVES

#### DATA QUALITY OBJECTIVES

The overall quality assurance objective for this monitoring program is to develop and implement sampling, sample handling, and analytical procedures that will provide data that can be used to fulfill the Data Quality Objectives (DQOs). DQOs are qualitative and quantitative statements that specify the field and laboratory data quality necessary to support specific decisions or regulatory actions. The DQOs describe which data are needed, why the data are needed, and how the data will be used to meet the needs of the project. DQOs also establish numeric limits for the data collected by the EnergySolutions' Groundwater Monitoring Program to allow the data user (or reviewers) to determine whether the data are of sufficient quality for their intended use. A summary of the individual tasks and their frequency are included in Table B.3-1.

#### ANALYTICAL QUALITY CONTROL LEVELS

Currently two levels are used to define data quality that are based on the type of site, the project DQOs, the end use of the analytical data, and the level of documentation:

- **Screening.** Screening-level data are qualitative or semi-qualitative data obtained by use of approved field equipment such as groundwater quality parameter meters.
- **Definitive.** Definitive data are quantitative, have known precision and accuracy, and are produced under controlled conditions using laboratory-grade instrumentation. EPA-accepted methods, such as SW-846 and the Contract Laboratory Program (CLP), are used for definitive data. Both screening and definitive data will be collected for this project

Practical Quantitation Limits (PQLs) are based on the extent to which the equipment, laboratory or field, or analytical process can provide accurate measurements of a reliable quality for specific constituents in field samples. The PQL for a given analysis will vary depending on instrument sensitivity and matrix effects. PQLs are discussed in Section B.7.

#### DATA QUALITY DEFINITION AND MEASUREMENT

The effectiveness of a QA program is measured by the quality of the data generated in the field and by the laboratory. For EnergySolutions compliance monitoring, data quality will be assessed in terms of its precision, accuracy, representativeness, comparability, and completeness (the PARCC parameters). These terms are described below:

- **Precision.** Precision is the reproducibility of measurements under a given set of conditions. For large data sets for conventional chemistry analyses, precision is expressed as the variability of a group of measurements compared to their average value (i.e., standard deviation). For duplicate measurements, precision is expressed as the relative percent difference (RPD) of a data pair and will be calculated using the following equation:

$$RPD = \frac{|A - B|}{\frac{(A + B)}{2}} \times 100$$

where: A and B are the reported concentrations for field duplicate sample analyses or the percent recoveries for matrix spike and matrix spike duplicate samples.

Data precision acceptance criterion is defined as using a control limit of + 25% for the RPD for a sample value greater than 5 times the laboratory detection limit (LDL). If the sample data are less than 5 times the LDL, a control limit of + the LDL is used.

Although precision for field duplicate samples will be assessed and reported, field duplicates will not be used to qualify data because there is no guidance for qualifying data based on duplicate RPDs.

For radiological analysis two types of data precision are used, corresponding with the two types of data. These are activity data and concentration data. Concentration data precision is determined by calculating the RPD as in the conventional chemistry analysis discussed in the section above. Activity data precision is determined by calculating the relative error ratio (RER) using the following formula:

$$RER = \left| \frac{(x - y)}{\sqrt{s^2 + t^2}} \right|$$

Where: x = Sample result  
 y = Duplicate result  
 s = error term of sample  
 t = error term of duplicate

Activity data precision acceptance criterion is defined as using a control limit of less than 3 for the RER for data greater than 5 times the LDL. If sample values are less than 5 times the LDL, a control limit of + LDL is used.

- **Accuracy.** Accuracy is the degree of agreement of a measurement or an average of measurements with an accepted reference or “true” value, and is a measure of bias in the system. The accuracy of a measurement system is impacted by errors introduced through the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analytical techniques. Accuracy will be evaluated by the following equation:

$$\text{Percent Recovery} = \frac{|A - B|}{C} \times 100$$

where: A is the concentration of analyte in a spiked sample  
 B is the concentration of analyte in an unspiked sample  
 C is the concentration of spike added.

- **Representativeness.** Representativeness is a qualitative expression of the degree to which sample data accurately and precisely represent a characteristic of a population, a sampling point, or an environmental condition. Representativeness is maximized by ensuring that, for a given project, the number and location of sampling points and the sample collection and

analysis techniques are appropriate for the specific investigation, and that the sampling and analysis program will provide information that reflects “true” site conditions.

- **Comparability.** Comparability is a qualitative parameter that expresses the confidence with which one data set may be compared to another. Comparability is dependent on similar objectives and is achieved through the use of standardized methods for sample collection and analysis, and the use of standardized units of measure.
- **Completeness.** Completeness is defined as the percentage of valid data relative to the total number of measurements. Completeness for this project will be calculated using the following equation:

$$\text{Completeness} = \frac{\text{Number of valid data points}}{\text{Total number of measurements}} \times 100$$

Where the number of valid data points is the total number of valid analytical measurements based on the precision, accuracy, and holding time evaluation.

Project completeness is determined at the conclusion of the data validation and is calculated by dividing the number of valid sample results by the total number of sample analyses listed in the WMQAP. The completeness objective for this project is 95 percent for all data. However, DWMRC approval will be required for any completeness objective less than 100 percent.

A summary of the evaluation of QC samples in relation to the PARCC parameters is presented in Table B.3-2. Method specific quality control procedures, frequency of QC sample analysis, acceptance criteria (control limits), and corrective actions are included in Attachment A.

**TABLE B.3-1**

(no changes proposed)

**TABLE B.3-2**

(no changes proposed)

### B.4 SAMPLING PROCEDURES

As required by EnergySolutions’ various regulatory permits and licenses, surface water and groundwater elevation measurement programs and surface water and groundwater sampling and analysis programs will be conducted. Specifically, groundwater will be monitored at the Federal Cell Facility, LARW, Class A West, and Class A North collection lysimeters; the Mixed Waste, Northwest Corner, and three LARW evaporation ponds; the Mixed Waste leachate collection sumps; and compliance monitoring wells (See Plate 1 for locations). This section describes the field procedures for monitoring these locations.

#### COLLECTION LYSIMETER FIELD PROCEDURES

- Water Elevation Measurements.** The collection lysimeters will be monitored by removing the manhole cover, implementing confined space entry procedures, and then removing the end plug from the top of the standpipe. The standpipe will then be probed for the presence of liquids using an electric well probe. Should free liquids exist, the depth to the free liquids will be recorded.

If and when free liquids initially appear in the standpipe, the DWMRC will be notified in accordance with Part I.H.8 of the GWQDP. Immediately after free liquids are initially detected, the monitoring frequency will be increased to daily in order to assess the flow rate into the collection lysimeter. Daily monitoring will continue until the flow rate has stabilized or can be estimated to schedule periodic purging and sampling of the lysimeter standpipe. Free liquid monitoring frequency will then be decreased as approved by the Director Executive Secretary to an appropriate monitoring interval.

Free liquids will not be allowed to build up in the standpipe to a level less than 12 inches below the invert of the transfer pipe. The standpipe will be purged of free liquids when they are detected unless a sampling event is planned and the volume is being accumulated to provide adequate sample volume for analysis. Purging will be performed using either a dedicated bailer or a peristaltic pump.

- Sampling Procedures.** Part I.F.6 of the GWQDP requires that water quality samples be collected within 24 hours after discovery. Because of the limited amount of water expected to be in the collection lysimeters, the number of radiological and chemical analyses will also be limited. Therefore, analytical samples will be collected using the following priority list.

Priority	Parameter	Sample Volume (ml)
1	Field Parameters- Temperature, pH, Specific Conductivity	100
2	Radiologics – LARW Suite	3,500
3	Metals/Inorganics – LARW Suite	500
4	IDS/TSS	500
5	Major Cations and Anions	500
6	Volatile Organic Compounds (VOCs)	3 X 40

Samples will be collected using either a dedicated bailer or a peristaltic pump.

**WASTEWATER POND FIELD PROCEDURES**

- **Water Elevation Measurements.** Part I.F.13 of the GWQDP requires that the permitted Evaporation Ponds be monitored for freeboard. All inspection records shall comply with Part II.G. of the GWQDP, and a minimum of 24-inches of vertical freeboard shall be kept in the ponds.
- **Sampling Procedures.** Part I.F.13 of the GWQDP requires that water quality samples be collected on an annual basis in all five ponds (Mixed Waste, Northwest Corner, 1995 LARW, 1997 LARW, and 2000 pond). Samples shall be collected at each pond during the normal annual groundwater sampling effort. Samples will be collected using a peristaltic pump and 1-inch PVC pipe. The PVC pipe will be lowered into the ponds, and the peristaltic tubing will be inserted inside the pipe. This will keep the peristaltic tubing from floating on the water surface. Samples will be analyzed in accordance with Parts I.F.5 and I.F.13 of the GWQDP.

**MIXED WASTE LEACHATE MONITORING FIELD PROCEDURES**

- **Sampling Procedures.** Part I.F.15 of the GWQDP requires that water quality samples be collected on an annual basis from the Mixed Waste leachate collection system (upper leachate collection access pipe). Samples shall be collected at each sump during the normal annual groundwater sampling event. If no leachate is present during the sampling event, no sample is required. This will be documented in the annual report. Samples will be collected using a peristaltic pump. Dedicated ¼" polyethylene tubing stored in each sump will be attached to the leachate withdrawal hose. Mixed Waste leachate will be sampled for VOCs, polychlorinated biphenyls (PCBs), and the radiologic constituents listed in tables IE and IF of the Ground Water Quality Discharge Permit, including complete gamma spectroscopic analysis.

**MONITORING WELL FIELD PROCEDURES**

- **Groundwater Elevation Measurements.** Groundwater elevation measurements will be collected monthly at GW-37, GW-38R, PZ-1, PZ-2, I-1-100, I-3-30, I-3-100, GW-27D, GW-19B, and all compliance monitoring wells. These sites are shown on Plate 1, and are listed in the Groundwater Elevation Measurement Form shown in Figure B.4-1. In addition, the specific gravity (SG) of groundwater from all locations listed above will be measured on-site on an annual basis. Samples for SG measurement will be obtained during groundwater sampling. For the wells without dedicated pumps (deep wells and piezometers), a disposable bailer will be used to collect samples for SG measurement. A hydrometer will be used to measure the SG.
- **Procedures.** Depth to groundwater will be measured using an electric water level indicator. The groundwater elevation measurements will be made from a surveyed reference location at the top of the protective casing. Prior to insertion into the well casing, the electric water level probe will be triple rinsed with distilled or deionized water and inspected for foreign matter to ensure proper decontamination. A straight edge will be placed across the open protective casing and measurements will be determined at the bottom of the straight edge.

After decontamination, the probe is then lowered until the signal is activated. The probe is then gently lifted and lowered as needed so that the probe is positioned at the surface of the water. The depth to groundwater value is determined by observing the place on the water level indicator's line at the bottom of the straight edge when the probe indicates it is at the

surface of the water. Depth to water measurements are recorded to the nearest 0.01’ in the Groundwater Field Notebook and on the Groundwater Elevation Measurement Form (Figure B.4-1). The measurements are repeated until at least two successive values are observed. The observed value is recorded. The probe is then removed from the well and rinsed thoroughly with distilled or deionized water and inspected for foreign matter.

- **Total Well Depth Measurements.** Total well depth measurements will be collected on an annual basis at all wells currently in the monitoring well network. These measurements will be made during the annual sampling event. The measured water column will be compared to the theoretical water column (based on monitoring well completion diagrams) to evaluate the amount of silt that has accumulated in the bottom of the monitoring wells using the following equation:

$$\text{Percent Actual Water column} = \frac{(TD_m - DTW)}{(TD_t - DTW)} \times 100$$

If the measured water column is less than 90 percent of the theoretical water column, the monitoring well will be redeveloped prior to sampling.

- **Procedures.** Total well depth will be measured using an electric water level indicator. Prior to measuring the total depth of each well, the dedicated pumps will be extracted from the wells. The condition of each pump will be checked, and any maintenance will be performed to ensure proper operating conditions of the pumps. The total monitoring well depth measurement will be made from a surveyed reference location at the top of the protective casing. A straight edge will be placed across the open protective casing and measurements will be determined from the bottom of the straight edge. Prior to insertion into the well casing, the electric water level probe will be triple rinsed with distilled or deionized water and inspected for foreign matter to ensure proper decontamination.

After decontamination, the electric water level indicator is turned off. The probe is then lowered slowly into the well until it hits the bottom of the well. The depth to the bottom of the well is determined by observing the place on the water level indicator’s line at the bottom of the straight edge when the probe indicates it is at the bottom of the well. Depth to the bottom of the well measurements are recorded to the nearest 0.01’ in the Groundwater Field Notebook. The measurements are repeated until at least two successive values are observed. The observed value is recorded. The probe is then removed from the well and rinsed thoroughly with distilled or deionized water and inspected for foreign matter.

After all depth measurements are recorded, a correction factor is added to each measurement. The correction factor represents the distance from the depth to water sensor (where the measuring tape is referenced) to the end of the steel probe (which contacts the bottom of the well).

- **Documentation.** All data collected during this program will be recorded on the Groundwater Elevation Measurement Form (Figure B.4-1). The field personnel will also maintain a field logbook consisting of a weather resistant, bound, survey-type book, with non-removable, numbered pages. The logbook will be updated on a daily basis (during fieldwork) and will include the following information:

Name of individual making entry	Name and location of job
---------------------------------	--------------------------

Personnel on site	Name and address of field contact person
Date and time groundwater elevations were started and completed	Equipment used for groundwater elevation measurements
Weather conditions	Any deviations from QAPP
Groundwater well number	Problems with monitoring wells

All entries will be made in ink and any errors will be corrected by drawing a single line through the appropriate text and then adding the correct text. All changes will be dated and initialed.

**GROUNDWATER SAMPLING**

- **Groundwater Sampling Locations and Frequency.** This WMQAP applies to groundwater monitoring at five disposal areas at EnergySolutions’ Clive facility. These disposal areas include the LARW cell, the Class A West cell, ~~the Class A North cell~~, the 11e.(2) cell, the Federal Cell Facility and the Mixed Waste cell. Because these disposal areas fall under different regulatory agencies, wells monitored for these areas have different analyte suites. However, all radiological analyses are regulated by the DWMRC. The groundwater sampling programs for the EnergySolutions facility are indicated and described in Tables B.4-1a and B.4-1b. Figure B.4-1 lists the monitoring wells for which depth to water measurements are determined on a monthly basis and provides areas for recording:
  - Measurement dates
  - Depth to water measurements
  - Specific gravity and groundwater elevation (if applicable)
- **Quality Assurance/Quality Control Samples.** To ensure the comparability of data to previous sampling programs, quality control (QC) for the groundwater sampling programs will include the following samples:

**QC Samples**

**Requirement**

Trip Blank	One trip blank will be included in each cooler containing samples for Volatile Organic Compounds (VOC) analysis
Field Blank	For RCRA sampling, one field blank (pour blank) will be collected per sampling event when the event includes VOC samples
Blind Duplicate	One blind duplicate will be collected for each scheduled analysis for each round of sampling (5 percent)
Matrix Spike	One sample for matrix spike analysis will

be collected for each scheduled analysis for each round of sampling (5 percent)

Matrix Spike Duplicate

One sample for matrix spike duplicate analysis will be collected for each scheduled analysis for each round of sampling (5 percent)<sup>a</sup>

<sup>a</sup> Except for dioxin/furan analysis by Method 8290 or equivalent, where isotopic dilution is used to assess the effects of matrix on method performance.

- Sample Designation.** All environmental groundwater samples will be designated using their current EnergySolutions location identification. The QA/QC samples will be designated based on type. Trip blanks will be designated by “TB”, which indicates the sample is a trip blank, and the date it was submitted for analysis (e.g., TB-7/24/97). Field blank samples will be designated with “FB”, which indicates the sample is a field blank, and the date the sample was collected (e.g., FB-7/24/97). Blind duplicates will be designated with a fictitious sample identification (e.g., the blind duplicate for GW-29 may be labeled GW-301). Samples collected for matrix spike (MS) and matrix spike duplicate (MSD) analyses will have the same designation as their associated environmental sample, except that an MS or MSD will follow the sample designation, e.g., GW-29 MS or GW-29 MSD.

**GROUNDWATER SAMPLING EQUIPMENT AND PROCEDURES**

- Pre-Sampling Procedures.** Prior to sampling, each monitoring well will be checked for proper identification, and the well head will be examined for signs of tampering or damage. All indications of tampering or damage will be recorded and reported to the [DRA DCP](#).

The sampler will prepare a Groundwater Sampling Sheet (Figure B.4-2) and a complete set of sample containers prior to sampling each well. All of the samples will be collected in new, and certified clean (by manufacturer), sample containers provided by the analytical laboratory. The analytical methods, and the container types and preservatives for each analysis type are listed in Table B.4-2.

A label will be placed on each sample container submitted for analysis and will include the following information: each sample container submitted for analysis and will include the following information:

- Project name and location
  - Field sample identification
  - Date and time the sample was collected
  - Preservative (if applicable)
  - Sampler’s initials
  - Analysis type
- Equipment.** All compliance groundwater monitoring wells at the EnergySolutions facility have dedicated PVC and Teflon® bladder pumps with Teflon® lined, polyethylene tubing. Should additional monitoring wells be required for future monitoring, these new monitoring wells also will be equipped with dedicated bladder pumps and tubing.



Depth to groundwater will be measured and recorded as previously discussed.

- **Pre-Sampling Purging.** To ensure the groundwater samples are representative of the aquifer, a minimum of three casing volumes of groundwater will be purged using the dedicated bladder pump. The following procedures will be used to calculate the volume of water to be purged from each monitoring well:
  - The height of the water column in the well will be determined by measuring the static water level and the total well depth according to the methods previously described.
  - The volume of water to be purged from the monitoring well will be calculated using the height of the water column in the well casing as follows:

$$\text{Total Purge Volume: } V_t = 3(V_c) \times 7.48 \text{ gal / ft}^3$$

where:  $V_t$  = Total Purge Volume (gallons)  
 $V_c$  = Volume of water in well casing (ft<sup>3</sup>)

$$\text{Casing Volume: } V_c = \pi r_1^2 h_1$$

where:  $V_c$  = Casing Volume (ft<sup>3</sup>)  
 $r_1$  = Inside radius of monitoring well casing (ft)  
 $h_1$  = Height of water column (i.e., total well depth minus static water level depth) (ft)

If there is insufficient groundwater recharge to evacuate three casing volumes from the well, it will be evacuated to dryness, then sampled after the well has recovered to 80 percent of the static water level. If the well becomes dry before all sample containers are filled, then the remaining sample containers will be filled after the well recharges sufficiently. Purge volume calculations and the actual purge volume removed from each well will be recorded on the Groundwater Sampling Sheet.

- **Water Quality Parameter Measurements.** To ensure the groundwater samples are representative of the aquifer, specific conductivity (SC), pH, temperature, dissolved oxygen (DO), and reduction/oxidation (redox) potential (Eh) will be monitored using a flow-through cell during pre-sampling purging. In addition, SG will be measured on an annual basis after purging is complete in each well. SG measurements will be made in the field using a hydrometer. Before sampling is initiated, a minimum of three casing volumes will be purged from the well and three consecutive water quality measurements will meet the following criteria:
  - Specific conductivity = ± 3 percent
  - pH = ± 0.1 units
  - Temperature = ± 1°C

If the criteria listed above are not met after three casing volumes have been removed from the well, the Groundwater [Program](#) Manager will be contacted to determine what corrective actions, if any, should be taken prior to sampling, or purging can continue until water quality measurements stabilize. All of the water quality measurements will be recorded on the appropriate Groundwater Sampling Sheet. The appearance of the discharge water will also be recorded on this sheet.

- **Purge Water Disposal.** Purge water evacuated from all wells is to be discharged into the Mixed Waste Wash Pad sump or into one of the Mixed Waste Evaporation Tanks.

#### ENVIRONMENTAL AND QA/QC SAMPLE COLLECTION

- **Environmental Samples.** Groundwater samples will be collected directly into the appropriate sample container from the discharge line of the dedicated bladder pump. For all samples, the sample bottles will be filled in the order of compound volatility or stability as follows:
  1. Volatile Organic Compounds (VOC)
  2. Semi-Volatile Organic Compounds (SVOCs)
  3. Inorganics/Anions
  4. Total Dissolved Solids (TDS), Total Suspended Solids (TSS)
  5. Sulfides/Cyanide
  6. Metals/Cations
  7. Radiological Parameters

The analytical methods for this program, and the associated sample containers and preservatives are listed on Table B.4-2.

For groundwater samples collected for VOCs from the bladder pumps, the discharge rate of the pump will be reduced to the extent possible to allow gentle filling of the sample bottles without aeration. The VOC sampling flow rate will be measured and documented on the sampling field sheet immediately prior to sample collection for VOCs, at least once daily, on all days when VOC samples are collected. Immediately after VOC sample collection, sample containers will be placed in a cooler containing ice in order to meet the VOC preservation requirements.

Quality assurance/quality control samples for these sampling programs include trip blank, field blank (for RCRA sampling), blind duplicate, matrix spike, and matrix spike duplicate samples. These samples will be collected as described below.

- **Trip Blanks.** Trip blanks will be prepared by the laboratory prior to sampling and will consist of three 40 ml glass bottles filled with preserved reagent grade (High Pressure Liquid Chromatography [HPLC]) water. The bottles will be filled so that there is no headspace and will be capped with a Teflon® septum. Trip blanks will be included in each cooler containing samples scheduled for VOC analysis.
- **Field Blanks.** Field blanks (Pour Blanks) are collected during RCRA sampling and consist of laboratory provided reagent grade water. During the sampling process, water supplied by the laboratory in a certified clean, new bottle is poured into at least three, 40 ml VOC bottles. The VOC bottles should then be capped so that no air is present. Field blanks are stored in the same sample cooler as other VOC samples.
- **Blind Duplicates.** A blind duplicate sample is a single grab sample that is split into two samples during collection. For samples collected for VOC analysis, the environmental sample will be collected from one pump cycle of water, and then the additional vials will be collected from the next two pump cycles. For all other samples, the environmental sample will be collected by alternately filling the environmental sample and the duplicate sample. Typically, the environmental bottle will be filled to one-third the total volume, and then the duplicate

bottle will be filled to one-third of the total volume. The bottles will be alternated in this fashion until both bottles are filled. The frequency of collection of blind duplicates will be 1 per 20 samples, or 5 percent.

- **Matrix Spike and Matrix Spike Duplicate Samples.** Samples for MS/MSD analysis will be collected for five percent of the total number of samples for each analytical method. The same procedures used to collect blind duplicate samples will be used to collect samples for MS/MSD analysis.

#### CHAIN OF CUSTODY

A project-specific Chain-of-Custody (COC) form will be completed and accompany each sample cooler. The COC includes:

- **Project identification**
- **Project location**
- **Sample location identification**
- **Sample designation and analysis type**
- **Sample collection date and time**
- **Sample collection technique**
- **Sample matrix**

All entries will be made in ink and unused portions of the COC form will be crossed out and initialed. Any errors will be corrected by drawing a single line through the appropriate text and then adding the correct text. Any changes will be dated and initialed. An example of the COC that will be used for this project is provided as Figure B.4-3.

The original copy of the COC will be signed, placed in a plastic bag, and placed inside of the shipping container used for sample transport. When the laboratory receives the samples, the appropriate laboratory personnel will sign the COC. After the laboratory logs in the samples, the COC will be completed and a copy of the completed COC will be faxed or e-mailed to the ~~DRA~~ ~~DCP~~ or designee within 48 hours.

#### SAMPLE PACKAGING PROCEDURES

All groundwater samples will be packaged in coolers containing ice and transported or shipped for next-day delivery to the appropriate laboratory on the same day of collection. In the event that the samples require shipping, the following procedures will be used for packing samples:

- The samples will be placed upright in a waterproof metal (or equivalent strength plastic) ice chest or cooler provided by the laboratory.
- Ice will be placed in double Ziploc™ bags (to prevent leakage) and arranged around, among, and on top of the sample bottles. Sufficient ice will be used so that the samples will be chilled and maintained at approximately 4°C.
- To prevent the sample containers from sliding around the cooler, the cooler will be filled with inert cushioning material, such as shipping peanuts, additional bubble pack, or cardboard dividers.
- The completed COC form will be placed in a waterproof plastic bag and taped to the inside of the cooler lid.
- The lid will be secured with strapping tape by wrapping it completely around the cooler.
- Signed and dated custody seals will be placed on the cooler in two locations across the opening of the cooler lid.

### SAMPLE SHIPPING

Samples will be hand delivered to AWAL laboratories and shipped to Test America laboratories. The delivery address for AWAL is:

American West Analytical Laboratories  
(ATTN: AWAL Project Manager)  
463 West 3600 South  
Salt Lake City, UT 84115

Samples will be shipped to TAR and TAD via overnight delivery service. The delivery address for radiological samples is:

Test America Richland  
(ATTN: STL Project Manager)  
2800 George Washington Way  
Richland, WA 99352  
(509) 375-3131

The delivery address for potentially contaminated conventional chemistry samples is:

Test America Denver  
(ATTN: STL Project Manager)  
4955 Yarrow Street  
Arvada, CO 80002  
(303) 736-0100

### FIELD EQUIPMENT CALIBRATION PROCEDURES

- **Field Parameter Meters.** All meters will be calibrated on a daily basis prior to their use, in accordance with the manufacturer's directions. The meters will also be recalibrated any time drift in the meter is suspected, and the calibration will be checked in the middle of the day (mid-day calibration check) and at the end of each day of use. All calibration information will be recorded on the Groundwater Monitoring Field Instrument Calibration Sheet (Figure B.4-4).
- **Water-Level Sounder.** The electric water-level sounder will be checked daily before the beginning of field activities to ensure that it is in good working order. The sounder will be checked for overall appearance (cleanliness, cuts in the tape) and the sounder probe will be placed in water to check for operation. This information will be recorded on the Calibration Sheet.

### DOCUMENTATION PROCEDURES

As discussed in the above paragraphs, all data collected during groundwater sampling will be recorded on the Groundwater Sampling Sheet (Figure B.4-2). The sampling personnel will also maintain a field logbook consisting of a weather resistant, bound, numbered, survey-type book, with non-removable pages. The log book will be updated on a daily basis (during field work) and will include the following information:

- **The name and location of the job**
- **Personnel onsite**

- Name and address of the field contact person
- The date(s) groundwater sampling was started and completed
- Weather conditions
- Sampling methodology
- Photograph numbers and descriptions (if applicable)
- Any deviations from the WMQAP
- Observations that may be relevant to the field program.

All entries will be made in ink and any errors will be corrected by drawing a single line through the appropriate text and then adding the correct text. Any changes will be dated and initialed.

**FIGURE B.4-1**

GW-26	<u>Federal Cell Facility</u>
GW-94	<u>Federal Cell Facility</u>
GW-95	<u>Federal Cell Facility</u>
GW-27	<u>Federal Cell Facility</u>
GW-27-D	<u>Federal Cell Facility</u>

**TABLE B.4-1a**

GW-26	FCF	20-30	Annual	LARW List
GW-94	FCF	19-34	Annual	LARW List
GW-95	FCF	14-29	Annual	LARW List
GW-27	FCF	20-30	Annual	LARW List
GW-27-D	FCF	20-30	Annual	LARW List

**TABLE B.4-1b**

Summary of Analyte Lists  
EnergySolutions

**RCRA Analyte List<sup>1</sup>**

Groundwater Monitoring Parameters (including pH, SC, TDS, TSS, and Sulfide)  
 Anions (including F, Cl, NO<sub>3</sub>-NO<sub>2</sub>, SO<sub>4</sub>, HCO<sub>3</sub>, CO<sub>3</sub>, and OH)  
 Cations (including Ca, Fe, Mg, K, and Na)  
 Anion/Cation Balance  
 Metals (including Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Hg, Ni, Se, Ag, Tl, V, and Zn)  
 Volatiles (full Appendix IX RCRA Groundwater Monitoring List Scan)  
 Semi-Volatiles (full Appendix IX RCRA Groundwater Monitoring List Scan)  
 Organochlorine Pesticides (full Appendix IX RCRA Groundwater Monitoring List Scan)  
 Polychlorinated Biphenyls (PCBs)  
 Radiologics (including Gross β, Ra-226 and 228, Np-237, Th-230 and 232, U-233, 234, 235, 236, and 238, K-40, C-14, I-129, Tc-99, Sr-90, Total U, and Tritium)

**LARW, Class A West, Class A North, Federal Cell Facility and Evaporative Pond Analyte List**

Groundwater Monitoring Parameters (including pH, SC, cyanide, and TDS)  
 Anions (including Br, F, Cl, NO<sub>3</sub>-NO<sub>2</sub>, SO<sub>4</sub>, HCO<sub>3</sub>, CO<sub>3</sub>, and OH)  
 Cations (including Ca, Fe, Mg, K, and Na)  
 Anion/Cation Balance  
 Metals (including Sb, Ba, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, and Zn)<sup>2</sup>  
 Volatiles (including 1,2-Dichloroethane, MEK, Acetone, Carbon Disulfide, Chloroform, Methylene Chloride, 1,1,2-Trichloroethane, and Vinyl Chloride)  
 Radiologics (including Gross β, Ra-226 and 228, Np-237, Th-230 and 232, U-233, 234, 235, 236, and 238, K-40, C-14, I-129, Tc-99, Sr-90, Total U, and Tritium)

**11e.(2) Analyte List**

Groundwater Monitoring Parameters (including pH, SC, cyanide, and TDS)  
 Anions (including Br, F, Cl, NO<sub>3</sub>-NO<sub>2</sub>, SO<sub>4</sub>, HCO<sub>3</sub>, CO<sub>3</sub>, and OH)  
 Cations (including Ca, Fe, Mg, K, and Na)  
 Anion/Cation Balance  
 Metals (including Sb, Ba, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, and Zn)<sup>2</sup>  
 Volatiles (including 1,2-Dichloroethane, MEK, Acetone, Carbon Disulfide, Chloroform, Methylene Chloride, 1,1,2-Trichloroethane, and Vinyl Chloride)  
 Semi-Volatiles (including Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Diethyl Phthalate, 2-Methylnaphthalene, Naphthalene)

Pesticides (including Chlordane)

Radiologics (including Gross  $\beta$ , K-40, Ra-226 and 228, Th-230 and 232, and Total U)

<sup>1</sup> Non-radiological analyte list from MW Storage, Treatment, and Disposal Permit Table VI-1

<sup>2</sup> Include As and Mo at Permit and License renewal

**TABLE B.4-2**

(no changes)

**FIGURE B.4-3**

(no changes)

**FIGURE B.4-4**

(no changes)



## B.5 SAMPLE CUSTODY, HANDLING, AND SHIPPING PROCEDURES

### SAMPLE CUSTODY

To ensure that samples are identified correctly and remain representative of the environment, the documentation and sample custody procedures specified in this section will be followed during sample collection and analysis. Standard sample documentation and custody procedures, as outlined below, will be used during the sampling program to maintain and document sample integrity during collection, transportation, storage, and analysis. The field sampling personnel will be responsible for ensuring proper documentation and that custody procedures are initiated at the time of sample collection until samples are relinquished to the laboratory. The laboratory will be responsible for maintaining sample custody and documentation from the time samples are relinquished to the lab until final sample disposition.

### CHAIN OF CUSTODY

Chain-of-custody (COC) procedures provide an accurate written record of the possession of each sample from the time of collection in the field through laboratory analysis. A sample is considered in custody if one of the following applies:

- It is in an authorized person's immediate possession,
  - It is in view of an authorized person after being in physical possession,
  - It is in a secure area after having been in physical possession of an authorized field person, or
  - It is in a designated secure area, restricted to authorized laboratory personnel only
- 
- **Field Procedures.** The sample custody and documentation procedures will be initiated at the time of sample collection. Sample collection details will be documented on the EnergySolutions Groundwater Sampling Sheet (Section B.4). Samples will be labeled and the appropriate information will be recorded on the COC as described in Section B.4. All entries will be made in indelible ink. Any errors will be corrected by drawing a single line through the incorrect entry, entering the correct information, and then initialing and dating the change.
  - **Sample Labels.** Sample labels will be completed and attached to sample containers as described in Section B.4.
  - **Chain of Custody Record.** Properly completed COC records will ensure that sample custody is documented, appropriate sample fractions have been collected, and scheduled analyses are properly assigned. The type of COC and the information required for completion of the COC are described in Section B.4.
  - **Custody Seals.** Custody seals will be placed in two locations across the cooler closure to ensure that any tampering is detected. The date and initials of the sampler will be written on the custody seal.
  - **Sample Packaging, Handling, and Transporting.** All groundwater samples will be packaged, handled, and transported as described in Section B.4.
  - **Laboratory Custody Procedures.** Upon receipt in the laboratory, the integrity of the shipping container will be checked by verifying that the custody seal is not broken. The cooler will be opened and examined for evidence of proper cooling. The sample containers will then be checked for breakage, leakage, damage, and the contents and analytical requirements of the shipment will be verified against the COC. Custody seal integrity, the temperature, and sample preservation will be checked. If a problem is found, it will be documented on the sample custody form(s) and the Groundwater **Program** Manager or Staff

Hydrogeologist will be notified at the time of receipt. Any shipping receipts will be stapled on the COC records and stored in the project file.

A permanent logbook will be maintained in the Sample Control area to document the following:

- Date of sample receipt
- Sample accession number
- Number of samples
- Source of samples

All insufficiencies and/or discrepancies will be immediately reported to the Laboratory Project Manager and an Anomaly Form will be completed. The Laboratory Project Manager will either resolve the problem internally or contact the Groundwater Program Manager or Staff Hydrogeologist for resolution. If the samples and documentation are acceptable, each sample container will be assigned a unique laboratory identification number from AWAL's, or Test America's Laboratory Information Management Systems (LIMS) database. Sample tracking will be documented on the LIMS (one of the functions of the LIMS is to assist in tracking samples while they are in the custody of the laboratory). Other information that will be recorded includes date and time of sampling, sample description, due dates, and required analytical tests. After the samples are entered into the LIMS, a copy of the proposed work order will be e-mailed or faxed to the Groundwater Program Manager or Staff Hydrogeologist within 24 hours of sample receipt. The Groundwater Program Manager or Staff Hydrogeologist will review the proposed work order and will contact the laboratory immediately should any errors or omissions be observed.

When the LIMS log-in has been completed, the samples will be transferred to the appropriate refrigerators in the Sample Control area. Separate refrigerators will be used for samples suspected to contain high levels of organic compounds and for samples for volatile analyses. The sample refrigerators will be kept at 0-6 degrees centigrade (oC) and their temperatures will be recorded daily with thermometers calibrated against National Institute of Standards and Technology (NIST) thermometers. The cleanliness of refrigerators storing samples for volatile analyses will be monitored using refrigerator blanks.

The Department Managers or their designee will be notified that the samples have arrived through the LIMS and will maintain custody of the samples during processing. The LIMS will maintain records of the sample custody. A sample location list is entered into the LIMS and printed on each sample label. Access to samples will be limited to authorized personnel, and Sample Check In/Out is tracked with the LIMS. Either a sample custodian or laboratory chemist will distribute samples for analysis from Sample Control.

Sample custody will be maintained within the laboratory's secure facility until sample disposal. Any marks or notes made on the chain-of-custody document by the Sample Custodian will be clearly distinguishable from original field notation.

- **Sample Disposal.** Thirty days after a laboratory report has been generated and submitted to the Groundwater Program Manager or Staff Hydrogeologist, the samples are transferred to the sample disposal area. This transfer will be documented on the Sample Control Form.

Samples will be disposed according to the laboratory's SOP, which is based on both State and Federal guidelines.

## B.6 CALIBRATION PROCEDURES

This section discusses general requirements for field equipment and laboratory instrument calibration and standards preparation. Instrument calibration is necessary for accurate sample quantitation, and it establishes the dynamic range of an instrument. Criteria for calibration are specific to each method and instrument manufacturer. The following paragraphs outline the calibration procedures for the field equipment and laboratory instrumentation

### FIELD EQUIPMENT

The field equipment to be used during the groundwater sampling program includes a water-level sounder; an Eh meter; a hydrometer, and a specific conductance, pH, and temperature meter. The meters will be calibrated according to the procedures outlined below.

- **Water-Level Sounder.** The electric water-level sounder will be checked before the beginning of field activities to ensure that it is in good working order. The sounder will be checked for overall appearance (cleanliness, cuts in the tape) and the sounder probe will be submerged in water to check for operation. This information will be recorded on the Groundwater Monitoring Field Instrument Calibration Sheet provided in Section B.4.

In addition, the water-level sounder will also be calibrated against a steel surveyor's tape on an annual basis, typically at the first of the calendar year. This calibration will be made at room temperature, and any adjustments will be made based off of the certificate of calibration.

- **Water Quality Parameter Meters.** Any meter used for water quality parameter measurements will be calibrated using reliable commercial reference standards or solutions in accordance with the manufacturer's instructions. Three buffer standards (4, 7, and 10) will be used for pH meter calibration. One standard (approximately 100,000  $\mu\text{mhos/cm}$ ) will be used for calibrating the specific conductance meter for a meter requiring a single-point calibration. Two standards (approximately 10,000 and 100,000  $\mu\text{mhos/cm}$ ) will be used for calibrating the specific conductance meter for a meter requiring a two-point calibration. These instruments will be calibrated prior to use or any time meter drift is suspected. In addition, calibration checks will be performed during the middle of the day and at the end of the day.

### LABORATORY INSTRUMENTS

AWAL and Test America will provide analytical services for all definitive data. Attachment B contains AWAL and Test America Standard Operating Procedures (SOPs) including instrument calibration and corrective action procedures.

## **B.7 ANALYTICAL PROCEDURES AND DETECTION LIMITS**

All groundwater samples collected for definitive data will be analyzed by AWAL and Test America Laboratories. The methods and Practical Quantitation Limits (PQLs) are listed in Attachment A. The PQLs are laboratory-specific target reporting limits that can be met in the absence of matrix interferences or high contaminant concentrations and are at least as stringent as the reporting limits specified for the individual analytical methods.

For radiological analysis, if the sum of the measured concentration plus the associated counting error term is equal to or greater than the Ground Water Protection Level (GWPL), the sample will be recounted for a period sufficient to provide a concentration with a counting error of  $\leq 10$  percent at the 95 percent confidence level.

All samples with concentrations of target analytes that exceed the linear range of the instrument will be diluted and reanalyzed. Every effort will be made to dilute the samples such that the sample concentration falls within the linear calibration range of the instrument. Estimated data will be used in any trends analysis or compliance reporting, but the results will be qualified.

## B.8 DATA REDUCTION, VALIDATION, AND REPORTING FIELD MEASUREMENTS

Raw data from field measurements and sample collection activities will be documented in the field logbook and on the appropriate field forms. All field data generated during this program will be evaluated under the direction of EnergySolutions ~~DRA DCP~~ or designee.

### LABORATORY MEASUREMENTS

- **Data Reduction Calculations.** Data will be reduced as specified by the analytical methods. These calculations are specific to the analytical instruments that are used for the analysis, the level of automation, and the type of software used to reduce the data. The procedures used for data reduction for each analytical method are described in the laboratory's SOPs, which are included as Attachment B of this WMQAP.

### LABORATORY DATA VALIDATION

The laboratory will perform in-house analytical data reduction and review under the direction of the Laboratory Project Manager and the Laboratory QA Officer before data are released to EnergySolutions. The Laboratory Project Manager and Laboratory QA Officer also are responsible for assessing the data quality and qualifying any data that may be unreliable. The laboratory will prepare and retain full analytical and QC documentation. The data reduction and review will be conducted as follows:

- The bench analyst will convert the raw data and conduct the initial data review. The analyst will review preliminary data entries, calculations, holding times and precision, accuracy, and calibration check standards. The analyst will also provide explanation and/or corrective action summaries for any method control parameters that are outside control criteria. The analyst will sign the analytical batch control form when the review is complete.
- The Laboratory Director (or designee) will review the analytical control documentation associated with each batch, as well as any corrective action explanations provided by the analyst. If the Laboratory Director (or designee) is not satisfied with all corrective action explanations and analytical control results, additional explanation will be required for the batch. The Laboratory Director is responsible for determining if the analytical data meet quality control criteria established by the analytical methods and by this WMQAP. The Laboratory Director will sign the analytical batch control form when satisfied with the data quality.
- The Laboratory Project Manager or Laboratory Supervisor will review analytical data batches that have been approved by the analyst, and will sign the batch control form when satisfied with the data. The Laboratory Project Manager also is responsible for reviewing all final data reports for proper format and reporting consistency prior to releasing the reports to EnergySolutions.

The Laboratory QC Officer is responsible for performing annual audits to ensure that required QC procedures are followed. In the case of QC problems, the Laboratory QC Officer will initiate and follow up on corrective actions taken to rectify the problem. The laboratory maintains a permanent record of these in-house audits.

The laboratory review of the data includes assessing compliance with the control limits in this WMQAP. Accuracy and precision are the primary data parameters that can be used to calculate control limits. Data to evaluate accuracy are obtained primarily from separately prepared laboratory QC samples. Data used to

evaluate precision are QC sample analyses or the replicate analysis of field samples. The calculations that are used to evaluate precision and accuracy are defined in the laboratory's SOP. Precision and accuracy quality control limits are generated from the statistical analysis of QC sample results.

## DATA REPORTING

All the correspondence, sample custody forms, raw data, reports, etc. will be kept in a specific project folder. The analytical data will be reported in a format organized to facilitate data evaluation. All of the data, including QC data, will be reported in the chronological order in which they were produced. The following information will be included in each data package:

- A case narrative that identifies samples not meeting QC criteria (i.e., poor spike recoveries) and any other analytical irregularities. The narrative shall describe the corrective action taken. If matrix effects are invoked as a case for out-of-control recoveries, a subsection of the narrative shall present a detailed justification for this assertion and include a summary of all relevant quality control data.
- A copy of the original chain-of-custody and copy of the project receipt checklist.
- The date the sample was collected in the field and the date the sample was received by the laboratory.
- Results for all environmental and QC sample analysis.
- Sample extraction/preparation and analysis dates.
- Method of analysis (name and method number).
- Quality control sample identification (for project specific quality control samples).
- Dilution factors for all applicable samples.
- Reporting limits or practical quantitation limits and units of measure for all analyses.
- Field sample identification and laboratory sample identification number.
- Quality control batch identifications
- The initial concentration and percent recovery of the surrogate spikes, matrix spikes, and laboratory control sample spikes and their associated quality control limits.
- Laboratory Control Sample (LCS) accuracy results with associated control limits – all samples will be clearly associated with each LCS analysis.
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) (as applicable) precision and accuracy results with associated control limits – all samples will be clearly associated with each MS/MSD sample pair analyses.
- Matrix Duplicate (MD) precision results with associated control limits.
- Method blank analytical results will be reported for all analytes for all required analyses – all samples will be clearly associated with each method blank sample analyses.
- Completed tuning and calibration data are stored in the data package with the raw data.
- Completed internal standard result summary results are stored in the data package with the raw data.
- Completed sample injection time and standard injection time summary forms are stored in the data package with the raw data.

The laboratories will archive the EnergySolutions project files, including raw data and bench work sheets for five years. These data will be available upon request. After five years, the DRA DCP or designee will be notified for disposition of data.

## B.9 INTERNAL QUALITY CONTROL

### FIELD PROGRAM

Internal quality control evaluates whether a method is performing within acceptable limits of precision and accuracy. On the sampling level, the quality control samples used to assess field sampling techniques and environmental conditions during sample collection and transportation include trip blanks and field blanks, and blind duplicates.

Trip blanks and field blanks will be used to evaluate representativeness. Trip blanks will be used to assess whether volatile organic compounds (VOCs) were introduced into samples during handling, shipping, or storage at the laboratory. Field blanks will be used to assess whether the target analytes were introduced into the environmental sample during sample collection and handling.

Blind duplicate samples will be used to assess variability in the sample media and to assess sampling and analytical precision. Blind duplicate samples will be collected for five percent of the total number of samples collected for all analyses.

### LABORATORY ANALYSIS

The general objectives of the laboratory QC program are to:

- Ensure that all procedures are documented, including any changes in administrative and/or technical procedures.
- Ensure that all analytical procedures are validated and conducted according to method guidelines.
- Monitor the performance of the laboratory using a systematic inspection program.
- Ensure that all data are properly archived.

All contract laboratories will conduct internal quality control for analytical services in accordance to their standard operating procedures, the individual method requirements, and this WMQAP. Before making changes to the WMQAP or analytical methodology, the laboratory will notify the [DRA DCP](#) in writing. EnergySolutions will then notify the [DWMRC, DWQ, and DSHW](#) Project Managers.

Laboratory quality control consists of two distinct components: a laboratory component and media component. The laboratory component measures the performance of the laboratory analytical processes during the sample analyses (i.e., holding time, refrigerator blanks, method blanks, and laboratory control samples), while the media component (i.e., MS/MSD and surrogate spikes) measures the effects of a specific medium on the method performance. The following paragraphs discuss the QC samples that the laboratories will use to assess the data quality prior to submission to EnergySolutions.

- **Holding Time.** Holding time reflects the length of time that a sample or sample extract remains representative of the environmental conditions. Depending on the analysis, either one or two holding times will be evaluated. For those analyses that do not include sample extraction, one holding time will be evaluated: the amount of time between sample collection and sample analysis. For analyses that have an extraction prior to analysis (e.g., SW-846 Method 8270), two holding times will be evaluated: 1) the length of time from sample collection until sample extraction, and 2) the length of time from sample extraction to sample analysis. Holding times for each analytical method are listed in Table B.4-2 of this WMQAP. Analytical data for those samples whose holding times were exceeded will be considered quantitatively questionable (possibly biased low) and will be qualified in accordance with



EPA guidance to indicate the data are estimated. In addition, an explanation detailing any holding time violation will be provided in the case narrative.

- **Method Blanks and Refrigerator Blanks.** Both method and refrigerator blanks will be used to evaluate representativeness by identifying any contaminants that have been introduced into the environmental sample during sample storage or analysis. Method blanks are generated in the laboratory and consist of reagent grade water. Refrigerator blanks are prepared in the laboratory and consist of a 40-ml glass bottle with a Teflon® septum containing reagent grade water. The refrigerator blank is placed with the environmental samples in the storage refrigerator when the samples are first received for a given sampling event and remains in the refrigerator until all samples for the sampling event are received. The refrigerator blank is then analyzed with the last analytical batch of samples for the sampling event. Both the refrigerator and method blanks are carried through each processing step necessary for a given analytical procedure. These blanks measure contamination originating from the laboratory (i.e., storage, water, air, reagents, equipment, and instruments used for analysis), and are used to distinguish low-level field contamination from laboratory contamination. If analytes of interest are found in the blanks and in associated environmental samples, the data from the associated environmental samples may be considered questionable depending on the relative concentrations of contaminants in the blanks and the environmental sample. All data for environmental samples with associated blank contamination will be qualified according to EPA guidance. In addition, an explanation detailing any blank contamination problems will be provided in the case narrative.
- **Laboratory Control Samples.** Laboratory Control Samples (LCS) will be used to evaluate accuracy. These samples are carried through the same analytical procedures as the environmental samples and are used to evaluate method and analytical procedure performance in the absence of matrix interference. LCSs are prepared in the laboratory and consist of ultra-pure water that is spiked with specific compounds as outlined in the analytical methods. An LCS sample will be prepared and analyzed at a frequency of one per 20 samples, or daily, whichever is more frequent. Accuracy will be evaluated by calculating percent recovery for each spiked compound and comparing it to the QC limits established by the individual methods (Attachments A and B). Values within the established QC limits indicate acceptable analytical accuracy. Values outside the QC limits indicate that the data may be inaccurate.
- **Matrix Spike and Matrix Spike Duplicate Samples.** MS/MSD/MD samples will be analyzed at a frequency of 5 percent on site-specific media to assess accuracy and precision. MS/MSD analyses will not be performed for radiological constituents, with the exception of technetium-99 and total uranium. Unlike LCSs, MS/MSD samples will be used to assess the influence of the sample media (media interference) on the analysis. Each MS/MSD sample will be spiked with the compounds specified by the analytical method. To evaluate accuracy, the percent recovery for each spiked compound will be calculated and compared to the QC limits listed in Attachment A. Precision will be evaluated by calculating the RPD between the MS and MSD samples for each spiked analyte. These RPDs will be compared to the QC limits established by laboratory performance (Attachment A). Percent recovery and RPD values within the QC limits indicate acceptable precision and accuracy. Values outside the QC limits indicate that there may have been media interference during analysis.
- **Matrix Duplicates.** Precision may also be measured by preparing and analyzing the same sample twice. Precision will be evaluated by calculating the RPD between the parent sample

and the matrix duplicate (MD) for inorganic analyses, or by calculating the RER for the radiological analyses. The RPDs or RERs will be compared to the QC limit established by laboratory performance (Attachment A).

- **Surrogate Spikes.** Surrogate spikes will be used to evaluate the accuracy of the method and analytical instrument performance for methods for organic analysis. Surrogate spikes will be added to each sample, including QC samples, prior to extraction or analysis as specified in SW-846 Test Methods for Evaluating Solid Waste (USEPA, 1996). After the analysis has been completed, the percent recovery of each surrogate spike will be calculated and compared to the QC limits established by the method of analysis (Attachment A). Percent recoveries within the QC limits indicate acceptable accuracy during analysis. Percent recoveries outside the QC limits indicate that there may have been a problem during analysis (media or nonmedia) and that the data may be inaccurate. Any surrogate failures will be summarized in the case narrative.

## B.10 PERFORMANCE SYSTEMS AUDITS

### FIELD PROGRAMS

Oversight of the field procedures will be the direct responsibility of the DRA DCP, who will review all elements of this WMQAP to ensure that the objectives of the monitoring are met. In addition to an initial review, the sampling procedures will be reviewed regularly so that any necessary modifications can be made.

The EnergySolutions Quality Assurance Director Manager (or designee) will conduct internal audits of field activities (sampling and measurements). The audits will include examining field measurement records, field equipment calibration records, field sampling records, field instrument operation records, sample collection procedures, sample handling and shipping procedures, and COC procedures. Field activities will be audited immediately after the approval of this WMQAP to verify that all the procedures in the WMQAP are being followed. Follow-up audits will be conducted on an annual basis to correct deficiencies, and to verify that QA procedures are maintained throughout the project.

The DWMRC, DWQ, and DSHW may conduct external field audits. Field audits may be conducted at any time during the field operations and will be based upon the requirements in this WMQAP. These audits may or may not be announced at the discretion of the regulatory agencies.

### LABORATORY AUDITS

In-house and regulatory agency audits of laboratory systems and performance are a regular part of a laboratory QC program and are outlined in the laboratory's QA/QC plans. The audits consist of a review of the entire laboratory system and at a minimum include examination of sample receiving, log-in, storage, and chain-of-custody documentation procedures; sample preparation and analysis; and instrumentation procedures.

To verify proper implementation of laboratory procedures and adherence to this WMQAP, external audits may be performed by regulatory or EnergySolutions personnel prior to or during field activities. These audits may or may not be announced and are conducted at the discretion of the auditing agency. External audits will include (but are not limited to) review of laboratory analytical procedures, laboratory on-site audits, and/or submission of Performance Evaluation (PE) samples to the laboratory for analysis.

## B.11 PREVENTATIVE MAINTENANCE

### FIELD EQUIPMENT

The field equipment used for this sampling program includes an electronic water-level sounder; and Eh, DO, pH, specific conductivity, and temperature meters or multiprobe. All meters and instruments will be maintained and used according to the manufacturers' directions. Each piece of equipment will be inspected on a regular basis to ensure that the equipment is operational. The results of any equipment inspection will remain on-site. Any preventative maintenance or repair conducted in the field will be recorded on the calibration sheets (Figure B.4-4).

### LABORATORY EQUIPMENT

- **Documentation.** All maintenance performed on an instrument is documented in its maintenance logbook, which is kept with the instrument. The date, initials of the analyst performing the maintenance and the type of maintenance are recorded in this logbook. Receipts from routine maintenance performed by the manufacturer's representative are filed with the maintenance logbook.
- **Contingency Plan.** In the event of instrument failure, every effort will be made to analyze samples by an equivalent alternate means within holding times. If the redundancy in equivalent instrumentation is insufficient to handle the affected samples, the DCP (or designee) will be notified immediately and the corrective action to be taken will be determined by the laboratory and the DCP (or designee). These actions include, but are not limited to re-collecting the groundwater samples after repairs are complete or sending the environmental samples to a secondary laboratory for analysis.

## B.12 DATA ASSESSMENT PROCEDURES

As described in Section B.3, the quality of the field and analytical data will be evaluated using the PARCC parameters, which are quantitative and qualitative statements that describe data quality. The PARCC parameters will be used to determine whether the data quality objectives of this program have been met by comparing QC sample results and standard procedures with acceptance criteria established for this project. The PARCC parameters that will be used for data evaluation are defined in Section B.3.

### FIELD DATA

The Groundwater **Program** Manager or Staff Hydrogeologist will assess field measurement data. The data quality evaluation, in terms of the PARCC parameters, will focus primarily on the laboratory data. However, the field data will be evaluated qualitatively in terms of the PARCC parameters. The following sections discuss how the PARCC parameters will be used to evaluate the field data and field sampling procedures.

- **Precision.** Sampling precision is affected by the procedures used for sample collection, handling, and transportation. To reduce the variability that may be introduced during sampling, Section B.4 of the WMQAP outlines the standard sampling, handling, and shipping procedures that will be used for the sampling program. The use of these procedures should minimize variability in the sampling process. In addition, the results of blind duplicate and blind replicate sample analyses will be used to evaluate sampling precision. The RPD will be calculated for each blind duplicate sample pair. Although the results of blind duplicate sample analyses also reflect the variability associated with analytical procedures, low RPD values are an indication that consistent sampling techniques were used for sample collection.
- **Accuracy.** Although there is no way to quantitatively measure the accuracy of the field program using percent recovery, some aspects of accuracy can be assessed, such as comparing the length of the water-level probe to a steel, engineers tape of known length and proper calibration of the field instruments.
- **Representativeness.** The representativeness of the field data is determined by the implementation of the data collection procedures. The sampling and field measurement procedures to be used are based on existing analytical data, hydrogeology, and the physical setting of the EnergySolutions facility.

Representativeness of the field sampling procedures and the field measurements will be evaluated by comparing the sampling and measurement procedures used in the field to the procedures outlined in this WMQAP. In addition, the results of field blank samples will be used to evaluate the representativeness of field sampling procedures. Contaminants detected in field blanks are indications that the sampling procedures are not being followed appropriately or there is another environmental factor that should be considered.

- **Comparability.** Comparability is a qualitative parameter that expresses the confidence with which one data set may be compared to another. Comparability is dependent on similar QA objectives and is achieved through the use of standardized methods for sample collection and analysis, and the use of standardized units of measure. Comparability of the field measurements will be assessed by evaluating compliance with the specific field measurement procedures presented in this WMQAP.

- **Completeness.** Completeness of the field program will be evaluated to ensure that the appropriate number of samples was collected for analysis, and that field data of the type and quantity outlined in the WMQAP were collected. Completeness of the field investigations will be evaluated by comparing the actual number of samples and the actual quantity of data that were collected to the requirements outlined in this WMQAP.

## LABORATORY DATA

The laboratory data will be validated by the Groundwater Program Manager or Staff Hydrogeologist, based on the assumption that the sample was collected, handled, and analyzed according to this WMQAP. The data reviewer will conduct a systematic review of the data for compliance with the QC criteria established in the WMQAP and will identify any data omissions or data that do not meet the quality control criteria. The reviewer also will interact with the contract laboratories to correct any data deficiencies. Decisions to repeat sample collection or analyses will be made by the DRA DCP based on the extent of the data deficiencies and their importance in the overall context of the project.

- **Laboratory Data Assessment Procedures.** All definitive data will be validated and qualified based on the results of QC sample analysis and the basic principles for data validation outlined in the USEPA Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994). To assess the quality of the analytical data, the results of QC sample analyses will be evaluated using quality control limits established by the analytical methods or by past laboratory performance (Attachment A). The QC samples that will be used for data validation for each data type are listed in Table B.3-2. The forms shown in Figures B.12-1 and B.12-2 will be used during the data validation process and will be completed for each data package. Results of the QC sample evaluation will be expressed in terms of the PARCC parameters and will be used to assess the quality of the analytical data.

The QC samples that will be used to evaluate the analytical data for this program include (as applicable) trip, field, refrigerator, and method blanks; surrogate spikes; MS/MSD; LCS; and blind duplicate samples. The specific types and descriptions of the QC samples that will be collected in the field are discussed in Section B.4. The QC samples that are prepared in the laboratory and the rate at which these samples are analyzed are method-specific. A summary of the QC sample evaluation of laboratory data in terms of the PARCC parameters is presented in Table B.3-2. Data qualifiers that will be used during this program are listed in Table B.12-1. The following sections describe the criteria that will be used to evaluate the laboratory data.

- **Precision.** Analytical precision will be assessed by comparing the percent recovery of the spiked analytes in the MS/MSD samples, or by comparing the MD concentration to the concentration of the parent sample. Relative percent difference will be calculated between the MS/MSD sample pairs using the recovery values of the spiked analytes, or by calculating the RPD between the concentrations of the MD and the parent sample for inorganic analyses. The RER will be calculated between the parent sample and the MD using the sample concentrations for the activity-based radiological analyses. The RPDs and RERs will then be compared to the QC acceptance criteria. The data quality objectives for precision during this program are based on laboratory established control limits, which are specific to each analyte (Attachment A).

Both analytical and field sampling precision will be evaluated by comparing the analytical results of field duplicate sample pairs. The RPDs will be calculated only for those analytes detected above the PQL in both the environmental and field duplicate sample. Because there is no guidance available for establishing QC limits for field duplicate RPDs, the QC criterion of  $\pm 25$  percent will be adopted for this project. Relative percent difference values within the QC guidelines indicate that good sampling and analytical procedures were followed. Relative percent difference values outside the QC limit indicate that there may have been a problem during sampling or analysis. Although precision for field duplicate samples will be assessed and reported, because there is no guidance for qualifying data based on field duplicate RPDs, field duplicate results will not be used to qualify data.

- **Accuracy.** Laboratory accuracy will be evaluated using the results for surrogate spike, MS/MSD, and LCS sample analyses. As with precision, the accuracy objectives for the data are based on laboratory-established limits and vary with the specific analyte (Attachment A).
- **Representativeness.** Representativeness is a qualitative parameter that evaluates whether or not the data represent the actual environmental conditions. Representativeness will be evaluated by analysis of method, refrigerator, trip, and field blanks and blind duplicate samples. Method, refrigerator, trip, and field blanks will be used to identify sources of contamination not associated with the environmental sample. Low RPDs for blind duplicate sample pairs indicate that the sampling technique was consistent and the resulting samples are representative of the environment.

Representativeness also is evaluated using holding-time criteria, which reflect the length of time that a sample or extract remains representative of the environmental conditions after sample collection. Holding times are compared to standard method specific holding times accepted by the EPA. All holding times within the acceptance criteria are considered representative. Those holding times outside of EPA acceptance criteria are qualitatively evaluated to determine the effect on sample representativeness.

- **Comparability.** Comparability is a qualitative parameter that expresses the confidence with which one data set may be compared to another. Comparability is dependent on similar QA objectives and is achieved through the use of standardized methods for sample collection and analysis, and the use of standardized units of measure.

As discussed in Section B.3, laboratory data comparability is dependent on the use of similar sampling and analytical methodology for different projects at a specific site. Comparability of laboratory data will be maximized for this project by specifying methodologies in this WMQAP, which are similar to those used previously. Laboratory data comparability will be assessed by comparing data collected under this WMQAP to historical EnergySolutions data (as available) and assessing whether the analytical methodologies presented in this WMQAP were followed.

During the validation process, the Groundwater **Program** Manager or Staff Hydrogeologist may determine that a laboratory result is anomalous by comparison with historical results. The Groundwater **Program** Manager or Staff Hydrogeologist may request re-analysis (within holding times) or resampling to confirm the anomalous result. However, the reanalysis or resampling will not delay the determination and notification of compliance status. In other words, anomalous data will be included in the evaluation of compliance status, and the

compliance status will be reported in accordance with the requirements of the GWQDP. The reason(s) for considering the result anomalous and follow-up actions to be taken (e.g., reanalysis) should be discussed in the compliance status notification.

- **Completeness.** Completeness also will be used to assess data quality and is expressed as the percentage of valid data relative to the total number of measurements. Completeness for this project will be calculated using the following equation:

$$\text{Completeness} = \frac{\text{Number of valid data points}}{\text{Total number of measurements}} \times 100$$

Where: the number of valid data points is the total number of valid analytical measurements based on the precision, accuracy, and holding time evaluation. Acceptance criteria for completeness are defined in Section B.3.

**TABLE B.12-1**

(no changes)

**FIGURE B.12-1**

(no changes)

**FIGURE B.12-2**

(no changes)



### B.13 CORRECTIVE ACTIONS

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or out of quality control performance that may affect data quality. All proposed and implemented corrective action will be documented in the regular quality assurance reports to the appropriate project management. Corrective actions will be implemented only after approval by the ~~DRA-DCP~~. If immediate corrective action is required, approvals secured by telephone from the ~~DRA-DCP~~ will be documented in an additional memorandum.

For each non-compliance, a formal corrective action program will be established and implemented at the time the problem is identified. The person who identifies the problem will be responsible for notifying the ~~DRA-DCP~~, who in turn will notify the appropriate regulatory Project Manager. Implementation of the corrective action will be confirmed in writing as described previously.

Any non-conformance with the established QC procedures specified in the WMQAP will be identified and corrected in accordance with the WMQAP. Corrective actions will be implemented and documented. No staff member will initiate a corrective action without prior communication of findings through proper channels. If corrective actions are insufficient, the appropriate personnel may issue a stop work order.

#### FIELD CORRECTIVE ACTION

During any field activity, the field staff will be responsible for documenting and reporting all suspected technical and QA non-conformances, and suspected deficiencies. The non-conformances and/or deficiencies will be documented in the field logbook and reported to the ~~DRA-DCP~~. If the problem is associated with field measurements or sampling equipment, the field staff will take the appropriate steps to correct the problem. Typical field procedures to correct problems include the following:

- Repeating the measurement to check for error.
- Making sure the meters or instruments are adjusted properly for the ambient conditions, such as temperature.
- Checking or replacing batteries.
- Recharging batteries.
- Re-calibrating the instruments.
- Replacing the meters or instruments used to measure field parameters.
- Stopping the work until the problem is corrected (if necessary).

If a deficiency is noted during review of the Groundwater Monitoring Field Instrument Calibration Sheet, corrective action will be taken. If calibration information is incomplete or if it is determined that a meter was not properly calibrated, the Groundwater Program Manager or Staff Hydrogeologist will determine and document corrective actions. If information is missing, the Sampling Technician will be contacted and applicable field logbooks will be reviewed to determine if the information was recorded in the logbook.

Although groundwater field parameter data are screening-level data, if a meter calibration deficiency is found, associated field parameter data will be qualified as estimated. The affected field data will depend on the timing of the deficiency (i.e., pre-event, mid-day, or end-of-day). Alternatively, rather than qualifying data, the deficiency may be corrected by obtaining another field measurement.

Stabilization of specific conductivity, pH, and temperature readings is used to document completion of purging prior to groundwater sample collection. If calibration associated with the measurement of all

three of these parameters is found to be deficient, the Groundwater Program Manager or Staff Hydrogeologist will notify the DRA-DCP. The DRA-DCP will determine if the well(s) should be resampled. The deficiency and its resolution will be documented.

As stated in Sections B.4 and B.5, the analytical laboratory will provide copies of COC forms to the Groundwater Program Manager or Staff Hydrogeologist within 48 hours of sample receipt (Section B.4) or, if a deficiency is noted at sample login, at the time of receipt (Section B.5). The Groundwater Program Manager or Staff Hydrogeologist will promptly review the COC forms for completeness, proper custody, and accuracy of information (sample numbers, collection dates, and requested analyses). If a problem or deficiency is noted, the Groundwater Program Manager or Staff Hydrogeologist will provide the laboratory with a corrected COC. Timing will consider analytical method holding times. If the custody deficiency potentially requires resampling, the DRA-DCP will be notified. The DRA-DCP will determine if the well(s) should be resampled. The deficiency and its resolution will be documented.

Field corrective action may consist of additional Sampling Technician training in groundwater sampling, water elevation measurement, field meter calibration, COC, sampling packaging and shipping, documentation, or completion of field forms. All field training will be documented.

If a non-conformance or problem requires a major adjustment to the field procedures as outlined in this WMQAP (e.g., changing sampling methodology), the DRA-DCP, in conjunction with the appropriate regulatory Project Manager, will be responsible for initiating corrective actions. The DRA-DCP will be responsible for:

- Evaluating the reported non-conformance.
- Controlling additional work on non-conforming items.
- Determining the appropriate corrective actions in conjunction with the appropriate regulatory Project Manager.
- Approving all changes in writing or verbally prior to field implementation, if feasible. If deemed unacceptable, the action taken during the period of deviation will be evaluated to determine the significance of any departure from established program practices and action taken.
- Ensuring that explanations of non-conformances and corrective actions are included in the report scheduled for this program.
- Ensuring that no additional work that is dependent on the non-conforming activity is performed until the appropriate corrective actions are completed.
- Reporting all changes to all affected parties.

#### **LABORATORY CORRECTIVE ACTION**

Corrective actions are required whenever unreliable analytical results prevent the quality control as specified by the method or the laboratory WMQAP from being met. The corrective action that is taken depends on the analysis and the non-conformance. Attachment A provides a summary of the corrective actions that will be undertaken for problems associated with specific laboratory analyses.

Corrective actions are handled primarily at the bench level by the analyst who reviews the sample preparation or extraction procedures, and performs the instrument calibration and analysis. If the problem persists or its cause cannot be identified, the matter will be referred to the department supervisor or QA department for further investigation. Once resolved, full documentation of the corrective action procedure will be filed with the QA department. A summary of the corrective actions will be included in the data package submitted to EnergySolutions.

Corrective action may be undertaken if one of the following occurs:

- Loss or spillage of sample during transit to the laboratory.
- Violation of the maximum holding time before laboratory analysis.
- QC data are outside the acceptance criteria for precision and accuracy.
- Blanks contain contaminants above acceptance levels.
- A trip blank analytical result is more than 10 percent of the corresponding parameter result, and the original parameter is above its corresponding GWPL.
- Gamma-spectroscopy yields a lower limit of detection (LLD) that is not at or below 10 percent of the corresponding GWPL.
- A counting error term is reported that is greater than the corresponding approved acceptance limit.
- Undesirable trends are detected in spike recoveries (or spike recoveries are outside the QC limits), or RPDs between duplicate analyses are consistently outside QC limits.
- There are unusual changes in detection limits.
- Deficiencies are detected during QA audits.

Whether or not corrective action is taken will be dependent upon how severe the problem is, and how critical the data are to the project DQOs and the completeness goal.

#### **DATA VALIDATION CORRECTIVE ACTION**

Corrective action may be initiated during data validation or data assessment. Potential corrective actions may include requesting re-sampling by the field team or reinjection/reanalysis of samples by the laboratory.

These actions are dependent upon the ability to mobilize the field team, how critical the data are to the project DQOs, or whether the samples are still within holding time criteria. When the data validator identifies a corrective action situation, the ~~DRA-DCP~~ will be notified and will have final responsibility for contacting the appropriate State agencies and for authorizing the implementation of the corrective action, including resampling. All corrective actions of this type will be documented by the ~~DRA-DCP~~.

Field duplicate precision is evaluated as part of data validation. As stated in Section B.3, evaluation of field duplicate precision will not result in data qualification. However, if assessment of field duplicate data indicates a pattern of field duplicate precision results exceeding acceptance criteria, corrective actions will be implemented and documented as described above for field corrective action.

### **B.14 QUALITY ASSURANCE REPORTS**

All of the analytical data collected during this program will be presented in annual reports, as required by the individual permit or license. The reports will be submitted to the ~~DRA-DCP~~ and to ~~DWMRC, DWQ,~~ ~~and DSHW~~ project managers as appropriate. The following information will be included in the report:

- Sampling procedures (planned and implemented, problems, and corrective actions).
- Groundwater sampling sheets
- Analytical procedures and detection limits.
- Analytical data (environmental and QC sample results).
- Results of the data quality evaluation.
- Findings regarding any field programs, data validation, and/or laboratory corrective action needed.
- Conclusions and recommendations.

**REFERENCES**

(unchanged)

**APPENDIX F**

**Post-closure Monitoring Plan for LARW, Federal Cell Facility and 11e.(2) Disposal Cells**

## Post-Closure Monitoring Plan

### 1.0 FACILITY CONDITIONS

#### 1.1 General Description

~~Envirocare of Utah, Inc. (Envirocare)~~ EnergySolutions operates a waste disposal ~~facility facilities~~ (Site) located at Sections 5 and 32 of Township 1 South and Range 11 West, Tooele County, Utah. The Site has been licensed to receive and dispose of naturally occurring radioactive material (NORM) waste, 11e.(2) waste, ~~and Class A low-level radioactive waste (LLRW)~~, and low-activity radioactive waste (LARW). ~~Envirocare~~ EnergySolutions has also been granted a permit to receive, treat, store, and dispose of Radioactive/Hazardous waste (Mixed Waste). Additionally, ~~Envirocare~~ EnergySolutions has been granted a Ground Water Quality Discharge Permit, (GWQDP) Permit No. UGW454445, by the State of Utah, Division of Water Quality. This Plan does not attempt to satisfy the closure requirements of ~~Envirocare's~~ EnergySolutions' Radioactive Materials Licenses, the closure requirements of EnergySolutions' Envirocare's state issued RCRA Part B Permit, the closure requirements of EnergySolutions' Radioactive Material License UT2300249 or closure requirements of EnergySolutions' Envirocare's 11e.(2) License No. UT2300478SMC-1599. The portions of the EnergySolutions' Envirocare Site which are covered by this Post-Closure Monitoring Plan include the LLRW / LARW / Federally generated waste Low-Activity Radioactive Waste (LARW) Disposal Areas, LLRW compliance monitoring wells, compliance monitoring wells at the Mixed Waste Facility for radiological constituents, and compliance monitoring wells located within the 11e.(2) Disposal Area for non-radiological constituents. In addition, required sampling of Mixed Waste Landfill Cell Leachate is covered in this plan.

### 2.0 POST-CLOSURE MONITORING PROCEDURES

#### 2.1 Sampling and Analytical Procedures

Post-closure sampling at the Site will include sampling of the LLRW LARW suction lysimeters and inspection of the observation manholes for the collection lysimeters. If fluids are present in the manholes, samples will be collected. Post-closure sampling will also consist of groundwater sampling from compliance monitoring wells ~~and~~; soil sampling; ~~and vegetation sampling~~.

All LLRW LARW suction lysimeter or LLRW / LARW / Federal Cell Facility groundwater sampling procedures and methodology will comply with the approved Water Monitoring Quality Assurance Project Plan, GWQDP, Appendix B. All 11e.(2) groundwater sampling will be performed in accordance with the 11e.(2) License. Sections 11.1 and 11.2. Groundwater sampling for radiological constituents at the Mixed Waste Facility will be performed in accordance with Module VI, Ground Water Monitoring of the RCRA Part B Permit. Sampling of any fluids from the LLRW and Federal Cell Facility LARW collection lysimeters will be in accordance with the requirements of Appendix C of the GWQDP. Soil, ~~and~~ vegetation sampling will be conducted in accordance with the Environmental Monitoring Plan of Appendix R of the Application for Renewal, Radioactive Materials License No. UT2300249, dated March 16, 1998 and Appendix E to the Federal Cell Facility Application.

Groundwater sampling will be performed for all compliance monitoring wells which are required by the GWQDP. Water samples collected from monitoring wells and lysimeters will be analyzed for all groundwater protection levels (GWPLs) and other monitoring parameters as required by the GWQDP. If monitoring of groundwater for Polychlorinated Biphenyls (PCBs) is required, it shall be performed using the Test Methods, Practical Quantitation Limit (PQL), and Concentration Limits specified in Section 14 of the GWQDP, Appendix I, Plan for the Management of Waste Containing Polychlorinated Biphenyls (PCBs), and Table VI-1 of the Mixed Waste Storage and Disposal Permit #982598898.

Mixed Waste Landfill Cell Leachate sampling will be performed on a semi-annual basis. Representative samples of leachate from the upper leachate collection access pipe will be analyzed for radiological constituents as specified in the GWQDP.

All groundwater, leachate, and lysimeter sampling and analysis will be reviewed by the Groundwater Program Manager or qualified designee. The Groundwater Program Manager or designee must be familiar with the EnergySolutions' Envirocare Water Monitoring Quality Assurance Project Plan, and the requirements listed in the Radioactive Materials License, 11e.(2) License, and RCRA Part B Permit.

## 2.2 Site Inspection

The LLRW, LARW and 11e.(2) Cells will be inspected at a minimum of once every six-month period for the duration of post-closure monitoring. The Mixed Waste Landfill Cell will be inspected in accordance with Attachment II-8, Post-Closure Monitoring Plan of the RCRA Part B Permit. The LLRW, LARW, Federal Cell Facility and 11e.(2) inspection will include the following tasks:

- a. Inspection for evidence of any vandalism or mischief including any breach of the security fencing, damage to the monitoring devices or systems, deposition of any litter or wastes or any other situation which would hinder EnergySolutions' Envirocare ability to control site access or monitor the facility.
- b. The cell caps will be viewed to determine any visual evidence of settlement, erosion, burrowing animals, and vegetation. Any vegetation observed on the cap or riprap will be removed within 10 working days to prevent any damage to the structural or hydraulic integrity of the cap, and subsequent infiltration of water. Any other damage to the cell cover, i.e., settlement, erosion, burrowing, etc., will also be repaired within 10 working days.
- c. Surface drainage systems, including the drainage ditches and the dispersion area will be visually inspected for any erosion, blockage, settlement or any other condition which may prevent or impede free drainage. If such conditions are observed, corrective actions will be taken within 10 working days to restore a condition of free drainage to these areas.
- d. The observation manholes for the collection lysimeters will be inspected for mechanical integrity and security status. If fluids are present in the observation manholes, their volume and flow rate will be recorded in addition to the information required by the GWQDP. If such conditions are observed, corrective actions to restore mechanical integrity and security status will be taken within 10 working days.
- e. A report from these semi-annual inspections will be submitted to the Director Executive Secretary. The semi-annual periods will be January-June and July-December. The reports will be submitted within 30 days of the end of the semi-annual period.

## 2.3 Groundwater Monitoring



Groundwater samples will be taken from the compliance monitoring wells on an annual basis for the period of post-closure monitoring (100-year period). The annual sampling events must be conducted at least six months later than the previous year's sampling event. A report of the analytical results of groundwater sampling will be submitted in writing to the ~~Director Executive Secretary~~ within 90 days of the completion of the groundwater sampling event unless a corrective action report is required relating to groundwater under Section 3.0. Groundwater compliance will be determined by a comparison of the results of sampling to the established groundwater protection levels specified in the GWQDP.

Suction lysimeters, soil moisture instruments, and other devices will be monitored and sampled on an annual basis in accordance with the GWQDP.

In conjunction with the annual sampling event, the compliance monitoring wells will be inspected for security of the surface casing, mechanical integrity, condition of inside casing and well depth to assure the well's screens are free and open to the formation. The suction lysimeters will also be inspected for mechanical integrity and security status. If any conditions requiring corrective actions are observed, these actions will be taken within 10 working days.

#### 2.4 Closure/Post Closure Quality Assurance Procedures

All groundwater, suction lysimeter, leachate ~~and~~ soil, ~~and vegetation~~ sampling, analyses, and documentation shall be conducted in accordance with the applicable Permit and/or License as listed in Section 2.1, with the exception of PCBs. Groundwater monitoring for PCBs as required, will be conducted using the Test Methods, Practical Quantitation Limit (PQL), and Concentration Limit as specified in Section 14 of the GWQDP, Appendix I, Plan for the Management of Waste Containing Polychlorinated Biphenyls (PCBs), and Table IV-1 of the Mixed Waste Storage and Disposal Permit #982598898.

#### 2.5 Closure/Post Closure Certification

All phases of closure operations will be documented by an "As-Built" Report which has been reviewed and stamp/certified by a Utah registered professional engineer. Upon completion of closure, a certification will be provided by the engineer stating that all work has been performed in accordance with the accepted engineering plans and specification.

Surveys of the site will be performed annually during post-closure and certified by a Utah registered land surveyor or Utah registered professional engineer. Surveying will include the cap of each disposal cell, all surface drainage systems and the water level measuring point at each compliance monitoring well.

A surveying report will be submitted to the ~~Director Executive Secretary~~ on or before March 31 of each calendar year.

### 3.0 CORRECTIVE ACTION

In addition to any other corrective action that may be required under the GWQDP, the need for corrective action will be evaluated in the event that Post-Closure monitoring detects migration of constituents to the groundwater, slope settlement (any relative decrease in slope from the approved design slope between settlement monitor points) of the final cap, or any other situation which indicates a compromise of the Cells' integrity, or settlement of the drainage system (any relative decrease in grade of center line of any drainage ditch). The ~~Director Executive Secretary~~ will be notified within five days of discovery of a need for corrective action including, but not limited to, security fence repair, cap repair, drainage system repair, monitoring well replacement or implementation of an escalated monitoring of both the vadose zone and compliance monitoring wells due to the detection of groundwater or lysimeter water exceeding the protection levels. Within ten days of notifying the ~~Director Executive Secretary~~, EnergySolutions' Envirocare will submit a plan and compliance schedule to complete the corrective action.

### 4.0 NOTIFICATION REQUIREMENTS

The Utah Division of ~~Waste Management and Radiation Control and the Utah Division of Solid and Hazardous Waste~~ will be notified at least one (1) year in advance of the initiation of closure activities. EnergySolutions' Envirocare will notify the Divisions of completion of closure by the submittal of an engineers' certification of closure. The Divisions will be notified of any plans for performing Post-Closure monitoring so that representatives from the Divisions may be present.

**APPENDIX J**

**BAT Performance Monitoring Plan**

**Post-Closure Monitoring Plan**

1.0 FACILITY CONDITIONS

1.1 General Description

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**APPENDIX K**  
**BAT Contingency Plan**

## 1 INTRODUCTION

EnergySolutions, LLC (EnergySolutions) has been granted a Groundwater Quality Discharge Permit, (GWQDP) Permit No. UGW450005 hereinafter called the Permit by the State of Utah. The Permit specifies the construction, operation, and monitoring requirements for all facilities at the Clive site that have a potential of discharging pollutants that may move directly or indirectly into groundwater. To cause the maximum reduction of pollutants achievable, the Permit specifies that “Best Available Technology” (BAT) be used in the construction of all facilities and that facilities be operated according to “Best Management Practices”. To demonstrate compliance with BAT requirements and performance standards, EnergySolutions shall implement a BAT Performance Monitoring Plan in accordance with the Permit. In the event of a BAT failure at any facility, the following Contingency Plan will be implemented.

This Contingency Plan provides direction to EnergySolutions personnel as to contingency actions required for maintaining or regaining compliance with the GWQDP BAT requirements. The timely execution of contingency and corrective actions outlined in this Contingency Plan will provide EnergySolutions with the basis to exercise the Affirmative Defense provision in the Permit and thereby avoid noncompliance status and potential enforcement action.

## 2 DEFINITIONS

### **Contingency Action:**

Actions performed to eliminate an existing threat or potential threat to human health and/or the environment and regain compliance with BAT as defined in the Permit.

### **Corrective Action:**

Actions required for regaining or maintaining compliance with all licenses and permits.

### **Discharge:**

The release of a pollutant directly or indirectly into subsurface waters of the state.

### **Best Available Technology:**

The application of design, equipment, work practice, operation standard, or combination thereof, at a facility to effect the maximum reduction of a pollutant achievable by available processes and methods taking into account energy, public health, environmental and economic impacts and other costs.

### **Contingency Plan:**

A plan for regaining and maintaining compliance with the permit limits and for reestablishing best available technology as defined in the Permit.

### **Discrepancy in Pad Integrity:**

Either: 1) a crack in the asphalt or concrete with greater than 1/8 inch separation (width) or 2) any significant deterioration or damage of the pad surface.

### 3 RESPONSIBILITIES

Responsibilities are provided in the BAT Performance Monitoring Plan.

### 4 CONTINGENCY PLAN

EnergySolutions is responsible for implementing the contingency plan for any identified failure of BAT in accordance with the BAT Performance Monitoring Plan. The contingency actions required for failures of BAT are listed below by facility.

#### 4.1 All Evaporation Ponds:

##### 4.1.1 Evaporation Pond Freeboard Level at Three Feet

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.

##### 4.1.2 Evaporation Pond Freeboard Exceedance:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will immediately direct the removal of water from the pond via pumping until the minimum freeboard level is obtained, if approved water storage capacity is available. Water from the evaporation pond with a freeboard exceedance may be stored in another approved evaporation pond.
3. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
4. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
5. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

##### 4.1.3 Leakage of Pipeline from Leak Detection System to Evaporation Pond

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The pipeline will be repaired.
4. If the pipeline cannot be repaired within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
5. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

4.1.4 Average Leakage Rate at Initial Action Level:

The initial action levels for each pond are listed below:

Evaporation Pond	Initial Action Level for Average Leakage Rate (in gallons)
1995 Evaporation Pond	155
1997 Evaporation Pond	160
2000 Evaporation Pond	355
Northwest Corner Evaporation Pond	300
Mixed Waste Evaporation Pond	160

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Manager, Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The Manager, Disposal Operations will notify the Manager, Engineering and Maintenance.
4. Within five days the Manager, Engineering and Maintenance will perform a pump down test to determine the accuracy of the flow meter.
  - a. The pump down test will entail the collection of water into a container with a known capacity as it is discharged from the Leak Detection System pump pipeline.
  - b. The water in the container will be measured and compared with the Leak Detection System meter to determine the system accuracy.
  - c. A report will be prepared and submitted to the DWMRC presenting the accuracy of the pump system.

4.1.5 Average Leakage Rate Exceedance :

The allowable average leakage rate for each pond is listed below:

Evaporation Pond	Allowable Average Leakage Rate (in gallons)
1995 Evaporation Pond	162
1997 Evaporation Pond	171
2000 Evaporation Pond	382
Northwest Corner Evaporation Pond	326
Mixed Waste Evaporation Pond	171

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification and a proposed corrective action plan and schedule to the DWMRC within seven calendar days of discovery.



5. A calculation from the monitored leakage rate will be evaluated by the Manager, Engineering and Maintenance to determine the probable size and location of the leak(s). This calculation will assess if the defect can be identified by performing a visual inspection.
  - a. If the defect can be identified by visual inspection, the water level will be reduced to a level designated by the Manager, Engineering and Maintenance to bring the average leakage volume below the allowable rate. Water may be placed in an approved evaporation pond.
  - b. If the leak(s) are determined too small for visual inspection, a leak location survey will be performed. EnergySolutions will include a Leak Survey Report with the HDPE Liner Repair Report detailing how the survey was conducted and provide the survey results, including the number and location of all leaks.
6. Defects in the liner will be repaired in accordance with the corrective action plan and schedule.
7. EnergySolutions shall submit for DWMRC approval an HDPE Liner Repair Report certified by a Utah Licensed Professional Engineer certifying all liner repair and testing procedures and quality assurance activities and documentation were performed in accordance with the corrective action plan and schedule. The report shall also include an estimate of the total volume of liquids released from the pond to the subsurface.

4.1.6 Fluid Head Level Exceedance (1 Foot Level Above the Lowest Point in the Lower Flexible Membrane Liner):

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
4. The pump and process controller will be checked for proper activation within 24 hours and adjusted or replaced if necessary.
5. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.2 1995/1997 Evaporation Pond Lift Station:**

4.2.1 Water Level Above the Lowest Level of the Inlet Pipe (Visual Alarm Activated):

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The IUF, Rail Wash Facility on Track No. 2, Containerized Waste Storage Pad, and Rail Digging Facility will be placed out of service.
3. The sump will be inspected to see if functioning properly.
4. If the sump pump requires repair or replacement it will occur within the same working day.
5. An inspection of the drainage system will occur to determine if blockage is present.
6. If blockage is present it will be removed to restore free drainage.
7. When free drainage is restored, the facilities may be placed back in service.

8. If blockage cannot be removed or is not removed within the same working day, the Manager, Disposal Operations will provide notification to the Manager, Compliance and Permitting and the QAM.
9. The QAM or ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~ will provide verbal notification to the DWMRC within 24 hours of identification.
10. The ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~ will provide written notification to the DWMRC within seven calendar days of discovery.

**4.3 2000 Evaporation Pond Water Transfer Pad**

**4.3.1 Lack of Free Drainage:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Manager, Compliance and Permitting.
3. Water management activities at the transfer pad will cease.
4. An inspection of the drainage system will occur to determine if blockage is present.
5. If blockage is present it will be removed to restore free drainage.
6. When free drainage is restored, water management activities may resume.
7. If free drainage is not restored within the same working day, the Manager, Disposal Operations will notify the QAM or the Manager, Compliance and Permitting.
8. The ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~ or QAM will provide verbal notification to the DWMRC within 24 hours of identification.
9. The ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~ will provide written notification to the DWMRC within seven calendar days of discovery.

**4.3.2 Water Level in Sump Above Grate**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~.
3. Water management activities at the 2000 Evaporation Pond will cease.
4. Water will be removed from the sump.
5. When water is removed from the sump, water management activities may resume.
6. If water is not removed within the same working day, the Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
7. The Manager, Disposal Operations will notify the QAM and the ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~.
8. The QAM or the ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~ will provide verbal notification to the DWMRC within 24 hours of identification.
9. The ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~ will provide written notification to the DWMRC within seven calendar days of discovery.

**4.3.3 Discrepancy in Exposed Concrete Integrity:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.

2. The Manager, Disposal Operations will notify the QAM and the Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The Facility Operator or BAT Inspector will cease water management activities at the transfer pad.
4. The Manager, Disposal Operations will schedule repairs to the exposed pad within 48 hours after receiving notification.
5. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will submit just cause in writing to the Director.
6. Upon completion of repairs, water management activities may resume.
7. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

#### 4.4 Northwest Corner Evaporation Pond Transfer Facility:

##### 4.4.1 Tear, gap, or hole found between concrete apron and HDPE liner:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and the Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The Facility Operator or BAT Inspector will cease water management activities at the transfer facility.
4. The Manager, Disposal Operations will schedule repairs to the exposed pad within 7 days after receiving notification.
5. Repairs will be completed within 30 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will submit just cause in writing to the Director.
6. Upon completion of repairs, water management activities may resume.
7. If repairs are not performed within 30 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

##### 4.4.2 Discrepancy in Exposed Concrete Integrity:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and the Director of Regulatory Affairs Manager, Compliance and Permitting.

3. The Facility Operator or BAT Inspector will cease water management activities at the transfer facility.
4. The Manager, Disposal Operations will schedule repairs to the pad within 7 days after receiving notification.
5. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will submit just cause in writing to the Director.
6. Upon completion of repairs, water management activities may resume.
7. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

#### 4.5 Containerized Waste Storage Pad:

##### 4.5.1 Water Above the Sump Grate:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Waste management activities at the facility will cease (waste may be removed from the facility in order to maintain compliance with the Radioactive Material License).
4. An inspection of the drainage system will occur to determine if blockage is present.
5. If blockage is present it will be removed to restore free drainage.
6. When free drainage is restored, waste management activities may resume at the facility.
7. If free drainage is not restored within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

##### 4.5.2 Discrepancy in Exposed Storage Pad Integrity:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The Facility Operator or BAT Inspector will arrange for the removal of items stored within the area of the major discrepancy.
4. The Facility Operator or BAT Inspector will mark the area with a sign or painted markings.
5. No storage will occur in the marked area until repairs are complete.
6. The Manager, Disposal Operations will schedule repairs to the exposed pad within 48 hours after receiving notification.

7. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
8. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
9. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

**4.5.3 Improper Labeling or Storage of Waste:**

1. The Facility Operator or BAT Inspector will rectify and document within the same working day.

**4.6 East Truck Unloading Area:**

**4.6.1 Troughs More Than Three Quarters Full:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Waste Management activities at the facility will cease (waste may be removed from the facility in order to maintain compliance with the Radioactive Material License).
4. If blockage is present it will be removed to restore drainage.
5. When free drainage is restored, waste management activities may resume at the facility.
6. If free drainage is not restored within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
7. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide notification to the DWMRC within seven calendar days of discovery.

**4.6.2 Discrepancy in Exposed Surface Integrity:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The Facility Operator or BAT Inspector will arrange for the removal of items stored within the area of the discrepancy.
4. The Facility Operator or BAT Inspector will mark the area with a sign or painted markings.
5. No waste management will occur in the marked area until repairs are complete.
6. The Manager, Disposal Operations will schedule repairs to the exposed surface within 48 hours after receiving notification.
7. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.

8. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that repairs were not performed.
9. The Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

#### **4.6.3 Containers Without Current Date on Bates Label on Asphalt Surfaces:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Waste management activities at the facility will cease (waste may be removed from the facility in order to maintain compliance with the Radioactive Material License).
4. The container(s) will be removed from the asphalt surface
5. When the container(s) have been removed, waste management activities may resume at the facility.
6. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
7. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

#### **4.6.4 Improper Labeling or Storage of Waste on Concrete Holding Pads:**

1. The Facility Operator or BAT Inspector will rectify and document within the same working day.

### **4.7 Intermodal Unloading Facility:**

#### **4.7.1 Water Above the Sump Grate:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Waste management activities at the facility will cease (waste may be removed from the facility in order to maintain compliance with the Radioactive Material License).
4. An inspection of the drainage system will occur to determine if blockage is present.
5. If blockage is present it will be removed to restore free drainage.
6. When free drainage is restored, waste management activities may resume at the facility.
7. If free drainage is not restored within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

#### **4.7.2 Discrepancy in Exposed Pad Integrity:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The Facility Operator or BAT Inspector will arrange for the removal of items stored within the area of the major discrepancy.
4. The Facility Operator or BAT Inspector will mark the area with a sign or painted markings.
5. No storage will occur in the marked area until repairs are complete.
6. The Manager, Disposal Operations will schedule repairs to the exposed pad within 48 hours after receiving notification.
7. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
8. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
9. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

#### 4.7.3 Improper Labeling or Storage of Waste:

1. The Facility Operator or BAT Inspector will rectify and document within the same working day.

#### 4.8 Intermodal Unloading Facility Lift Station

##### 4.8.1 Water Level Above the Lowest Level of the Inlet Pipe (Visual Alarm Activated):

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The IUF, Rail Wash Facility on Track No. 2, and Rail Digging Facility will be placed out of service.
4. The sump will be inspected to see if functioning properly.
5. If the sump pump requires repair or replacement it will occur within the same working day.
6. An inspection of the drainage system will occur to determine if blockage is present.
7. If blockage is present it will be removed to restore free drainage.
8. When free drainage is restored, the facilities may be placed back in service.
9. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
10. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

#### 4.9 LARW Box Washing Facility:

##### 4.9.1 Lack of Free Drainage to the Sump Continuing to the Concrete Holding Tanks:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. The drainage system will be inspected for blockage.
5. The sump pump will be inspected to see if functioning properly.
6. If the sump pump requires repair or replacement it will occur within the same working day.
7. If blockage is present within the drainage system, it will be removed within the same working day.
8. When drainage is restored via blockage removal or sump pump repair, the facility may be placed back in service.
9. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
10. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

##### 4.9.2 Pipeline Cap from the Building Not Intact:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. Water will be removed from the sump.
5. Evaluate whether there has been a discharge from the facility. If so, implement the Emergency Response Plan.
6. The cap will be replaced.
7. When cap is replaced, the facility may be placed back in service.
8. If cap cannot be replaced within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
9. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

##### 4.9.3 Discrepancy in Exposed Concrete Integrity:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.



3. The Manager, Disposal Operations will schedule repairs within 48 hours after receiving notification.
4. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
5. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

**4.9.4 Water Level in the Holding Tanks Greater Than Three Quarters (3/4)  
Full:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. The water will be removed
5. Upon completion of water removal, the facility may be placed back in service.
6. If water cannot be removed, or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
7. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.10 Rail Wash Facility on Track No. 4:**

**4.10.1 Lack of Free Drainage to the Wash Bay Sump Pump Continuing to the  
Collection Tank(s) Within the Adjacent Equipment/Mechanics Building:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. The sump pump will be inspected to see if functioning properly.
5. If the sump pump requires repair or replacement it will occur within the same working day.
6. An inspection of the drainage system, including the concrete trench in the rail wash building will occur to determine if blockage is present.
7. If blockage is present it will be removed to restore free drainage.
8. When free drainage is restored, the facility may be placed back in service.
9. If blockage cannot be removed or is not removed within same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.

10. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.10.2 Failure of Gray Water Transfer System from the Collection Tank(s) to the 1997 Pond:**

1. The Facility Operator or BAT inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Place the facility out of service.
4. Inspect the gray water transfer system (pump and piping) to see if it is operating correctly.
5. Perform repairs or replacement of the pump if necessary within the same working day.
6. Inspect the piping system, including Manholes 1 and 2 if needed to identify damage or leakage.
7. If the gray water transfer system cannot be repaired within same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.10.3 Discrepancy in Exposed Pad Integrity:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The Manager, Disposal Operations will schedule repairs to the exposed pad within 48 hours after receiving notification.
4. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
5. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

**4.11 Rail Digging Facility:**

**4.11.1 Lack of Free Drainage of Water to the Collection Basins to the Sediment Basin:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.

4. An inspection of the drainage system will occur to determine if blockage is present.
5. If blockage is present it will be removed to restore free drainage.
6. When free drainage is restored, the facility may be placed back in service.
7. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.11.2 Water Level in the Collection Basins Above the Elevation of the Outlet Pipe Grate:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. The outlet pipe will be inspected for blockage.
5. If blockage is present it will be removed to restore free flowing condition.
6. When free drainage is restored, the facility may be placed back in service.
7. If blockage cannot be removed, or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.11.3 Water Level in the Sediment Basin Above the Elevation of the Outlet Pipe:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. The outlet pipe will be inspected for blockage.
5. If blockage is present it will be removed to restore free flowing condition.
6. When free drainage is restored, the facility may be placed back in service.
7. If blockage cannot be removed, or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.11.4 Leakage of Stormwater Detected at the Digging Facility Manhole:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.

3. The facility will be placed out of service.
4. When repairs are completed, the facility may be placed back in service.
5. If repairs cannot be made within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.11.5 Discrepancy in Exposed Asphalt Pad and Concrete Integrity:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The Manager, Disposal Operations will schedule repairs to the exposed pad within 48 hours after receiving notification.
4. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
5. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

**4.12 Decontamination Access Control Building:**

**4.12.1 Lack of Free Drainage to the Wastewater Collection Tank:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The bootwash, respirator sink, shower, and sink next to shower will be placed out of service.
4. An inspection will occur to determine if blockage is present.
5. If blockage is present it will be removed to restore free drainage.
6. When free drainage is restored, the bootwash, respirator sink, and sink next to shower may be placed back in service.
7. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

#### 4.12.2 Visual Alarms Located Inside the Building at the Bootwash and Respirator Sink Activated:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. If water is not removed from the collection tank within the same working day, the bootwash, respirator sink, shower, and sink next to shower will be placed out of service.
3. Upon completion of water removal, the out of service designation will be removed from the bootwash, respirator sink, shower, and sink next to shower.

#### 4.12.3 Water Level in the Wastewater Collection Tank Not Below the Bottom Elevation of the Inlet Pipe:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The bootwash, respirator sink, shower, and sink next to shower will be placed out of service.
4. Water will be removed from the tank.
5. Upon completion of water removal, the out of service designation will be removed from the bootwash, respirator sink, shower, and sink next to shower.
6. If water is not removed, within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
7. The Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

#### 4.12.4 Presence of Fluids in Leak Detection System:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Manager, Compliance and Permitting.
3. The bootwash, respirator sink, shower, and sink next to shower will be placed out of service.
4. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
5. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.
6. Fluid will be collected from the leak detection system.
7. Gamma Spectroscopy analysis will be performed on fluid collected to determine if radiological contamination has occurred.
8. A written report including remediation plans if necessary will be submitted to the DWMRC.

#### 4.13 Intermodal Container Wash Building:

##### 4.13.1 Water Level in the Sediment Basin Sump At or Above the Weir Gate:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.

2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. Water will be removed from the sump.
5. If water is not removed, within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.13.2 Lack of Free Drainage from the Bootwash to the Troughs:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. An inspection of the drainage system will occur to determine if blockage is present.
5. If blockage is present it will be removed to restore free drainage.
6. When free drainage is restored, the facility may be placed back in service.
7. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.13.3 Lack of Free Drainage Through the Troughs to the Sediment Basin:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. An inspection of the drainage system will occur to determine if blockage is present.
5. If blockage is present it will be removed to restore free drainage.
6. When free drainage is restored, the facility may be placed back in service.
7. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

#### 4.13.4 Presence of Fluids in Leak Detection System:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be taken out of service.
4. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
5. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.
6. Fluid will be collected from the leak detection system.
7. Gamma Spectroscopy analysis will be performed on fluid collected to determine if radiological contamination has occurred.
8. A written report including remediation plans if necessary will be submitted to the DWMRC.

#### 4.13.5 Discrepancy in Exposed Concrete Integrity:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The affected bay(s) will be placed out of service.
4. The Manager, Disposal Operations will schedule repairs to the exposed pad within 48 hours after receiving notification.
5. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
6. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
7. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

**4.14 Shredder Facility:**

**4.14.1 Lack of Free Drainage from Concrete Surface to Catchbasins:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Place the facility out of service.
4. Perform an inspection of the drainage system to determine if blockage is present. Water will be removed from the sump.
5. If blockage is present, remove blockage.
6. Place facility back in service when free drainage is restored.
7. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.14.2 Presence of Leakage from Manhole 1 Pipeline to Water Storage Tanks:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Place the facility out of service.
4. Inspect the pipeline to determine source of leak.
5. Repair the pipeline.
6. If repairs cannot be completed within the same work day that the leak was discovered, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
7. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.14.3 High Water Level Alarms Activated at the Water Storage Tank(s):**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Place the facility out of service.
4. The Manager, Disposal Operations will schedule the manual removal of water from the storage tank.
5. If the water is not removed below the high water level within the same working day that the alarm was activated, the Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.



6. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
7. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.
8. Upon completion of water removal below the high water level, the facility may be placed back in service.

**4.14.4 Valve to Alternate Wastewater Management System in Closed Position when Managing PCB Waste:**

1. The Facility Operator or BAT Inspection will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. Valve to the Rotary Dump Facility will be checked to ensure that it is in the closed position. If this valve is in the “open” position, the actions of 4.16.5, below, will be implemented.
5. The Manager, Disposal Operations, together with the Director of Regulatory Affairs Manager, Compliance and Permitting, will assess the situation and open the valve to the alternate wastewater management system prior to placing the system back in service.

**4.14.5 Valve to Rotary Dump Facility in Open Position when Managing PCB Waste:**

1. The Facility Operator or BAT Inspection will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting will determine necessary sampling activities.

**4.14.6 Facility Not Labeled for PCBs as Required:**

1. The Facility Operator or BAT Inspection will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. The Facility Operator or BAT Inspector will ensure proper labeling of facility.
5. The facility will be placed back in service.

**4.14.7 Water Storage Tank Not Labeled as PCBs as Required:**

1. The Facility Operator or BAT Inspection will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. The Facility Operator or BAT Inspector will ensure the tank is properly labeled.
5. The facility will be placed back in service.

#### 4.14.8 Discrepancy in Exposed Concrete Integrity:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will schedule repairs to the exposed pad within 48 hours after receiving notification.
3. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
4. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
5. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

#### 4.14.9 Shredded Material Remaining on the Outfeed Pad at End of Shift:

1. The Facility Operator will cease operation of the Shredder Facility.
2. The Facility Operator will notify the Manager, Disposal Operations.
3. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
4. The Facility Operator will ensure that the material is no longer susceptible to wind dispersal as follows:
  - a. Containerize shredded material; or
  - b. Cover with a nominal 6” inches of soil or soil-like waste material; or
  - c. Cover with a commercial fixative to prevent wind dispersal and leachate generation, applied in accordance with the manufacturer’s instructions.
5. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that shredded material was not removed by the end of shift.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that material was not removed from the outfeed pad by the end of the shift.
7. The Shredder Facility may not continue operation until the shredded material is removed.

#### 4.15 Rotary Dump Facility:

##### 4.15.1 Thaw Building:

##### 4.15.1.1 Discrepancy in Exposed Concrete Integrity:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.

3. The Manager, Disposal Operations will schedule repairs to the exposed pad within 48 hours after receiving notification.
4. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
5. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

**4.15.1.2 Ponding of Water on the Granular Floor Surface of the Thaw Building:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Place the facility out of service.
4. Perform an inspection of the drainage system to determine if blockage is present.
5. If blockage is present, remove blockage.
6. Place facility back in service when drainage is restored.
7. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.15.1.3 Blockage of Pipe from Thaw Building to Rotary Floor:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Place the facility out of service.
4. Remove blockage.
5. Place the facility back in service when drainage is restored.
6. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
7. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.15.2 Wash Building:**

**4.15.2.1 Discrepancy in Exposed Concrete Integrity of the curbing at the east end of the wash building:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. An absorbent material will be placed along the curbing to deter water flow past the curb.
4. The Manager, Disposal Operations will schedule repairs to the exposed pad within 48 hours after receiving notification.
5. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
6. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
7. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

**4.15.2.2 Discrepancy in Exposed Concrete Integrity:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The Manager, Disposal Operations will schedule repairs to the exposed pad within 48 hours after receiving notification.
4. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
5. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

**4.15.2.3 Integrity Breach at Surface Seal Around Footing**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Facility Operator or BAT Inspector will place the Wash Building out of service.
3. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
4. The Manager, Disposal Operations will schedule repairs to the surface seals within 48 hours after receiving notification.
5. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.

6. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
7. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

**4.15.2.4 Water Level Above Grates Within the Wash Building:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. Perform an inspection of the drainage system to determine if blockage is present.
5. If blockage is present, remove blockage.
6. Place facility back in service when drainage is restored.
7. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.15.2.5 Lack of Free Drainage from the Floor to the Trench:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The facility will be placed out of service.
4. Perform an inspection to determine if blockage is present.
5. If blockage is present, remove blockage.
6. Place facility back in service when drainage is restored.
7. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.15.3 Rotary Building**

**4.15.3.1 Discrepancy in Exposed Concrete Integrity:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting g.
3. The Manager, Disposal Operations will schedule repairs to the exposed pad within 48 hours after receiving notification.

4. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
5. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

**4.15.3.2 Lack of Free Drainage from Rotary Dump Floor to Sediment Basin (When waste management activities are not occurring):**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Place the facility out of service.
4. Perform an inspection of the drainage system to determine if blockage is present.
5. If blockage is present, remove blockage.
6. Place facility back in service when free drainage is restored.
7. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.15.3.3 Water Level Above the Grate in the Sediment Basin:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Waste management activities at the facility will cease (waste may be removed from the facility).
4. The submersible pump will be inspected to see if functioning properly.
5. If the submersible pump requires repair or replacement, it will occur within the same working day.
6. The pipeline from the submersible pump to the northwest corner evaporation pond will be inspected for blockage.
7. If blockage is present within the pipeline it will be removed.
8. When blockage of pipeline is removed and/or pump repair or replacement has been completed, the facility may be placed back in service.
9. If blockage cannot be removed and/or pump repair/replacement cannot be completed, or is not completed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.

10. The ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~ will provide written notification to the DWMRC within seven calendar days of discovery.

**4.15.3.4 Presence of Fluids in Sediment Basin Leak Detection System:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~.
3. The facility will be taken out of service.
4. The QAM or the ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~ will provide verbal notification to the DWMRC within 24 hours of identification.
5. The ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~ will provide written notification to the DWMRC within seven calendar days of discovery.
6. Fluid will be collected from the leak detection system.
7. Gamma Spectroscopy analysis will be performed on fluid collected to determine if radiological contamination has occurred.
8. A written report including remediation plans if necessary will be submitted to the DWMRC.

**4.15.3.5 Presence of Fluids in Leak Detection System for the Pipeline from Rotary Building to the Northwest Corner Evaporation Pond:**

1. The Facility Operator or BAT Inspector will return the observation valve to the closed position.
2. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
3. The Manager, Disposal Operations will notify the QAM and ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~.
4. The facility will be taken out of service.
5. The Facility Operator or BAT Inspector will close and lock the valve between the sediment basin and the Northwest Corner Evaporation Pond.
6. The Manager, Disposal Operations will notify to the ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~ of the desire to operate the facility using the Alternate Wastewater Management Area.
7. The ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~ will provide verbal notification to the DWMRC.
8. Upon completion of DWMRC notification to use the Alternate Wastewater Management System, the Rotary Dump Facility may be placed in service.
9. The QAM or the Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that fluids were present within the leak detection system.
10. The ~~Director of Regulatory Affairs Manager, Compliance and Permitting~~ will provide written notification to the DWMRC within seven calendar days of discovery.
11. Fluid will be collected from the leak detection system.
12. Gamma Spectroscopy analysis will be performed on fluid collected to determine if radiological contamination has occurred.
13. A written report including remediation plans if necessary will be submitted to the DWMRC.

**4.15.4 Alternate Wastewater Management Area (When Placed in Service and Locking Valve is in the “Open” Position)**

**4.15.4.1 Presence of Leakage from Sediment Basin Pipeline to Water Storage Tanks:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Place the facility out of service.
4. Inspect the pipeline to determine origin of leak.
5. Repair the pipeline.
6. Place facility back in service when repairs are complete.
7. If repairs cannot be repaired within the same work day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.15.4.2 Visual Alarm at One or Both Storage Tanks:**

1. The Rotary Dump Facility will be placed out of service
2. Perform manual removal of water from the collection tank.
3. If the water is not removed within the same working day, the Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
4. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
5. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.
7. Upon completion of water removal, the facility may be placed back in service.

**4.15.4.3 Ponding of Water on the Concrete Surface at the Alternate Wastewater Management Area:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Place the facility out of service.
4. Inspect the drainage system to determine if blockage is present.
5. If blockage is present, remove blockage.
6. Place facility back in service when drainage is restored.
7. If blockage cannot be removed or is not removed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.



8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.15.4.4 Discrepancy in Exposed Concrete Integrity:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The Manager, Disposal Operations will schedule repairs to the exposed pad within 48 hours after receiving notification.
4. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
5. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

**4.16 East Side Drainage System:**

**4.16.1 Stormwater Management System:**

**4.16.1.1 Catchbasin Water Level Above Outlet Pipe:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting
3. Inspect the drainage system to determine why it is not free-draining.
4. Complete repairs as needed to restore free drainage within the same working day.
5. If free drainage is not restored within the same work day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.16.1.2 Lift Sump Alarm Activated:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Inspect the alarm system to determine if functioning properly.

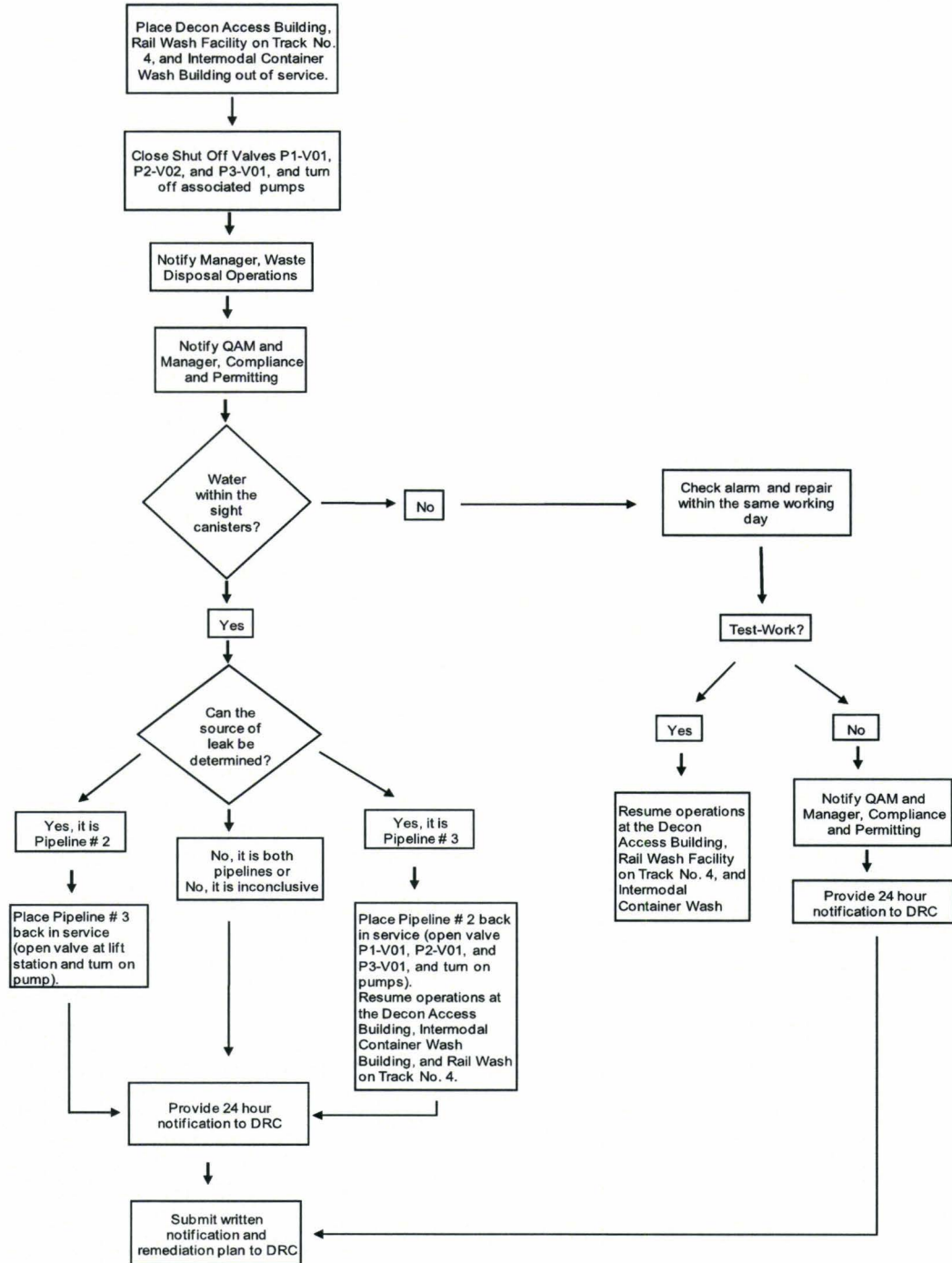
4. Inspect the sump pump(s) to determine if functioning properly.
5. If the sump pump(s) requires repair or replacement it will occur within the same working day.
6. If sump pump(s) cannot be repaired or replaced on the same working day of discovery, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
7. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.16.2 East Side Drainage System Gray Water:**

**4.16.2.1 Visual Alarm Activated at Manhole 1 (See Figure 1 of inspection form):**

1. Perform Contingency Actions in accordance with the following Flow Chart.

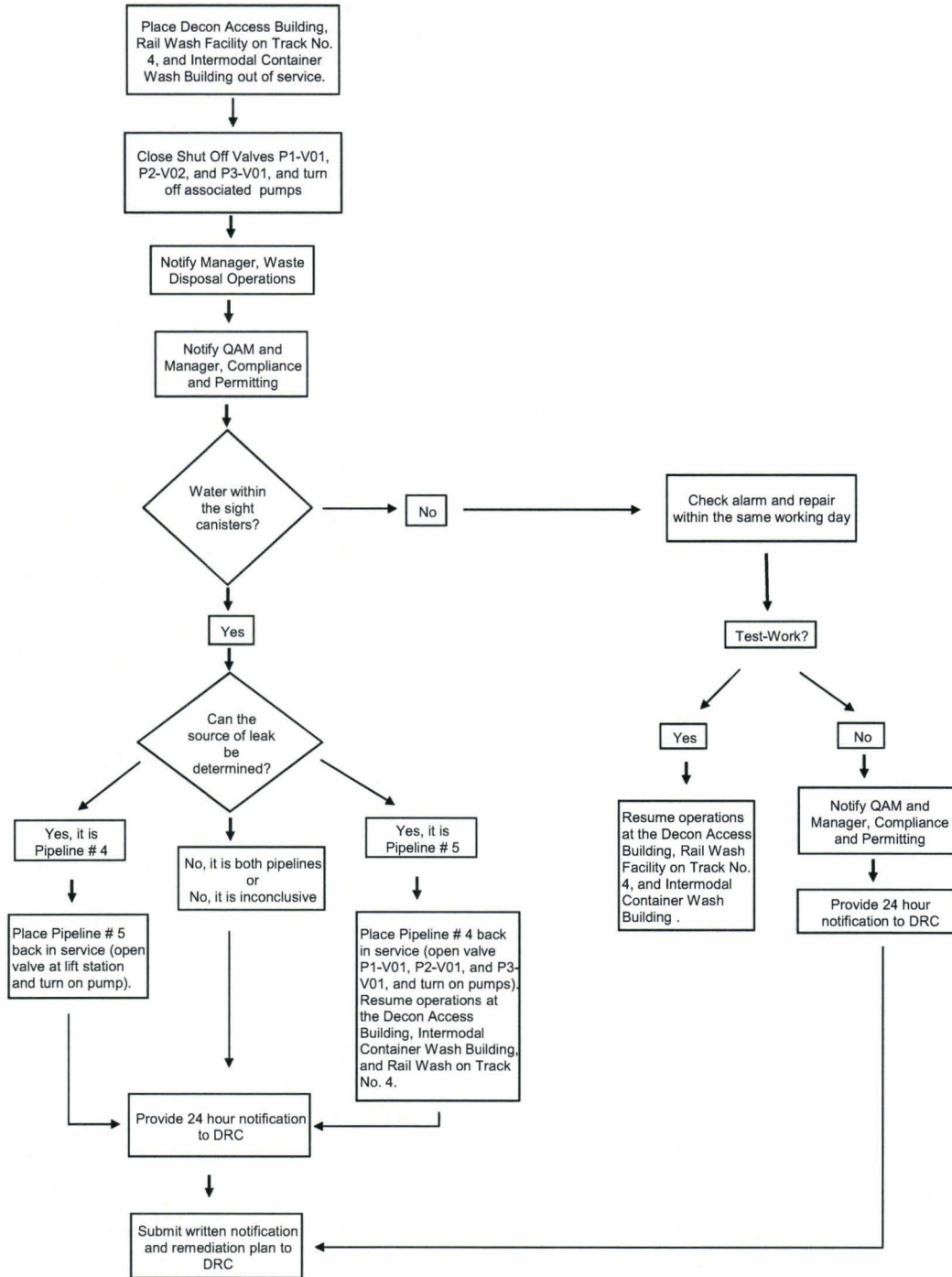
### Alarm Activated at Manhole 1



**4.16.2.2 Visual Alarm Activated at Manhole 2 (See Figure 1 of inspection form):**

1. Perform Contingency Actions in accordance with following Flow Chart.

### Alarm Activated at Manhole 2



## 4.16.2.3 Failure of the carrier pipe:

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The affected shut-off valves will be closed, and associated pumps to affected facilities will be placed out of service.
3. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting and Manager, Engineering and Maintenance.
4. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of confirmation and provide notification of manual water removal from affected facilities.
5. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.
6. The Manager, Engineering and Maintenance will schedule testing of the containment pipe(s).
7. The containment pipe(s) will be tested based on the ASTM-F1417 method.
8. Upon completion of containment pipe testing, findings will be documented and a report submitted to the DWMRC within 30 calendar days. The report will include any completed or scheduled remediation.
9. Once remediation efforts have been completed, verification of the containment pipe repairs and remediation will be performed under the direction of and certified by a certified Professional Engineer.
10. The facility will be placed back into service.

**4.17 South Ditch and Southwest Corner Pond****4.17.1 South Ditch – Pump system not functioning as designed: green light not activated when pump is present and operating:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM, Manager, Engineering and Maintenance, and Director of Regulatory Affairs Manager, Compliance and Permitting
3. The Manager, Engineering and Maintenance will schedule repairs within 48 hours after receiving notification.
4. Repairs will be completed within 14 calendar days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
5. If repairs are not performed within 14 calendar days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.17.2 South Ditch – Pump system not functioning as designed (pump is present but not operating with or without activation of green light):**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.

2. The Manager, Disposal Operations will notify the QAM, Manager, Engineering and Maintenance, and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Manual removal of water will begin within the same working day.
4. The Manager, Engineering and Maintenance will schedule repairs of the pump system within 48 hours after receiving notification.
5. Repairs will be completed within 14 calendar days of discovery or Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
6. If repairs are not performed within 14 calendar days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
7. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.17.3 South Ditch – Pump system not functioning as designed (blue light not activated when water is above the sump grate):**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM, Manager, Engineering and Maintenance, and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The Manager, Engineering and Maintenance will schedule repairs within 48 hours after receiving notification.
4. Repairs will be completed within 14 calendar days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
5. If repairs are not performed within 14 calendar days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
6. The Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.17.4 South Ditch – Grate less than 75% clear of debris (determined during monthly pump and indicator light inspection):**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. Debris removal will be completed within 48 hours of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
3. If debris removal is not performed within 48 hours of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the debris removal was not performed.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that the removal was not performed.

**4.17.5 South Ditch – Manual water removal (only required when pump is not operating or has been removed during freezing weather) not initiated the same day as identification:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will schedule manual water removal.
3. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
5. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.17.6 Southwest Corner Pond – Freeboard level less than 12 inches (determined by visual inspection), pumping to Section 5 did not begin same working day as identification:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will schedule initiation of pumping to begin within current working day.
3. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of discovery.
5. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.17.7 Southwest Corner Pond – Pumping to Section 5 stops before freeboard is greater than or equal to 12 inches:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will determine reason pumping stopped and time estimate for resumption of pumping.
3. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of discovery.
5. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

Notification for temporary stoppage (e.g., refueling pump, changing pump, removing water by tanker truck, etc.) will not be required.



**4.18 LLRW Operations Building:**

**4.18.1 High water level alarm (orange strobe) activated at the wastewater collection tank:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will schedule the manual removal of water from the storage tank.
3. If the water is not removed below the high water level by the end of the following workday after discovery, the Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting
4. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
5. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

**4.18.2 High-high-level alarm (red strobe) activated at the wastewater collection tank:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM Director of Regulatory Affairs Manager, Compliance and Permitting.
3. Place the wastewater generating systems (restricted area of the building) out of service.
4. The Manager, Disposal Operations will schedule the manual removal of water from the wastewater collection tank.
5. If the water is not removed below the high water level within the same working day of discovery, the Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
6. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
7. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.
8. Upon completion of water removal below the high water level, the facility may be placed back in service.

**4.18.3 Presence of fluids in the leak detection system**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM, Director of Regulatory Affairs Manager, Compliance and Permitting, and Manager, Engineering and Maintenance.
3. The wastewater generating systems (restricted area of the building) will be placed out of service.
4. The Manager, Engineering and Maintenance will determine the cause of the alarm and schedule repairs as needed.
5. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.

6. If repairs to the inner (primary) tank are required, the tank shall be re-certified by an independent PE before being placed back into service.
7. If the sensor is determined to be faulty, the facility may be placed back into service once it is repaired or replaced and tested.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

#### **4.19 SRS DU Storage Building:**

##### **4.19.1 Discrepancy in Exposed Asphalt Integrity:**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The Manager, Disposal Operations will schedule repairs to the exposed asphalt surface within 48 hours after receiving notification.
4. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
5. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

##### **4.19.2 Evidence of container leakage, corrosion, or deterioration**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and the Director of Regulatory Affairs Manager, Compliance and Permitting.
3. An inspection will be performed to determine corrective actions as needed i.e. overpack of containers.
4. Corrective actions shall be completed and documented within the same working day.
5. If corrective actions cannot be completed within the same working day, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
6. If corrective actions cannot be completed with the same working day, Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

##### **4.19.3 Presence of water on the asphalt surface**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will schedule water removal.
3. The Manager, Disposal Operations will notify the QAM, Director of Regulatory Affairs Manager, Compliance and Permitting, and Manager, Engineering and Maintenance.

4. An inspection will be performed to determine the source of the water and schedule repairs as needed.
5. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification.
6. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

#### **4.20 Evaporation Pond Ancillary Equipment to Facilitate Evaporation:**

##### **4.20.1 Contact wastewater spill outside of the pond and secondary containment:**

1. The Facility Operator or BAT Inspector will implement the Emergency Response Plan. Implementation automatically notifies the Manager, Disposal Operations, QAM, and Director of Regulatory Affairs Manager, Compliance and Permitting.
2. The spill will be cleaned up in accordance with the Emergency Response Plan. Initial (24-hour) and followup (7-day) reports will be made to the Director in accordance with that plan.
3. The ancillary equipment will be taken out of service until the cause of the spill has been determined and repaired.
4. Once the ancillary equipment has been repaired, 24 hour notification shall be provided to the Director prior to placing the system back into service.

##### **4.20.2 Damage to the evaporation pond liner:**

1. The ancillary equipment will be taken out of service immediately.
2. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.
3. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
4. The Manager, Disposal Operations will schedule repairs to the pond liner within 48 hours after receiving notification.
5. Once the pond liner has been repaired 24 hour notification shall be provided to the Director prior to placing the system back into service.
6. Repairs will be completed within 10 working days of discovery or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide just cause in writing to the Director.
7. If repairs are not performed within 10 working days of discovery and just cause has not been provided to the Director, the QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of identification that the repairs were not performed.
8. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of identification that repairs were not performed.

#### **4.21 Contingency Actions for Qualitative BAT Performance Standards:**

##### **4.21.1 Failure to complete inspections as required**

1. The Facility Operator or BAT Inspector will notify the Manager, Disposal Operations.

2. The Facility Operator or BAT Inspector will perform missed inspection.
3. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
4. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of confirmation.
5. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.

#### 4.21.2 Failure to Comply with Waste Disposal Location Requirements:

1. Notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of confirmation.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification to the DWMRC within seven calendar days of discovery.
5. The waste will be removed from the location and disposed of in the correct location.
6. Follow up sampling will be performed to ensure that all waste material placed incorrectly has been completely removed and a report containing sample analytical results will be submitted for DWMRC approval. Upon approval, waste placement within the sampled area may resume.

#### 4.21.3 Disposal of Unauthorized Wastes:

1. Notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification in accordance with the Permittee's Radioactive Material License.

#### 4.21.4 Failure to Construct as Per Approval Designated in I.E.3:

1. Upon discovery the Applicable Site Director or designee will be notified immediately.
2. The Applicable Site Director or designee will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting or designees.
3. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting or designee will provide verbal notification to the DWMRC.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting or designee will provide written notification in accordance with the Permittee's Radioactive Material License.

#### 4.21.5 Failure to Complete a Portion of the Disposal Cell Within the Applicable Open Cell Time Limit:

1. Notify the Manager, Disposal Operations

2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of discovery.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification and proposed corrective actions to the DWMRC within seven calendar days of discovery.

#### **4.21.6 Failure to Comply with General Stormwater Management Requirements and Performance Criteria:**

1. Notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of discovery.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification and proposed corrective actions to the DWMRC within seven calendar days of discovery.

#### **4.21.7 Failure to Comply with 11c.(2) Waste Management and Storage Requirements:**

1. Notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of discovery.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification and proposed corrective actions to the DWMRC within seven calendar days of discovery.

#### **4.21.8 Failure to Comply with LLRW Waste Management Requirements:**

1. Notify the Manager, Disposal Operations.
2. The Manager, Disposal Operations will notify the QAM and Director of Regulatory Affairs Manager, Compliance and Permitting.
3. The QAM or the Director of Regulatory Affairs Manager, Compliance and Permitting will provide verbal notification to the DWMRC within 24 hours of discovery.
4. The Director of Regulatory Affairs Manager, Compliance and Permitting will provide written notification and proposed corrective actions to the DWMRC within seven calendar days of discovery.