



State of Utah

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*Interim Director*

May 13, 2021

Vern C. Rogers, Director of Regulatory Affairs  
EnergySolutions, LLC  
299 South Main Street, Suite 1700  
Salt Lake City, UT 84111

RE: Federal Cell Application Acceptance/Completeness Review

Dear Mr. Rogers:

On April 9, 2021, EnergySolutions submitted its formal application for management of Depleted Uranium at the proposed Clive Federal Cell Facility. Included in this submission was the Depleted Uranium Performance Assessment.

The Division, in conjunction with its contractor SC&A, Inc. has performed an acceptance/completeness review of the EnergySolutions' submittal. This review was conducted following U.S. Nuclear Regulatory Commission's guidance contained within NUREG-1199 and NUREG-1200 (NRC 1991; NRC 1994). This cursory review found areas that are deemed "complete" or "acceptable." Those sections are therefore ready for technical review. Other sections of the EnergySolutions document have been deemed "incomplete" and will need revision and resubmission prior to the Division's technical review. Although many of the sections have been deemed "complete" EnergySolutions should resubmit the entire application as many pages will change and may not follow the original Table of Contents. Additionally, initial comments of a more technical nature are also provided, although a technical review was not performed. Although technical in nature, addressing these comments with the resubmission of the license application will expedite a timely review.

Please find the attached Division and SC&A, Inc. document that outlines sections of the License Application that meet acceptance/completeness criteria and those that do not.

(Over)

DRC-2021-006787

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If you have any questions regarding this letter or would like to request a meeting, please call me at (801) 536-0220.

Sincerely,



Otis H. Willoughby, Low Level Radioactive Waste Section Manager  
Division of Waste Management and Radiation Control

OHW/OW/ar

Enclosure: Acceptance/Completeness Review of *EnergySolutions*, LLC Federal Cell Facility  
Application (DRC-2021-006787)

c: Jeff Coombs, Health Officer, Tooele County Health Department  
Bryan Slade, Environmental Health Director, Tooele County Health Department  
Vern C. Rogers, Director of Regulatory Affairs, *EnergySolutions*, LLC (Email)  
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Acceptance/Completeness Review of:  
Energy Solutions, LLC



Federal Cell Facility Application for a  
Radioactive Material License Clive, Utah

April 9, 2021

*Prepared by:*

Utah Department of  
Environmental Quality  
Division of Waste Management  
and Radiation Control



SC&A, Inc.



May 13, 2021

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## **Abbreviations and Acronyms**

CAW	Class A West
CFR	Code of Federal Regulations
CQA/QC	Construction Quality Assurance and Quality Control
CTC	Cover Test Cell
DOE	U.S. Department of Energy
DU	depleted uranium
NAC	Neptune and Company, Inc.
NARM	naturally occurring and accelerator produced material
NRC	U.S. Nuclear Regulatory Commission
NUREG	U.S. Nuclear Regulatory Commission Regulation
ORNL	Oak Ridge National Laboratory
PA	performance assessment
PMF	probable maximum flood
SC&A	consultants
SRP	standard review plan
UAC	Utah Administrative Code
UDEQ	Utah Department of Environmental Quality

## 1.0 INTRODUCTION AND BACKGROUND

On April 9, 2021 EnergySolutions submitted a Federal Cell Facility (FCF) Radioactive Material License Application and a Groundwater Quality Discharge Permit, UGW450005, Modification Request to the Utah Department of Environmental Quality (UDEQ), Division of Waste Management and Radiation Control (EnergySolutions 2021). Pursuant to the U.S. Nuclear Regulatory Commission’s guidance contained within NUREG-1199 and NUREG-1200 (NRC 1991; NRC 1994), UDEQ/SC&A has performed an acceptance / completeness review of the EnergySolutions’ submittal. This report provides EnergySolutions with the results of that review.

## 2.0 METHODOLOGY

The EnergySolutions submittal contains a sizeable cover letter, the License Application, as well as Appendices A through U. As explained in the following two subsections, the approach UDEQ/SC&A utilized to review the appendices differed somewhat from that which was used to review the License Application itself.

### 2.1 License Application

Comments in this acceptance/completeness review follow the guidance from NUREG-1200, Standard Review Plan for the Review of a License Application for a Low-Level Radioactive Disposal Facility (SRP) 1.0:

*Completeness is determined by a rapid reading and screening of the entire application against the requirements of 10 CFR 61.10 through 61.16 and by comparing it to the subject **headings** in NUREG documents 1199, 1200 and 1300 and Regulatory Guide 4.18. (emphasis added; NUREG-1300 “Environmental Standard Review Plan” and Regulatory Guide 4.18 “Standard Format and Content of Environmental Reports for Near-Surface Disposal of Radioactive Waste” are for reviewing the Environmental Report, which is not the subject of this review.)*

That said, UDEQ/SC&A personnel who reviewed the April 9, 2021 License Application may have read beyond the section headings and generated comments on the substance of the sections. Whenever this has occurred, we have included those comments in this report but have identified them as technical comments. Although UDEQ does not require EnergySolutions to address these technical comments to produce an acceptably complete License Application, these comments will need to be addressed before the License Application can be approved.

### 2.2 Appendices

Since NUREG-1199 and NUREG-1200 do not provide guidance for reviewing appendices to the License Application, UDEQ/SC&A took the following approach: the primary assumption was that all appendices to the License Application could be subject to UDEQ/SC&A review; and because some of the appendices were references used in the License Application that EnergySolutions provided for the convenience of UDEQ. This resulted in the dilemma: what to do with appendices that UDEQ/SC&A has previously reviewed or with appendices that were developed by the U.S. NRC? To resolve this dilemma, UDEQ is recommending that a separate License Application Reference Library be developed by EnergySolutions, which contains all the

documents that are referenced in the Application, but do not require UDEQ/SC&A review. *EnergySolutions* should provide this Reference Library to UDEQ along with, but not part of, the revised License Application. UDEQ notes that *EnergySolutions* has utilized this approach in the past (e.g., the June 16, 2011 License Amendment Application).

The appendices were also examined to determine whether they contain sufficient information to perform their intended function. As the attachments to this report indicate, only Appendix O “Waste Characterization Plan” failed to meet this criterion. UDEQ/SC&A personnel provided completeness review comments on Appendix O and the remaining appendices, within the procedure described in Section 3.2 of this report.

### 3.0 REVIEW COMMENTS

#### 3.1 General Comments

**General-1:** For the convenience of UDEQ, *EnergySolutions* has provided a number of references that were cited in the License Application as appendices to the Application. These include, but are not necessarily limited to, Appendix B “2020 Annual Meteorologic Report (MSI, 2021),” Appendix C “Hydrogeologic Report – Bingham Environmental (1992),” Appendix G “SWCA Vegetation Study (2011),” and Appendix L “Methodologies for Evaluating Long-Term Stabilization Designs (NUREG/CR-4620).” While UDEQ appreciates having these references provided, we believe that including them as a part of the License Application would lead to confusion as to what is under review. Please remove the abovementioned appendices and any others that were provided for the convenience of UDEQ from the License Application, but that should not be reviewed by UDEQ as part of the License Application, and instead provide all references cited in Section 12 “References” as a separate License Application Reference Library.

**General-2:** In Appendix Q, *EnergySolutions* has provided the Depleted Uranium Performance Assessment (DU PA) (NAC-0024\_R4, Neptune, November 24, 2015), and all its 21 appendices that were first provided to UDEQ in November 2015, as well as several later reports prepared by NAC. In addition to Appendix Q, the License Application contains several appendices that would appear to be addressing interrogatories and concerns on the DU PA that were raised by UDEQ/SC&A, e.g., Appendix D “Phase 1 Basal-Depth Study Report and 2021 Interrogatory Responses,” Appendix N “Neptune Erosion Analysis (Neptune, 2021a),” and Appendix P “Neptune Cover Infiltration Analysis (Neptune, 2021b),” but have not been incorporated into the DU PA. For UDEQ/SC&A to review it and the Director to approve it, the DU PA must be a standalone, self-contained document, with analysis, calculations, and conclusions and recommendations that reflect the current proposed design and analysis information (i.e., not historical design and analysis information).

**General-3:** Although the title of the *EnergySolutions* transmittal letter contained the phase *Groundwater Quality Discharge Permit UGW450005 Modification Request*, UDEQ/SC&A did not identify any proposed UGW450005 modifications in the documents that we received.

**General-4:** The submittal package needs an overarching table of contents with page numbers for the appendices. It is suggested that the application package would benefit from a concise introduction explaining how the entire package is organized.

### 3.2 Specific Comments

Specific comments on the License Application itself and each of its appendices may be found in Attachment LA for the License Application and Attachments A through U for the License Application Appendices A through U.

Comments were made in four categories: Incomplete (i.e., incomplete comments may prevent UDEQ from performing a technical review), Technical (i.e., comments of a technical nature), Editorial (e.g., a section that is referenced is not provided), and References (e.g., references cited, but not included; references included, but not cited). Table 1 shows into which category each of the Attachments LA and A through U specific comments has been assigned.

**Table 1: Specific Comments Classified by Type**

Comment	Type	Comment	Type	Comment	Type	Comment	Type
LA-1	Incomplete	C-2	Tech	I-6	Incomplete	O-5	Tech
LA-2	Tech	C-3	Edit	I-7	Incomplete	O-6	Tech
LA-3.1	Tech	C-4	Edit	J-1	Tech	O-7	Tech
LA-3.2	Tech	C-5	Edit	L-1	Incomplete	O-8	Tech
LA-4.1	Tech	C-6	Edit	M-1	Incomplete	O-9	Tech
LA-4.2	Tech	C-7	Edit	M-2	Incomplete	P-1	Tech
LA-5	Tech	C-8	Edit	M-3.1	Ref	P-2	Tech
LA-6.1	Ref	C-9	Edit	M-3.2	Ref	P-3	Tech
LA-6.1	Ref	D-1	Tech	M-3.3	Ref	P-4	Ref
A-1	Tech	D-2	Edit	M-3.4	Ref	P-5	Ref
A-2	Tech	E-1	Tech	N-1	Incomplete	Q-1	Tech
A-3.1	Tech	E-2	Tech	N-3.1	Incomplete	Q-2	Tech
A-3.2	Tech	F-1	Tech	N-3.2	Ref	Q-3	Ref
A-4.1	Tech	G-1	Incomplete	N-3.3	Ref	Q-4	Tech
A-4.2	Tech	G-2	Tech	N-3.4	Ref	Q-5	Ref
B-1	Incomplete	H-1	Tech	N-4	Tech	Q-6.1	Ref
B-2	Tech	H-2	Tech	N-5	Edit	Q-6.2	Ref
B-3	Tech	I-1	Incomplete	N-6	Tech	Q-6.3	Ref
B-4	Edit	I-2	Edit	O-1	Tech	Q-6.4	Ref
B-5	Edit	I-3	Edit	O-2	Tech		
B-6	Ref	I-4	Incomplete	O-3	Tech		
C-1	Incomplete	I-5	Incomplete	O-4	Tech		

In order for UDEQ to proceed with the technical review of the License Application, it is imperative that EnergySolutions address at this time all the comments identified as Incomplete in Table 1. Comments made in the other three categories will need to be addressed by EnergySolutions in order to facilitate a timely review of the License Application.

## 4.0 CONCLUSION

After review using NUREG-1199 and NUREG-1200 guidance, UDEQ has determined that the following parts of the License Application are accepted for detailed technical review:

- The entire application, i.e., Sections 1 through 12, was accepted for technical review. However, as documented in Attachment LA “Specific Comments on the License Application,” there are numerous comments on these sections that will need to be addressed by *EnergySolutions* before the application can be approved.
- Appendix A "Suggested Radioactive Material License for the Federal Cell Facility"
- Appendix E "Revised Hydrogeologic Report – Waste Disposal Facility Clive, Utah"
- Appendix H "Federal Cell Facility Engineering Drawings"
- Appendix I "Proposed Federal Cell Facility Construction Quality Assurance/Quality Control Manual (FCF CQA/QC Manual)"
- Appendix J "Cover/Liner Construction Estimates"
- Appendix K "Drainage Ditch Calculations"
- Appendix M "Geosyntec Federal Cell Engineering Evaluation (Geosyntec, 2021)"
- Appendix R "Financial Surety Calculations"
- Appendix S "Example Standby Trust Agreements"
- Appendix T "Long-Term Stewardship Agreement for the Federal Cell Facility"
- Appendix U "Draft Memorandum of Agreement"

DEQ as determined that the following appendices are not acceptable for detailed technical review in their current form for the reasons summarized below and detailed in the attachments to this review:

- As explained in the general comments, UDEQ is required to perform a technical review of the entire application, including appendices. For various reasons, UDEQ does not believe that the following appendices to the April 9, 2021 version of the application should be subject to review as part of the application. UDEQ recommends that these and all License Application references be provided to UDEQ in a separate “reference” transmittal (similar to the approach ES utilized with the June 16, 2011 license amendment application).
  - Appendix B "2020 Annual Meteorologic Report (MSI, 2021)" – routine report, should be reviewed as part of the normal routine, not as part of the application.
  - Appendix C "Hydrogeologic Report – Bingham Environmental (1992)" – previously reviewed by UDEQ.
  - Appendix F "2020 Annual Groundwater Monitoring Report" – routine report, should be reviewed as part of the normal routine, not as part of the application.
  - Appendix G "SWCA Vegetation Study (2011)" – previously reviewed by UDEQ; UDEQ comment provided in that review need to be addressed prior to data from this report being used in the application.
  - Appendix L "Methodologies for Evaluating Long-Term Stabilization Designs (NUREG/CR-4620)" – NRC report, not subject to UDEQ review.

- The following appendices to the April 9, 2021 application are not accepted as is for review for the reasons summarized below and the specific comments provided in the attachments to this letter (see Comment General-2):
  - Appendix Q "Depleted Uranium Performance Assessment" – this DU PA was published in 2015 and does not reflect the great deal of work that ES/Neptune has done since that time (e.g., Appendices D, N, and P). Also, there is much “historical” information contained within Appendix Q, which has been superseded and needs to be removed. UDEQ recommends that Appendix Q only provide an updated DU PA (currently referred to as NAC-0024\_R4), and that all supporting documents (all other NAC documents provided in Appendix Q) be provided to UDEQ under a separate DU-PA “reference” transmittal (similar to the approach ES utilized with the June 16, 2011 license amendment application).
  - Appendix D "Phase 1 Basal-Depth Study Report and 2021 Interrogatory Responses" – This appendix is attempting to address interrogatories raised by UDEQ on the DU PA. As such, it is relevant to the DU PA but not necessarily to the rest of the application. This document should be provided to UDEQ as part of the separate DU PA “reference” transmittal.
  - Appendix N "Neptune Erosion Analysis (Neptune, 2021a)" – See and apply UDEQ remarks on Appendix D.
  - Appendix P "Neptune Cover Infiltration Analysis (Neptune, 2021b)" – See and apply UDEQ remarks on Appendix D.
- Appendix O "Federal Cell Facility Waste Characterization Plan" – UDEQ acceptance review of Appendix O identified numerous comments. We believe that the WCP currently in Appendix O pertains in a generic manner to LLRW, and it needs to be more specific to the DU that would be disposed of in the Federal Cell.

## 5.0 REFERENCES

EnergySolutions 2021. “Federal Cell Facility Radioactive Material License Application; Groundwater Quality Discharge Permit UGW450005 Modification Request,” letter from Vern C. Rogers, Director of Regulatory Affairs, to Mr. Ty Howard, Director, Utah Division of Waste Management and Radiation Control, CD-2021-052, April 9, 2021.

NRC 1991. “Standard Format and Content of a License Application for a Low-Level Radioactive Waste Disposal Facility,” NUREG-1199, Revision 2, U.S. Nuclear Regulatory Commission, January 1991.

NRC 1994. “Standard Review Plan for the Review of a License Application for a Low-Level Radioactive Waste Disposal Facility,” NUREG-1200, Revision 3, U.S. Nuclear Regulatory Commission, April 1994.

## ATTACHMENT LA — SPECIFIC COMMENTS ON THE LICENSE APPLICATION

**Comment LA-1:** To determine the completeness of the License Application UDEQ/SC&A performed a rapid reading and screening of the entire Application against the requirements of 10 CFR 61.10 through 61.16 and by comparing it to the subject headings in NUREG-1199 and NUREG-1200. Table LA-1 presents the results of that completeness review.

**Table LA-1: Completeness Review Comments**

Cmnt #	Section #	Comment
C-G-1	General	This completeness review is based on a review of the material included in the ES Federal Cell Application with the criteria provided in NUREG-1199, “Standard Format and Content of a License Application for a Low-Level Radioactive Waste Disposal Facility,” Rev. 1 (January 1988) and Rev.2 (January 1991) combined. This is not a technical review, but rather a review to determine if the application has sufficient information to satisfy the criteria set forth in NUREG-1199 for submittal of a License Application.
C-G-2	General	In the Introduction, NUREG-1199 states: “NUREG-1199 presents a format for SARs that is acceptable to the NRC staff. However, conformance is not required. The staff will accept SARs with different formats if they provide an adequate basis for the findings requisite to issuing a license. Staff review of SARs with different formats may take longer because the staff is familiar with, and its review procedures are based on, NUREG-1199.” Essentially the NRC is stating that sticking close to the format guide will lead to a more expeditious review of the document. Experience has shown that minor differences from the format guide, that the applicant feels provides a better discussion of the facility (while still meeting the guide’s content requirements), does not affect the review process.
C-1-1	1.1	The writeup provided, along with Table 1-1 and the material referenced in Appendix A, is acceptable for submittal of this part of the License Application.
C-1-2	Table 1-2	<p>NUREG-1199 is not a Rule, and it is not part of a Rule (i.e., it is not cited in 10 CFR 61); thus, instead of “Rule”, the column heading should be “NUREG-1199 Section.” Additional comments on Table 1-2:</p> <ul style="list-style-type: none"> <li>• NUREG-1199, Section 1.4 has two Application Sections against it: 1.4 and 5.4; however, there is no 5.4.</li> <li>• NUREG-1199, Sections 4.1 - 4.4 correspond to Application Sections 4.3 - 4.6. There is no Application Section 4.9.</li> <li>• NUREG-1199, Sections 6.1 - 6.3.3 all reference Application Chapter 6; this is unacceptable.</li> <li>• NUREG-1199, Section 9.1 corresponds to Application Sections 9.1 and 9.2.</li> <li>• NUREG-1199, Section 9.2 of NUREG-1199 does not exist.</li> <li>• NUREG-1199, Chapter 11 corresponds to Application Chapter 12.</li> <li>• Application Chapter 11 (“House Bill 220”) refers to NUREG-1199, Chapter 1. Comments 11-1 and 11-2 discuss Application Chapter 11.</li> </ul>
C-1-3	1.2	It is not clear how Figures 1-1, 1-2, and 1-3 are related. While Fig. 1-1 shows the Clive Facility, Fig.1-2 shows the ES property, but not where the Clive Facility is within the property. Fig. 1-3 provides no indication of where the Clive Facility is on its layout.

Cmnt #	Section #	Comment
C-1-4	1.2	The legibility/resolution of Figure 1-1 is borderline unintelligible, even when one zooms in. Fig. 1-1's title block and labels on the drawing have missing, partially missing, or faint letters. Also, the drawing states that the scale is 1" = 360'; this is incorrect. Finally, this is supposed to be a black line drawing; the figure conversion has rendered much of the material into shades of gray making it harder to read.
C-1-5	1.2	The legibility/resolution of Figure 1-2 is borderline unintelligible, even when one zooms in. While Fig. 1-2's conversion has less problems, they still exist. It is not clear on this drawing where the restricted area is.
C-1-6	1.2	The legibility/resolution of Figure 1-3 is borderline unintelligible, even when one zooms in. Fig. 1-3 is very difficult to use. In the lower left-hand corner, the scale is a smudge, and the box below it is random dots. The information in the legend is largely unreadable. The contrast of white on gray is very difficult to read. The resolution is so low that lines are jagged instead of straight, and any lettering, at best is difficult to read. These problems make it difficult to know as to where on the map is the Clive Facility.
C-1-7	1.2	The legibility/resolution of Figure 1-4 is borderline unintelligible, even when one zooms in. Fig. 1-4 is worthless. The resolution is poor, and the conversion has rendered black lines gray. Essentially little can be gleaned from this drawing.
C-1-8	1.2	Based on Comments 1-3 through 1-7, Figures 1-1 through 1-4 need to be upgraded to be acceptable or complete for review.
C-1-9	1.2	Section 1.2 of NUREG-1199 discusses land use and states that there should be a discussion with appropriate surveys, maps and aerial photography of the vicinity that is within 10 km of the site. Groundwater users, as mentioned in NUREG-1199, Section 1.2, are not identified within this zone. These items are not discussed in this part of the Application.
C-1-10	1.2	Section 1.2 of NUREG-1199 also discusses the facility description and specifically 19 different principal features. While descriptions are provided, they suffer from not following the breakout provided in the NUREG, and they reference Fig. 1-4, which, because of its poor quality, is inadequate. In addition, it is not clear that all 19 principal features are discussed. Since the SRP does require review of the 19 principal features, they should be clearly discussed in the writeup.
C-1-11	1.3	Section 1.3 appears complete.
C-1-12	1.4	Section 1.4 appears complete.
C-1-13	1.5	Section 1.5 references Section 11, but this is in error. Section 11 is: "House Bill 220." This needs to be corrected.
C-1-14	1.5	Section 1.5 states: "Other references supporting the information that the Director has previously found acceptable (noted in "blue") can be found in EnergySolutions' other radioactive material license applications, requests, permits and permit modification requests." None of the references provided are in "blue;" this needs to be clarified.
C-1-15	1.6	NUREGs, NUREG/CRs, NRC Standard Review Plans, and NRC Technical Positions are not Regulatory Guides. Only Regulatory Guides should be discussed here. Blanket statements are not acceptable. The information provided in Section 1.6 of NUREG-1199 should be followed in discussing conformance.

Cmnt #	Section #	Comment
C-1-16	1.6	If the applicant feels that it wants to discuss conformance with NUREGs, NUREG/CRs, NRC Standard Review Plans, and NRC Technical Positions, then the applicant should provide a separate section to discuss these documents. However, blanket statements are not acceptable. The information provided in Section 1.6 of NUREG-1199 should be followed in discussing conformance.
C-1-17	1.7	This section is unacceptable. The guidance provided in Section 1.7 of NUREG-1199 needs to be discussed.
C-2-1	2.1.1	Section 2.1.1 of NUREG-1199 calls for specific types of maps supplying specific information; nothing is provided.
C-2-2	2.1.1	While Section 1.2 mentions other facilities near the Clive Facility, they are not referenced in Section 2.1.1, and there is no information provided addressing the criteria in NUREG-1199.
C-2-3	2.1.2	Because there is only one permanent residence and no transient facilities within 10 km of Clive, the need for map divided into compass sectors is unnecessary. However, a map showing this location relative to Clive, should be provided. Table 2-1 states that there is 1 person at this location. Is that number correct or is there a family living there? If it is the latter, the population number should be updated.
C-2-4	2.1.2	NUREG-1199 discusses towns within 50 km of the site with populations exceeding 10,000 persons. If there are no such towns, state it.
C-2-5	2.1.2	NUREG-1199 states that the applicant should discuss the effect (if any) of the facility on the current and projected population and land use. This discussion is missing. Application Section 1.2 states: "BLM has seasonal sheep and cattle grazing allotments near Clive." This grazing falls under the definition of land use. <b>See also Comment LA-2, below.</b>
C-2-6	2.2	NUREG-1199 discusses using the local meteorological parameters to develop a design basis and for performance assessment. Nothing has been provided in this section.
C-2-7	2.3.2	The legibility/resolution of Figure 2-2 is borderline unintelligible, even when one zooms in. Fig. 2-2 title box and legend are unreadable, and the text on the diagram is also illegible. The figure needs to be upgraded to be acceptable for review.
C-2-8	2.4	Section 2.4 indicates that it does not discuss characterization of the site's basal-depth aquifer, since it is still under review. The information on the site's basal-depth aquifer will, however, need to be reviewed and approved for completeness and for technical content accuracy prior to approval of the License Application.
C-2-9	2.5	Section 2.5 says that the site's geotechnical characteristics are described in Appendix E. However, Appendix E is the revised hydrogeologic report, and it does not appear in general to discuss geotechnical characteristics, properties, processes, etc. As suggested in NUREG-1199, information on site geotechnical characteristics is needed. Without that, the Application is not complete.
C-2-10	2.6	Section 2.6 appears complete.
C-2-11	2.7.2	The section states: "While one of the two wells east of the site is in current use to water livestock, the second well has been destroyed." There needs to be a discussion as to whether the groundwater supplying the operative well is affected (and thus the livestock drinking the water) by the proximity of the Clive facility. Moreover, there are four actively pumping groundwater wells several miles east of the site, not just one. Please address the other three, as well.
C-2-12	2.7	The rest of Section 2.7 appears complete.

Cmnt #	Section #	Comment
C-2-13	2.8	Section 2.8 appears complete.
C-2-14	2.9	Section 2.9 of NUREG-1199 provides specific guidance as to what should be included in a preoperational environmental monitoring program. The applicant does not address this at all. Instead, the requirements of two Radioactive Material Licenses (UT2300249 and UT2300478) are cited. Thus, a comparison of these licenses to NUREG-1199 needs to be provided.
C-3-1	3.1	Section 3.1 appears complete.
C-3-2	Table 3-1	The only accident conditions provided in the table are for the liner’s standing water function, where the accident scenario is heavy equipment damage and downstream blockage of the drainage system. For a majority of the accident conditions listed in the table the statements: “Not required per NUREG-1199” or NA are provided. The applicant provides no basis for making these statements throughout the table. The basis needs to be provided to be acceptable for review. In NUREG-1199, Section 3.2 states: “For each of the design features, the applicant should ... (4) identify any accident scenarios used in the design ....” While the NUREG does state that for certain design features and for certain accident scenarios that no accident analysis is necessary, in other cases, it does indicate a need for discussing accident scenarios. These need to be addressed.
C-3-3	3.2	This section states: “In this Application, each of the aspects of the Federal Cell Facility principal design features has been analyzed for normal conditions, abnormal conditions, and potential accident conditions (see Tables 3-2 and 3-3). The review demonstrates that each aspect of the facility remains stable through these conditions.” Since Table 3-1 essentially discarded any accident scenarios except the liner damage or drainage blockage, and Tables 3-2 and 3-3 do not discuss either accident scenario, this statement cannot be verified.
C-3-4	3.2	Except for the need to enhance the information on accident scenarios (comments 3-2 and 3-3), Section 3.2 appears complete.
C-3-5	3.3	Section 3.3 appears complete.
C-3-6	3.4.1	The description is inadequate (see Section 3.4.1 NUREG-1199).
C-3-7	3.4.2	There is no mention of the traffic systems (see Section 3.4.2 NUREG-1199).
C-3-8	3.4.3	The Fire Protection System description is inadequate (see Section 3.4.3 NUREG-1199).
C-3-9	3.4.4	The description is inadequate (see Section 3.4.4 NUREG-1199).
C-4-1	4.1	Section 4.1 appears complete. This is additional ES waste review/certification that is outside the purview of NUREG-1199.
C-4-2	4.2	Section 4.2 appears complete. This is additional ES waste review/certification that is outside the purview of NUREG-1199.
C-4-3	4.3	Section 4.3 appears complete, per Section 4.1 of NUREG-1199.
C-4-4	4.4	Section 4.4 appears complete, per Section 4.2 of NUREG-1199.
C-4-5	4.5	Section 4.5 appears complete, per Section 4.3 of NUREG-1199.
C-4-6	4.6	Section 4.6 appears complete, per Section 4.4 of NUREG-1199.
C-5-1	5.1	Section 5.1 appears complete.
C-5-2	5.2	Section 5.2 appears complete.
C-5-3	5.3	Section 5.3 appears complete.
C-6-1	6.1	Section 6.1 appears complete. <b>See also Comments LA-3.1 and 3.2, below.</b>
C-6-2	6.2	Section 6.2 appears complete. <b>See also Comments LA-4.1 and 4.2, below.</b>

<b>Cmnt #</b>	<b>Section #</b>	<b>Comment</b>
C-6-3	6.3	Section 6.3 appears complete.
C-7-1	7.1	Section 7.1 appears complete.
C-7-2	7.2	Section 7.2 appears complete. <b>See also Comment LA-5, below.</b>
C-7-3	7.3	Section 7.3 appears complete.
C-7-4	7.4	Section 7.4 appears complete.
C-8-1	8.1	Section 8.1 appears complete.
C-8-2	8.2	Section 8.2 appears complete.
C-8-3	8.3	Section 8.3 appears complete.
C-8-4	8.4	Section 8.4 appears complete.
C-8-5	8.5	Section 8.5 appears complete.
C-8-6	8.6	Section 8.6 appears complete.
C-8-7	8.7	Section 8.7 appears complete.
C-9-1	9.1	Section 9.1 appears complete, per Section 9.1 of NUREG-1199.
C-9-2	9.2	Section 9.2 appears complete, per Section 9.1 of NUREG-1199.
C-10-1	10.1	Section 10.1 appears complete.
C-10-2	10.2	Section 10.2 appears complete.
C-10-3	10.3	Section 10.3 appears complete.
C-10-4	10.4	Section 10.4 appears complete.
C-10-5	10.5	Section 10.5 appears complete.
C-10-6	10.6	Section 10.6 appears complete.
C-10-7	10.7	Section 10.7 appears acceptable.
C-11-1	11.0, 11.1, 11.2, 11.3	These sections need to meet the guidance of Chapter 1 of NUREG-1199. In addition, these sections have some of the same problems that were discussed in the above comments, such as: physical relationship to the Clive Facility, illegibility of the drawing, and description of the facility. Essentially, comments 1-1 through 1-15 should be reviewed for applicability to these sections. There are two options: <u>1</u> - Incorporate these sections into Application Chapter 1, or <u>2</u> - Leave this as a stand-alone Application Chapter following the format of NUREG-1199, Chapter 1, with those sections that are duplicative to the material discussed in Application Chapter 1 by just referencing back to the appropriate section.
C-11-2	11.2	How is Figure 11-1 physically related to Figures 1-1 through 1-4? The legibility/resolution of the figure is borderline unintelligible, even when one zooms in. The figure comments, 1-3 through 1-7, above are also applicable here.
C-12-1	12.0	<b>See Comments LA-6.1 and 6.2, below.</b>

**Comment LA-2:** In Section 2.2.1, potential effects of the disposal facility on other important forms of nearby land use, including railroad and highway transportation, military bombing practice in areas both north and south of Clive, other embankments within Section 32, and proposed disposal of waste in a landfill just to the south of Section 32 should also be discussed.

**Comment LA-3.1:** Section 6.1 of EnergySolutions' Application contains two sentences indicating that wastes containing uranium recycled from reactor returns will be accepted for disposal at the proposed Federal Cell. EnergySolutions' needs to add to this section that this is acceptable only if these wastes are not placed in containers that have held recycled uranium previously, unless it is first verified that those

containers do not contain "heels" with TRU contaminants having heel concentrations exceeding TRU limits for LLRW.

**Comment LA-3.2:** Section 6.1.5 refers to ranch hands, hunters and OHV users as potential receptors of radionuclides within about 8 miles of Clive. These potential receptors rarely come near the site and their exposure is transitory. However, this section also needs to address potential ongoing doses to people from routine groundwater ingestion from a well that may be drilled in the future at or near Clive, perhaps hundreds or thousands of years down the road. While an analysis of dose from groundwater to people under certain specified conditions was conducted previously by Neptune, EnergySolutions needs to address this topic specifically in the Application when discussing potential receptors.

**Comment LA-4.1:** Section 6.2 is incomplete in one sense, because it does not account for pertinent requirements in Utah rule R313-25-21, which is entitled, "Protection of Individuals from Inadvertent Intrusion." This rule requires special provision for any LLRW disposal site. It requires that "design, operation, and closure of the land disposal facility shall ensure protection of any individuals inadvertently intruding into the disposal site and occupying the site or contacting the waste after active institutional controls over the disposal site are removed." Ensuring no movement onto the site or contact with the waste by an inadvertent intruder requires special engineering and security provisions. EnergySolutions needs to address this and clarify the issue.

**Comment LA-4.2:** See Comment LA-3.2.

**Comment LA-5:** Section 7.2 of NUREG-1199 states: "sources should be categorized according to isotope composition or gamma ray energy groups, strength (curie content), and geometry, and the basis for the values should be provided." That type of description appears to be missing from Section 7.2 of the Application. In addition, no mention is made of potential sources other than DU, such as DU progeny (the first two daughter products in the decay series), or TRU waste in heels in cylinders. Finally, nothing is said in Section 7.2 regarding the presence of Tc-99 and other fission products that may be present in the DU.

**Comment LA-6.1:** Table LA-2 provides citations in the Federal Cell Facility License Application text that lack proper documentation in Section 12 "REFERENCES".

**Table LA-2: Citations in the Text Without Section 12 "REFERENCES"**

Page	Cited Document	Date in Citation	Page	Cited Document	Date in Citation
iii	Bingham Environmental	1992	3-4	AMEC	2012a,b
iii	Neptune	2021b	3-5	AMEC	2012a,b
1-22	NRC	1982	3-1*	Western Region Climate Center	2000
2-8	Willoughby	2021	3-1*	RBG	2020
2-8	Bingham Environmental	1992	3-1*	Whetstone	2005
2-10	Utah Seismic Safety Commission	2003	3-1*	Neptune	2020
2-12	Bingham Environmental	1996	3-4*	Neptune	2020
2-18	Oviatt	2020	3-9	AMEC	2012a,b
2-19	BLM	2012a	3-9	AMEC	2012a,b
2-21	Bingham	1994	3-9	AMEC	2012a,b
2-21	Bingham	1994	3-9	AMEC	2012a,b

Page	Cited Document	Date in Citation	Page	Cited Document	Date in Citation
2-24	BLM	2012a	3-10	AMEC	2012a,b
2-25	BLM	2012b	6-17	Willoughby	2021
2-25	BLM	2012b	6-18	Willoughby	2021
2-25	BLM	2012b	7-2	NRC	2010
2-25	BLM	2012b	7-2	Rich et al.	1998
3-4	AMEC	2012a,b	* means "repeat-pagination" error		

For each item cited above, please provide the correct information in both the References section and in the citation, making sure that the two correspond properly, and provide an electronic copy of the reference to the Division.

**Comment LA-6.2:** Following is a list of seven (7) documents provided in the License Application, Section 12 "References," that are not cited in the text of the Application:

Anderson, S.T. "Response to Question Regarding Tri-Party Agreement for Depleted Uranium Disposal. Letter from the Utah Division of Waste Management and Radiation Control to Vern Rogers of EnergySolutions, August 9, 2017. (Anderson, 2017).

Anderson, S.T. "Response to April 2, 2018 Correspondence." Letter from the Utah Division of Waste Management and Radiation Control to Vern Rogers of EnergySolutions, June 13, 2018. (Anderson, 2018).

Bingham Environmental. Hydrogeologic Report Addendum 1 for Clive Facility, Clive, Utah, June 1992, (Bingham, 1992b).

Bingham Environmental. Hydrogeologic Report Addendum 2 for Clive Facility, Clive, Utah, July 1992, (Bingham, 1992c).

Neptune. "Clive DU PA Model—Response to DWMRC 1-28-2021 Comments". Neptune, April 5, 2021, (Neptune, 2021c).

NOAA. "NOAA Atlas 2 Precipitation Frequency Estimates in GIS Compatible Formats." Accessed at <http://www.nws.noaa.gov/oh/hdsc/noaaatlas2.htm> on 20 October 2012. (NOAA, 2012).

URS. "Evaluation of Closure, Post-Closure, and Perpetual Care and Maintenance for Commercial Hazardous and Commercial Radioactive Waste Treatment, Storage and Disposal Facilities." (URS, 2015).

For each reference listed above, please provide the correct information in both the citation and in the References section, making sure that the two correspond properly.

## ATTACHMENT A — SUGGESTED RADIOACTIVE MATERIAL LICENSE FOR THE FEDERAL CELL FACILITY

Appendix A of the application contains EnergySolutions' suggested radioactive material license. The following comments describe elements of the subject report that were found to be incomplete.

**Comment A-1:** Item 10.A of the Proposed License states: “The Licensee may receive, transload closed packages and store licensed materials within certain portions of the Licensee’s facility ...” (emphasis added). Please define which portions of the Licensee’s facility would be subject to this license.

**Comment A-2.1:** Item 11, Condition, of the Proposed License states: “The open cell area within the Federal Cell Facility, where uncovered waste disposal/placement has occurred shall be limited to a waste surface area of 1,376,113 square feet.” Since DU would only be disposed of “beneath the Embankment’s top slope” (Application, p 1-20) and since the total area under the top slope is 1,376,113 ft<sup>2</sup>, this Condition places no limitation on the amount of uncovered waste. UDEQ recommends deleting this misleading Condition.

**Comment A-2.2:** EnergySolutions needs to provide analysis for open-cell area and the time over which the cell areas can be open. There is no justification given for the proposed open-cell limits.

**Comment A-3.1:** Item 10.B defines the FCF by the four corners of the Federal Cell. Alternatively, Radioactive Material License UT 2300249 defines the Licensee’s Facility as Section 32, which includes not only the Class A West disposal cell, which is referred to as the LLRW Facility, but also the Containerized Waste Facility, the West Rail Spur and Unloading Facility, the Mixed Waste Facility, etc. If EnergySolutions intends to utilize any onsite facilities, other than the Federal Cell Facility, for the unloading, handling, processing, etc. of DU, then those facilities must also be included in the FCF License.

**Comment A-3.2:** The groundwater discharge permit (UGW 450005) has the coordinates for the corners of each cell in Section 32; these are going to be moved to the licenses, including the FCF License. UDEQ recommends that positions be given as Universal Transverse Mercator (UTM) rather than latitude and longitude, as UTM is considered more accurate.

**Comment A-4.1:** As an adjunct to Comment A-2, it is an open-cell time limit, along with the open-cell area limit, that is of interest to the Director. The open-cell limit will need to be negotiated between EnergySolutions and the Director before the License Application can be approved. The open-cell time limit is an important aspect of the performance of the proposed DU disposal site that will require careful analysis. An open-cell time limit is not currently included in the License Application or in the Groundwater Quality Discharge Permit.

**Comment A-4.2:** As provided, the April 9, 2021 License Application does not contain an analysis to define and justify an open-cell area or time limit. Before the Application can be approved, such an analysis must be provided to UDEQ.

## **ATTACHMENT B — 2020 ANNUAL METEOROLOGIC REPORT (MSI, 2021)**

Appendix B of the application contains a copy of a Trinity Consultants' report (Project 214501.0003) titled "January 2020 and December 2020 and January 1993 through December 2020 Summary Report of Meteorological Data Collected at EnergySolutions' Clive, Utah Facility", dated February 18, 2021. The following comments describe elements of the subject report that were found to be incomplete.

**Comment B-1:** See comment General-1 regarding inclusion of Appendix B in the License Application.

**Comment B-2:** Each of the appendices to MSI, 2021, which contain the hourly data, have been truncated, such that not all of the data is provided. Please provide all the hourly data. In addition, headers are cut off from some tables such that it is not possible to identify the nature of the data being presented in columns below these cut-off headers.

**Comment B-3:** MSI (2021), Figure 2-1, presents a wind rose based upon data from January 1993 through December 2020. For the DU PA (Appendix Q), NAC-0021\_R2 (Neptune, 5 November 2015), Figure 1 presents a wind rose based on a single year's data, January through December 2009. How would the expanded meteorological data provided in MSI (2021) affect the results provided in the DU PA?

**Comment B-4:** The document provided to the Division is not searchable. Please provide all submitted documents in searchable format.

**Comment B-5:** The information on the document cannot be copied and then pasted as understandable English text, e.g., as might be used in a review document. Instead, when copied and pasted, an incomprehensible batch of letters and symbols is produced. The document does not appear to be set up properly to be part of a License Application submission.

**Comment B-6:** Below are three entries in Appendix B "REFERENCES" with URLs that do not connect to an active Web site. These items also have no corresponding citations in the main text.

National Renewable Energy Laboratory. Dynamic Maps, GIS Data, and Analysis Tools. Available from: [http://www.nrel.gov/gis/images/map\\_pv\\_us\\_june\\_dec2008.jpg](http://www.nrel.gov/gis/images/map_pv_us_june_dec2008.jpg)

U. S. Department of Commerce, National Oceanic and Atmospheric Administration National Climate Data Center, Cooperative Summary, Dugway, Utah. Available from <http://www7.ncdc.noaa.gov/IPP/getcoopstates.html>.

Western Region Climate Center. Climatological Summary, Dugway, Utah. Available from: <http://wrcc.dri.edu/climatedata.html>.

**ATTACHMENT C — HYDROGEOLOGIC REPORT – BINGHAM ENVIRONMENTAL (1992)**

Appendix C of the application contains copies of several reports prepared by Bingham Environmental (Projects 1675 and 1416). An initial report is titled “Hydrogeologic Report, Mixed Waste Disposal Area”, dated July 13, 1992 (Project No. 1675-002). This report is followed by several addendums and a supplemental report. The first is titled “Addendum #1 to Hydrogeologic Report Envirocare Waste Disposal Facility”, dated January 31, 1992, revised June 1992 (Project No. 1416-018). The second is titled “Addendum #2 to Hydrogeologic Report Envirocare Waste Disposal Facility”, dated July 27, 1992 (Project No. 1416-024). The third and last is titled “Supplement to Addendum #2 to Hydrogeologic Report Envirocare Waste Disposal Facility”, dated October 30, 1992 (Project No. 1416-034).

The following comments describe elements of the subject reports that were found to be incomplete.

**Comment C-1:** See comment General-1 regarding inclusion of Appendix C in the License Application.

**Comment C-2:** Supplement to Addendum #2 contains old groundwater gradient and other calculations, and water quality data from the 1990s. The calculations and water quality data should be reviewed to see if they are up to date, what they are supporting is not clear.

**Comment C-3:** There are a number of packages of documents that appear to be orphans following the Addendum #1 report. Each package is preceded by a cover page with an identifying title. The following table lists each package. These document packages are not listed in the table of contents for Addendum #1. Please confirm the packages are not orphans or misplaced.

**Table C-1: Document Packages Not Listed in Addendum #1 Table of Contents**

<b>PDF starting page</b>	<b>Package Title</b>
1217	Existing LARW Cell Compliance Monitoring Wells Sampling Event 3, Chemical Analyses
1228	Existing LARW Cell Compliance Monitoring Wells Sampling Event 1, Radiological Analyses
1234	Existing LARW Cell Compliance Monitoring Wells Sampling Event 2, Radiological Analyses
1239	Existing LARW Cell Compliance Monitoring Wells Sampling Event 3, Radiological Analyses
1243	Existing LARW Cell Compliance Monitoring Wells, Additional Groundwater Quality Analyses, GW-16 and I-2-30
1250	Groundwater Quality Analyses, Future LARW Cells, Compliance Monitoring Wells
1259	Groundwater Quality Analyses, Future LARW Cells, Compliance Monitoring Wells, Radiological Analyses

PDF starting page	Package Title
1268	Groundwater Quality Analyses, Other Relevant Monitor Wells (GW-1 through GW-8)
1280	Groundwater Quality Analyses, Other Relevant Monitor Wells (GW-17A, GW-18, GW-19B, GW-21, and I-1-30)
1293	Groundwater Quality Analyses, Other Relevant Monitor Wells (SC-1 through SC-5)
1305	Groundwater Quality Analyses, Other Relevant Monitor Wells (SC-201 through SC-206)

**Comment C-4:** Appendices C and D of the Addendum #2 report are missing. Please revise Appendix C of the application to include these misplaced documents.

**Comment C-5:** Appendix B of the Supplement to Addendum #2 report is missing. Please revise Appendix C of the application to include this misplaced document.

**Comment C-6:** There appears to be the following misplaced or orphaned documents. Starting at PDF page 1547 and continuing for 307 pages, there appears to be misplaced and repeated portions of Addendum #2. In general, see the same sequence of pages starting on PDF page 1339. Please reconsider the organization of these pages.

**Comment C-7:** There appears to be the following misplaced or orphaned documents. Starting at PDF page 1855 and continuing for 3 pages, there is a Figure 3 and four tables that are misplaced or orphaned. Please reconsider and/or revise the presentation.

**Comment C-8:** There appears to be misplaced documents in the application. Starting at PDF page 1882 and continuing for 260 pages, there appears to be misplaced and repeated portion of Addendum #2. In general, see the same sequence of pages starting on PDF page 1319. Please reconsider the organization of these pages.

**Comment C-9:** There appears to be misplaced documents in the application. Starting at PDF page 2143 and continuing for 64 pages, there appears to be a misplaced and repeated portion of the Appendix Supplement to Addendum #2. In general, see the same sequence of pages starting on PDF page 1481. Please reconsider the organization of these pages.

## ATTACHMENT D — PHASE 1 BASAL-DEPTH STUDY REPORT AND 2021 INTERROGATORY RESPONSES

Appendix D of the application contains an *EnergySolutions* report titled “Phase 1 - Final Basal-Depth Aquifer Study Report and Responses to Round 2 Interrogatories”, dated February 18, 2021. The *EnergySolutions* report is followed by two documents prepared by Stantec Consulting Services, Inc. (Stantec) including an Exhibit 1 titled “Responses to Interrogatory”, dated March 10, 2021, and the Exhibit 2 titled “Phase 1 Basal-Depth Aquifer Study Report, Clive Disposal Facility”, dated March 13, 2020. The following comments describe elements of the subject report that were found to be incomplete.

**Comment D-1:** It is not clear who the qualified professional(s) is that prepared and authored the initial 16 pages of Appendix D. This is a portion entirely on *EnergySolutions* letterhead. It is important that Stantec concurs with the content of the initial 16 pages. Please indicate the individual(s) that are responsible for technical responses and conclusions contained in these pages of Appendix D.

**Comment D-2:** This comment pertains to citations and references in Appendix D of the License Application. Appendix D is divided by *EnergySolutions* into two sections. The first section is “Phase 1 - Final Basal-Depth Aquifer Study Report and Responses to Round 2 Interrogatories,” prepared by *EnergySolutions*. The second section is entitled “Exhibit 1 to Appendix D: Stantec Response to the Division’s January 15, 2021 Interrogatory,” prepared by Stantec (2021). The first section is addressed here first.

Table D-1 provides citations in the Federal Cell Facility License Application text that lack proper documentation in Section 12 “REFERENCES”.

**Table D-1: Citations Without Proper Corresponding References in “REFERENCES”**

Page	Cited Document	Date in Citation	Note (Comparison with REFERENCES)
D-2	Stantec	2019	Reference employs a different name
D-2	DOE	1984a	Uncertain; date in REFs has no letter suffix
D-2	DOE	1984b	Uncertain; date in REFs has no letter suffix

For completeness, please provide the correct, matching information in the text (citation) and in the REFERENCES section.

### **Ambiguous Entries in “REFERENCES” Section of Appendix D Document:**

For the sake of completeness, each appendix of a License Application should have clear and unambiguous references. This helps prevent confusion during reviews by regulators and the public.

- (1) None of the following three entries in “REFERENCES”, while having the same authorship and date, have a letter suffix following the date that would allow for differentiation when reading the citation DOE (1984), or, for that matter, DOE (1984a) or DOE (1984b):

DOE. “Final Environmental Impact Statement of Remedial Actions at the Former Vitro Chemical Site, South Salt Lake, Salt Lake County, Utah.” (DOE/EIS-0099-F) U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, July 1984.

DOE. “Remedial Action Plan and Site Conceptual Design for Stabilization of the Inactive Uranium Mill Tailings Site at Salt Lake City, Utah.” (UMTRA-DOE-/EA-0141.0000) U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico. 1984.

DOE. “Final Environmental Impact Statement - Remedial Actions at the Former Vitro Chemical Company Site South Salt Lake, Salt Lake County Utah.” (DOE/EIS-0099-F). U.S. Department of Energy. July 1984. Vol2. Pg. D-92.

Please check the naming and document information associated with the first and third references. The references each have the same DOE document number. Both are dated July 1984. The titles, as written, are similar, but not identical, as written. The word “of” is missing in the third reference, and the punctuation in the title of the third reference is different than in the first. One reference says Vol2, whereas the other has no volume number associated with it. One has a publication place or location; the other does not. One has a page number; the other does not.

The citations given in the text, DOE (1984a) and DOE (1984b), have letter suffixes, whereas the corresponding DOE entries in the “REFERENCES” section, while having the same year, do not have differentiating suffixes. It is therefore not apparent, based on the citation format, which citation goes with which reference. Please use dates with added letter references when the year and author are the same for two or more references.

- (2) To be consistent with the other references as written in the REFERENCES section, and to allow reviewers to quickly find the reference associated with the specific citation given as (Eyzaguirre, 2021), the reference “Personal Communication. Susan Eyzaguirre, Stantec. January 22, 2021” should be rewritten to start with the author or the source of the information, i.e., “Eyzaguirre, S.”, consistent with the treatment for the other references. This entry should thus be alphabetized in the “E” section of the REFERENCES section. The name of the source should be followed by the nature of the information, i.e., “Personal Communication, January 22, 2021.”
- (3) The following three entries, while all pertaining to the same company, have two different company names (i.e., Stantec and Stantec Consulting Services Inc) written for the company in different references, as follows:

Stantec Consulting Services Inc, 2021. Responses to the Division’s January 15, 2021 Interrogatory. March 10, 2021.

Stantec, 2020. Phase 1 Basal-Depth Aquifer Study Report – Final, Revised, v2, September 30, 2020, prepared for and Submitted to EnergySolutions, EnergySolutions, LLC by Stantec Consulting Services, Inc., Salt Lake City, Utah.

Stantec Consulting Services Inc, 2019. Clive Facility Basal (Deep) Aquifer Characterization Work Plan. October 1, 2019.

Please use a single author/source name for a single company consistently. This way, reviewers not fully familiar with the company can know, rather than simply assume, that these entries are all authored or sourced by the same company.

The second section is entitled “Exhibit 1 to Appendix D: Stantec Response to the Division’s January 15, 2021 Interrogatory.” The following are some of the issues related to citations and references in this section.

**Table D-2: Citations in Text Without Corresponding References in “REFERENCES”**

<b>Pg.</b>	<b>Cited Document</b>	<b>Citation Date</b>	<b>Note (Comparison with REFERENCES)</b>
10	AQTESOLVE	1998-2020	AQTESOLV’s a model, but this appears like a citation
13	Neuman-Witherspoon	1969	w/ letter suffix in REFERENCES; not in citation
13	Neuman-Witherspoon	1969	Date w/ letter suffix in REFERENCES; not in citation
13	Cooper-Jacob	1946	Not found in REFERENCES section
13	Theis	1935	Not found in REFERENCES section
13	Cooper-Jacob	1946	Not found in REFERENCES section
13	Theis	1935	Not found in REFERENCES section
13	Cooper-Jacob	1946	Not found in REFERENCES section
13	Theis	1935	Not found in REFERENCES section
13	Cooper-Jacob	1946	Not found in REFERENCES section
13	Theis	1935	Not found in REFERENCES section
14	Neuman-Witherspoon	1969	Date w/ letter suffix in REFERENCES; not in citation
14	Cooper-Jacob	1946	Not found in REFERENCES section
14	Cooper-Jacob	1946	Not found in REFERENCES section
14	Cooper-Jacob	1946	Not found in REFERENCES section
14	Theis	1935	Not found in REFERENCES section
14	Cooper-Jacob	1946	Not found in REFERENCES section

14	Theis	1935	Not found in REFERENCES section
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For completeness, please provide the correct, matching information for each citation in the REFERENCES section.

## **ATTACHMENT E — REVISED HYDROGEOLOGIC REPORT – WASTE DISPOSAL FACILITY CLIVE, UTAH**

Appendix E of the application contains an *EnergySolutions* report titled “Revised Hydrogeologic Report – Waste Disposal Facility, Clive, Utah, Version 4.0”, dated January 15, 2019. The following comments describe elements of the subject report that were found to be incomplete.

**Comment E-1:** The Revised Hydrogeologic Report is submitted every five years in support of renewal of the Groundwater Permit. This report has not been technically reviewed by UDEQ or accepted by the Director. Its review was put on hold with Permit renewal. If this Report is to be referenced in the FCF License Application, it will need to be technically reviewed as part of the Application acceptance process.

**Comment E-2:** It is not clear who the qualified professional(s) are that prepared and authored the report of Appendix E. Please indicate the individual(s) that are responsible for the technical conclusions contained in the subject report.

## **ATTACHMENT F — 2020 ANNUAL GROUNDWATER MONITORING REPORT**

Appendix F of the application contains an *EnergySolutions* report titled “2020 Annual 11e.(2), LARW, Class A West, and Mixed Waste Groundwater Monitoring Report”, dated February 25, 2021. The UDEQ is in the process of reviewing this report, but it has not been accepted or approved by the Director. Since Appendix F is being already being reviewed, UDEQ recommends that Appendix F be deleted from the License Application and instead be provided as part of the License Application Reference Library.

**Comment F-1:** The 2020 Annual Groundwater Monitoring Report has not been technically reviewed by UDEQ or accepted by the Director. If this Report is to be referenced in the FCF License Application, it will need to first be technically reviewed as part of the Application acceptance process.

## **ATTACHMENT G — SWCA VEGETATION STUDY (2011)**

Appendix G of the application contains a report prepared by SWCA Environmental Consultants (SWCA) titled “Field Sampling of Biotic Turbation of Soils at the Clive Site, Tooele County, Utah”, dated January 12, 2010 (sic). The following comments describe elements of the subject report that were found to be incomplete.

**Comment G-1:** See comment General-1 regarding inclusion of Appendix G in the License Application.

**Comment G-2:** UDEQ has previously provided ES with comments on the 2011 SWCA Vegetation Study. Before the results from the 2011 SWCA Vegetation Study can be accepted, the ES responses to the UDEQ comments must be evaluated and agreed to by UDEQ.

## ATTACHMENT H — FEDERAL CELL FACILITY ENGINEERING DRAWINGS

Appendix H of the application contains engineering drawings prepared by EnergySolutions that depict the design of the Federal Cell Facility. The table below is a list of 11 drawings that have been submitted for the Federal Cell Facility. This list was prepared from the May 4, 2019 Preliminary Review Draft application as well as the April 9, 2021 application. Several drawings are missing from this application and several drawings recently included with the application are believed to be for a project other than the Federal Cell Facility. More detailed completeness comments are included after the table.

**Table H-1: Federal Cell Facility Engineering Drawings**

Drawing No.	Drawing Date	Drawing Title	Comment
14004-G01	—	Project Title Sheet	See comment H-1
14004-C01	2/19/2021	Embankment Features and Controls	No comment at this time
14004-C02	—	Embankment Cross-Sections	See comment H-1
14004-C03	2/19/2021	Sections and Details, 1 of 3	No comment at this time
14004-C04	2/19/2021	Sections and Details, 2 of 3	No comment at this time
14004-C05	—	Sections and Details, 3 of 3	See comment H-1
10004-C05	3/24/2021	CAW, Active CWF & LC Areas, Area & Haul Road Layout	See comment H-2
10004-C06	3/24/2021	CAW, Active LG Component Area, LG Component Area Plan and Details	See comment H-2
14004-U01	4/5/2021	Disposal Cell Buffer Zone	No comment at this time
14004-U02	2/19/2021	Disposal Cell Waste Limits-Latitudes & Longitudes	No comment at this time
14004-U03	3/24/2021	Subdivision Parcel Map	No comment at this time

**Comment H-1:** Three drawings in the table above with this comment were not included with Appendix H of the Application. Please provide these drawings with the application.

**Comment H-2:** Two drawings in the table above with this comment appear to be for a project other than the Federal Cell Facility. Please explain how they are pertinent to the Federal Cell Facility or remove them from the application.

**Comment H-3:** Drawings for site remediation and site closure were not included.

## ATTACHMENT I — PROPOSED FEDERAL CELL FACILITY CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL MANUAL

Appendix I of the application contains the proposed “Federal Cell Facility Construction Quality Assurance / Quality Control Manual” (FC CQA/QC Manual), Revision 0, dated April 9, 2021. The following comments describe elements of the FC CQA/QC Manual that were found to be incomplete.

**Comment I-1:** The Federal Cell Facility Construction Quality Assurance / Quality Control Manual (FC QA/QC Manual) is not complete because it does not appropriately indicate the type of waste that will be disposed of in the proposed Federal Cell. The FC QA/QC Manual contains many references to disposal of waste in the Federal Cell inconsistent with what EnergySolutions has indicated to the Division would be the type of waste disposed of and the manner of waste disposal. The only type of waste that should be discussed in the FC QA/QC Manual for this Application is DU waste disposed of in cylinders or drums. These cylinders or drums would be separated from one another by intervening CLSM fill. Inconsistencies in this Appendix render this part of the Application incomplete because the Appendix does not correctly indicate the waste to be disposed of. These inconsistencies include inappropriate mention for inclusion in the proposed Federal Cell of “bulk waste”, “native material [that] may be used as fill during waste placement”, “fill or backfill material [that] may consist of licensed waste, native material, or other materials from off-site sources”, “the waste material [that] will be placed in lifts with a compacted average thickness not exceeding 12 inches”, etc.). The Division has previously requested that mention of such wastes be scrubbed from the document. The FC QA/QC manual must be revised to apply to disposal in the proposed Federal Cell of only DU waste in cylinders or drums with intervening CLSM. No other waste or fill between waste containers is acceptable.

**Comment I-2:** It is unclear why Table 1 - *CQA/QC Activities*, which is essentially a table of contents for the FC CQA/QC manual, indicates 94 pages, while there are only 92 total pages and the manual itself indicates a sequence of 110 pages. Were the additional pages inadvertently left out or are these simply typographical errors? Please confirm and revise as necessary.

**Comment I-3:** The designation of Table 1 has been used for two different tables. One as described above in Comment I-2 and the other table is identified as Table 1 – *Material Specifications for Portland Cement CLSM*. Please review and revise as necessary.

**Comment I-4:** Figure 1 - *Federal Cell Settlement Monuments* of the FC CQA/QC manual has not been included with the application. Please review and revise as necessary.

**Comment I-5:** Appendix A - *List of CQA/QC Documentation Forms* of the FC CQA/QC manual has not been included with the application. Please review and revise as necessary.

**Comment I-6:** Appendix B - *Testing Methods* of the FC CQA/QC manual has not been included with the application. Please review and revise as necessary.

**Comment I-7:** Appendix C - *Rock Quality Scoring* of the FC CQA/QC manual has not been included with the application. Please review and revise as necessary.

## **ATTACHMENT J — COVER/LINER CONSTRUCTION ESTIMATES**

Appendix J of the application contains the proposed Cover/Liner Construction Estimates for the Federal Cell Facility. The following comments describe elements of the construction estimates that were found to be incomplete.

**Comment J-1:** The two pages of estimates do not indicate which set of design drawings the estimates are based on. Please include a description of the design basis for the estimates on the estimate-summary pages. The design basis should indicate the most recent date of the design drawings.

## **ATTACHMENT K — DRAINAGE DITCH CALCULATIONS**

The material in the subject appendix was found to be complete and therefore there are no comments at this time. UDEQ will proceed with the technical review of this appendix.

## **ATTACHMENT L — METHODOLOGIES FOR EVALUATING LONG-TERM STABILIZATION DESIGNS (NUREG/CR-4620)**

Appendix L of the application contains a copy of the June 1986 NRC publication NUREG/CR-4620, which is a technical report titled: *Methodologies for Evaluating Long-term Stabilization Designs of Uranium Mill Tailings Impoundments*.

**Comment L-1:** See comment General-1 regarding inclusion of Appendix L in the License Application.

**ATTACHMENT M — GEOSYNTEC FEDERAL CELL ENGINEERING EVALUATION (GEOSYNTEC, 2021)**

Appendix M of the application contains a report prepared by Geosyntec Consultants titled “Geotechnical Engineering Evaluations for Federal Cell at the Clive Facility, Clive, Utah”, dated March 17, 2021 (Project No. SLC1025). The following comments describe elements of the subject report that were found to be incomplete.

**Comment M-1:** This appendix deals with stability performance objectives described in UAC R313-25-9(4)(d), which are specifically required therein as part of a site-specific performance objective. While Appendix M is essential to demonstrating compliance with the Part 61 “Performance Objectives” and thus must be included, UDEQ has yet to determine whether the License Application or the DU PA is the appropriate location for Appendix M. For this completeness review, keeping Appendix M as part of the License Application is acceptable; however, depending on the outcome of UDEQ internal discussions, in the future *EnergySolutions* may be instructed to incorporate Appendix M into the DU PA.

**Comment M-2:** Attachment B of the Geosyntec report presents graphical representations of slope stability analyses performed using the two-dimensional computer program SLOPE/W. Attachment B includes 10 figures that among other items display the critical sliding surface for each scenario analyzed. Please expand the presentation for each scenario analyzed with the supporting output file generated by SLOPE/W that indicates coordinates of the surface geometry, subsurface profile, and groundwater elevation. The output files should indicate how the embankment material properties were assigned to each layer, whether or not a pseudostatic force was applied, and the number of random searches made to determine the critical sliding surface. Revise the graphical representations of each slope stability scenario to also include a display of the lowest 10 failure surfaces determined for each scenario as well as a separate presentation of all surfaces analyzed. It is anticipated that the geometry of the limits placed on the search will be readily visible on the graphical representations.

**Comment M-3.1:** See Table M-1 below and text that follows that.

**Table M-1: Citations Without Proper Corresponding References in “REFERENCES”**

Page	Cited Document	Date in Citation	Note (e.g., Comparison with REFERENCES)
7	Seismicmap.org	N/A	Incorrect; should be seismicmaps.org
8	<i>EnergySolutions</i>	2021	Inconsistent; it is listed as 2020 in REFERENCES
9	DWMRC	2005; 2011	Not found in REFERENCES
11	GEOSTUDIO	2019	cf. GEO-STUDIO International, Ltd. in REFERENCES
11	Lee and Kim	2014	Incorrect; should be Lee, Kim and Lee (2014)
12	Hynes-Griffin	No date given	cf. Hynes-Griffin, Mary E. and Franklin, Arley G. (1984)
12	USACE	1984	Incorrect; see USACE with date of 2003 in REFERENCES

For completeness, please provide the correct, matching information for items both in the citation itself and in the REFERENCES section. Authors’ given names should all be initialized for consistency.

**Comment M-3.2:** The following listed reference has no citation (including the year) in the text:

Neptune and Company, Inc. (Neptune) (2015). Final Report for the Clive DU PA Model v1.4, November 2015.

Please provide correct, matching information for items in the citation and the REFERENCES section.

**Comment M-3.3:** For the sake of completeness, each appendix of a License Application should have clear, unambiguous references. This helps prevent confusion when reviews are made.

Two different Neptune reports by the same company/author with the same dates are listed in the “REFERENCES” section of Appendix L. Among other issues, the company/author is named inconsistently. The first reference is given as

Neptune and Company, Inc. (Neptune) (2015). Final Report for the Clive DU PA Model v1.4, November 2015.

The second reference is given as

Neptune (2015). Radioactive Waste Inventory for Clive DU PA Model v1.4, November 2015.

Please provide the same company/author name for each reference from the same company for consistency and to eliminate potential confusion. Please also append sequential lower-case alphabetical suffixes to identical dates on two or more different references when the company/author is the same (e.g., Neptune, 2015a and Neptune, 2015b).

**Comment M-3.4:** Incomplete or Incorrect References in “REFERENCES” Section

(1) An incomplete reference in the “REFERENCES” section is the following:

ASTM International.

This reference does not list the article name, the place of publication or the page numbers. Please show each of these.

(2) Another incomplete reference is this:

Idriss, I. M. and Boulanger, R. W., [2008], Soil Liquefaction During Earthquakes, Earthquake Engineering Research Institute (EERI), Monograph 12.

Please give the place of publication, and the total number of pages.

(3) An incomplete and incorrect reference in the “REFERENCES” section is this one:

Lee and Kim. (2014). Flowable Backfill Materials from Bottom Ash for Underground Pipeline. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5453207/> Page 30 of 30

As shown on the referenced Web site, the authors should be listed as Lee, K-J., Kim, S-K., and Lee, K-H. Two authors have Lee as the last name, not just a single author. All the authors, in addition to their surnames, should have their given names initialized as shown here.

In the Web site given in the reference, no page numbers for the document appear to be provided, so it is unclear to the Division where the “Page 30 of 30” came from.

The reference given in the “REFERENCES” section leaves out the primary publication venue and details. These items include “Materials (Basel). 2014 May; 7(5): 3337–3352”, which are found on the Web site. The Web site URL should only be a secondary reference because the primary reference is available.

(4) The paper by Makdisi and Seed (1978) listed in the “REFERENCES” section as “Simplified Procedure for Estimating Dam and Embankment Earthquake-Induced Deformation,” should use the word “Deformations” as employed in the actual title of the paper, instead of “Deformation.” The reference as given in the “REFERENCES” section is also out of order alphabetically.

(5) As indicated at

[https://www.publications.usace.army.mil/Portals/76/Publications/EngineerManuals/EM\\_1110-2-1902.pdf](https://www.publications.usace.army.mil/Portals/76/Publications/EngineerManuals/EM_1110-2-1902.pdf), the USACE (2003) reference should be listed as

US Army Corps of Engineers (USACE) (2003). Engineering and Design Slope Stability, Engineer Manual No. 1110-2-1902, 31 October 2003.

rather than

US Army Corps of Engineers (USACE) (2003). Engineering and Design Slope Stability, Engineering Manual No. 1110-2-1902, October 2003.

(6) The reference “Qian, et al. (2002). Geotechnical Aspects of Landfill Design and Construction” is incomplete. It leaves out the initials of the primary author’s name. It leaves out the names of the two other authors, Robert M. Koerner and Donald H. Gray. While Qian et al. (2002) would be an acceptable citation, if used as presented, it is not an acceptable reference, in part due to its lacking the names of two of its authors. Moreover, the reference as written does not list the publisher, the place of publication, or the total number of pages.

## ATTACHMENT N — NEPTUNE EROSION ANALYSIS (NEPTUNE, 2021A)

Appendix N of the application contains a report prepared by Neptune and Company, Inc., titled “Clive DU PA Model–Response to DWMRC 1-28-2021 Comments, dated March 5, 2021 (Project No. NAC-0166\_R0). The following comments describe elements of the subject report that were found to be incomplete.

**Comment N-1:** The DU PA should be revised to include the relevant technical information from Appendix N, and then Appendix N should be deleted from the License Application. The revised DU PA should describe the current status of the erosion modeling of the Federal Cell. Appendix N can serve as a source document where erosion-related interrogatories are discussed but a full explanation of the modeling work related to the maximum permissible velocity and SIBERIA (inter alia) should be presented in the DU PA. Outdated material on USLE and RHEM and earlier SIBERIA modeling should be removed from the DU PA.

**Comment N-3.1:** The Applicant has not provided UDEQ with reference Neptune, 2021b: *Surface Erosion Modeling at the EnergySolutions Clive, Utah Facility*, NAC-0167\_R0, Neptune and Company Inc., Lakewood CO, 2021. Please provide.

**Comment N-3.2:** See Table N-1 below and text that follows it.

**Table N-1: Citations Without Proper Corresponding References in “REFERENCES”**

Page	Cited Document	Date in Citation
2	UWQB	2009
2	UWQB	2009
11	UWQB	2009
11	UWQB	2009
14	NRC	1986

For the items cited above, please provide the correct, matching information in the citation and in the REFERENCES section.

**Comment N-3.3:** A citation to a document dealing with erosion is given in the text as NRC (1986), but no relevant NRC reference dealing with erosion is given in the REFERENCES section for that date. Therefore, this omission makes the citation/reference link incomplete. The text says,

A value for the runoff coefficient of 0.5 is recommended for a graveled surface in Table 4.6 of NUREG 4620 (NRC 1986).

However, there is no reference given in the “REFERENCES” section of the License Application in which NUREG 4620 is paired with NRC (1986). The following is the actual 1986 reference to an NRC document that should be given in connection with NUREG/CR-4620:

Nelson, J.D., et al., 1986. Methodologies for Evaluating Long-Term Stabilization Designs of Uranium Mill Tailings Impoundments, NUREG/CR-4620,

ORNL/TM-10067, United States Nuclear Regulatory Commission (NRC),  
Washington DC, June 1986

On the other hand, the following reference is the only one given in “REFERENCES” for NRC (1986):

NRC, 1986. Update of Part 61 Impacts Analysis Methodology, Methodology Report, Volume 1, NUREG/CR-4370, United States Nuclear Regulatory Commission, Washington DC

The first document (NUREG/CR-4620) seems to be the appropriate reference to be paired with the citation NRC (1986), but this reference is not referred to in “REFERENCES” as NRC (1986). Instead, it is referred to as Nelson et al. (1986).

The second reference (NUREG/CR-4370) does not seem to be the appropriate reference, even though it is called NRC (1986) in the REFERENCES section. The content does not match. For example, Table 4.6 of NUREG/CR-4620 deals with runoff coefficients. Table 4.6 of NUREG/CR-4370, on the other hand, does not use the term runoff coefficients nor does it appear to relate to them.

For the appropriate reference and citation pair in the License Application, please provide correct matching or corresponding information.

**Comment N-4:** The drawings in Attachment 1 are not correct. For example, Drawing 14004 C02 shows waste all the way up to the bottom surface of the cover. Additionally, it shows waste under the side slope. Attachment 1 drawing 14004 C05 should be supported by appropriate calculations showing how the side-slope rock was sized and how the thickness of riprap layer was established.

**Comment N-5:** On page 16 of Appendix N, the reader is referred to Section 4.1.1.3. There is no Section 4.1.1.3.

**Comment N-6:** On page 15, it states: “These empirical calculations are confirmed by RHEM and SIBERIA modeling of the hybrid cover design, as discussed in Section 4.1.1.2 and 4.1.1.3, respectively.” There is no discussion of RHEM in Section 4.1.1.2 or elsewhere in Appendix N.

## ATTACHMENT O — FEDERAL CELL FACILITY WASTE CHARACTERIZATION PLAN

Appendix O of the application contains the proposed Federal Cell Facility Waste Characterization Plan, revision 0 (FCF WCP) as prepared by *EnergySolutions*. The following comments describe elements of the subject waste characterization plan that were found to be incomplete.

**Comment O-1:** The FCF WCP appears to have been adopted from the Class A West WCP, with the appropriate deletion of Section V “Liquid Waste Management.” UDEQ/SC&A finds this to be an appropriate approach, provided adoption was performed correctly and all adopted materials pertain to disposal of DU waste in the proposed Federal Cell.

**Comment O-2:** With the deletion of Section V “Liquid Waste Management”, the subsequent sections were renumbered from the CAW WCP to the FCF WCP. There is extensive section cross referencing within the WCP. ES did not renumber the cross references to correspond with the revised section renumbering. Please revise the section cross referencing to correspond with the revised FCF WCP section numbering.

**Comment O-3:** Even though Section V “Liquid Waste Management” was deleted, the FCF WCP makes at least five (5) references to it (e.g., I.10, III.2.b.ii.A, III.5.c, III.5.d.i.A, and III.5.d.i.B). UDEQ requires that all reference to Liquid Waste Management be removed from the FCF WCP.

**Comment O-4:** The License Application (p 1-3) states “*EnergySolutions* herein applies for a new Radioactive Material License authorizing disposal of DOE-generated concentrated depleted uranium in a dedicated Federal Cell.” (emphasis added) By this statement, UDEQ understands that it is ES’ intent to only dispose of depleted uranium in the FCF; i.e., debris and other non-DU LLW would not be disposed of within the FCF. Two (2) locations within the Appendix O FCF WCP contain references to disposing debris (i.e., I.6.c and IV.6.b.i). UDEQ requires that all reference to disposing of debris be removed from the FCF WCP.

**Comment O-5:** Since the FCF is dedicated to the disposal of depleted uranium, UDEQ requires that all reference to disposing of samples be removed from the FCF WCP (i.e., Section V “Sample Management” and all references to Section V [note: references to Section V “Sample Management” within Appendix O are currently given as references to Section VI, see Comment O-2] need to be deleted).

**Comment O-6:** Since the FCF is dedicated to the disposal of depleted uranium, UDEQ requires that all reference to disposing of mixed waste be removed from the FCF WCP (i.e., Section VIII “Transfer of Waste from the Mixed Waste Facility” and all references to Section VIII [note: references to Section VIII “Transfer of Waste from the Mixed Waste Facility” within Appendix O are currently given as references to Section IX, see Comment O-2] need to be deleted).

**Comment O-7:** Depleted uranium (DU) decays by emitting an alpha particle. The Appendix O, WCP, IV.2.c “Radiological Analytical Parameters” requires gamma spectroscopy analysis and states that “When non-gamma radionuclide concentrations contribute to the waste being within

75% of Class A limits, the contributing non-gamma radionuclide(s) shall also be analyzed.” Since non-gamma DU contributes most of the radiation, UDEQ expects this section to specify what analytical procedures are required to detect alpha particles both on the surface of the container and within the waste.

**Comment O-8:** UDEQ’s discussions with NRC concluded that transuranic radionuclide heels in some used DU containers could exceed Class A waste concentration limits, and therefore they could not be disposed of at the ES Clive facility. Since it is not feasible to sample the heels to determine which containers exceed the limits, in its DU PA evaluation UDEQ requires that no containers that previously contained recycled DU be disposed of at the Federal Cell. The Appendix O WCP does not currently do so, but it needs to specify how ES intends to adhere to this UDEQ requirement.

**Comment O-9:** In Appendix A “Suggested Radioactive Material License” (p 3) the FCF is defined as the embankment only.

**ATTACHMENT P — NEPTUNE COVER INFILTRATION ANALYSIS (NEPTUNE, 2021B)**

Appendix P of the application contains a report prepared by Neptune and Company, Inc., titled “Clive DU PA Model–Response to DWMRC 12-3-2020 Comments, dated March 31, 2021 (Project No. NAC-0166\_R0). The following comments describe elements of the subject report that were found to be incomplete.

**Comment P-1:** The DU PA should be revised to include the relevant technical information from Appendix P and then Appendix P should be deleted from the License Application. The revised DU PA should describe the current status of the cover infiltration analysis of the Federal Cell.

**Comment P-2:** The NAC report is preceded by a single orphan page on EnergySolutions letterhead. The page is titled “5.6.1.2 EnergySolutions’ Response to FPL Construction Specifications.” Please provide additional context to the purpose of this orphaned page.

**Comment P-3:** Neptune (2021B) has analyzed infiltration for times subsequent to the placement of a cover system. Neptune (2021B) has not analyzed infiltration for the few decades prior to the placement of a cover system. This will be important, for, during this time period, there apparently will be no capillary barrier lying above the DU waste to assist in removing water from the soil and minimizing deeper infiltration or percolation. While this may be considered a technical issue, it does represent infiltration during an important phase of the project that is currently missing from the discussion.

**Comment P-4:** See Table P-1 below.

**Table P-1: Citation Without Proper Corresponding Reference in “REFERENCES”**

Page	Cited Document	Date in Citation	Note (Comparison with REFERENCES)
14	Neptune	2015f	Citation for 1-D modeling vs. ref to biological issues

The reference, which applies to biological issues, is not pertinent to 1-D modeling, to which the citation seems to point. For the item cited above, please provide the correct, matching information in the citation and the REFERENCES section.

**Comment P-5:** Please provide copies in the DU PA Reference Library of the following References identified in Appendix P:

Black, P., et al., 2019. Scaling Input Distributions for Probabilistic Models - 19472, proceedings of the *Waste Management Symposia 2019, March 3-7*, Phoenix AZ, 2019

Energy Fuels, 2021. *Q4-20 Data Quality Report for the Primary Test Section, White Mesa Mill— Tailings Management Cell 2*, Energy Fuels Resources (USA) Inc., San Juan County UT, January 2021

Kennedy, W.E., et al., 1985. Biotic Transport of Radionuclides from a Low-level Radioactive Waste Site, *Health Physics*, 49 (1) 11–24

Neptune, 2015c. *Neptune Field Studies, December 2014, Eolian Depositional History Clive Disposal Site*, NAC-0044\_R0, Neptune and Company Inc., Los Alamos NM, March 2015

Rodenbeck, C., et al., 2001. Dynamical Systems with Time Scale Separation: Averaging, Stochastic Modelling, and Central Limit Theorems, *Progress in Probability* 49 (2001) 189–190

Taylor, S.A., and G.M. Ashcroft, 1972. *Physical Edaphology*, Freeman and Co., San Francisco CA

Wolf, M., et al., 2005. *Mammal Parameter Specifications for the Area 5 and Area 3 RWMS Models*, Neptune and Company Inc., Los Alamos NM, September 2005

## **ATTACHMENT Q — DEPLETED URANIUM PERFORMANCE ASSESSMENT**

Appendix Q of the application contains a series of reports prepared by Neptune and Company, Inc. (NAC) that have collectively been titled the “Depleted Uranium Performance Assessment”. The initial report prepared by NAC is titled “Final Report for the Clive DU PA Model”, dated November 24, 2015 (Project No. NAC-0024\_R4). The following comments describe elements of the subject reports that were found to be incomplete.

**Comment Q-1:** The DU PA presented in Appendix Q does not appear to support the License Application. For example, the Appendix Q DU PA (NAC-0024\_R4, Neptune, November 24, 2015) assumes an evapotranspiration (ET) cover over both the top and side slopes of the embankment, whereas the License Application states that the ET cover would only be over the top slope and that the side slope would include rock armoring (p 3-3 to 3-2 [note: pages in the License Application are mis-numbered]). Also, while the DU PA itself states that the “disposal volume above the DU waste is assumed to be backfilled with clean material” (NAC-0024\_R4, Neptune, November 24, 2015, Section 6.0), other material in Appendix Q indicates that waste would be placed above the DU (e.g., NAC-0101\_R0, Neptune, 23 February 2018, Figure 2). Please ensure that the DU PA presented in Appendix Q supports the description of the Federal Cell, as given in the License Application. **See also Comment General-2.**

**Comment Q-2:** UDEQ notes that some of the other appendices would seem to impact the DU PA results and/or be responsive to UDEQ’s DU PA interrogatories (e.g., Appendix D “Phase 1 Basal-Depth Study Report and 2021 Interrogatory Responses,” Appendix N “Neptune Erosion Analysis (Neptune, 2021a),” and Appendix P “Neptune Cover infiltration Analysis (Neptune, 2021b).” However, the DU PA, as presented in Appendix Q, does not incorporate any of the information provided in these other appendices. If ES desires UDEQ to consider the information provided in the other appendices in the DU PA, then that information must be included in the DU PA. **See also Comment General-2.**

**Comment Q-3:** On the cover Sheet: **APPENDIX Q; DEPLETED URANIUM PERFORMANCE ASSESSMENT; (Neptune, 2015 and 2021c).** There is no Neptune 2021c reference. The latest document in Appendix Q is dated April 2020.

**Comment Q-4:** Appendix Q is not a complete DU PA. It includes the DU PA version 1.4 dated November 2015, interrogatory responses dated February 2108, responses to amended interrogatories dated April 2020, and the March 2020 deep time assessment (v1.5). Important revisions to the DU PA are included in Appendices N and P and supporting references thereto (e.g., Neptune 2021b). Appendix Q should be updated to be a complete, free standing document that can be used to fully describe the performance of the Federal Cell. Out-dated material should be removed as should discussion of interrogatories. **See also Comment General-2.**

**Comment Q-5:** See Table Q-1 below for a citation in NAC-0147\_R0 “Response to Model Version 1.4 Amended Interrogatories” (Neptune, April 24, 2020) without a proper corresponding reference.

**Table Q-1: Citation in Without Proper Corresponding Reference in NAC-0147\_R0  
“REFERENCES”**

Page	Cited Document	Date in Citation	Note (Comparison with REFERENCES)
3	UWQB	2009	No reference

**Comment Q-6.1:** See Table Q-2 below for citations in NAC-0032\_R5 “Deep Time Assessment for the Clive DU PA, Model v1.5” (Neptune, March 30, 2020) without proper corresponding references.

**Table Q-2: Citation Without Proper Corresponding References in NAC-0032\_R5  
“REFERENCES”**

Page	Cited Document	Citation Date	Note (Comparison with REFERENCES)
vi	Oviatt, pers. comm. <sup>1</sup>	None	The superscript has no corresponding footnote
10	The Salt Lake City	None	Reference is missing
10	Bardsley et al.	2013	Reference is missing
10	Morgan and Pomerleau	2012	Reference is missing
11	Eardley et al.	1973	Reference is missing
11	Eardley et al.	1973	Reference is missing
15	Schnurrenberger	2003	The name in the reference is misspelled
16	Oviatt	1985	Reference is missing
39	Field Studies	2015a	Reference is missing
39	Oviatt	1985	Reference is missing
39	Neptune	2015	No reference 2015 without a letter suffix
39	Neptune	2015	No reference 2015 without a letter suffix
39	Oviatt	1985	Reference is missing

**Comment Q-6.2:** Listings in NAC-0032\_R5 “REFERENCES” Out of Alphabetical Order:

Berger, A., 1988. Milankovitch theory and climate. *Reviews of Geophysics*, 26(4): 624-657.

Berger, A. and M. F. Loutre, 2002. An exceptionally long interglacial ahead? *Science*, 297: 1287-1288.

Please place these in REFERENCES alphabetically between appropriate entries and provide in the reference library.

**Comment Q-6.3:** Listings in NAC-0032\_R5 “REFERENCES” Without Properly Formulated Corresponding Citations in the Text:

Nash, W.P., 1990, Black Rock Desert, Utah, in C.A Woods and J. Kienle, eds. Volcanoes of North America, Cambridge University Press, Cambridge p. 271-273.

Oviatt, C. G., D. M. Miller, J. P. McGeehin, C. Zachary, and S. Mahan, 2005. The Younger Dryas phase of Great Salt Lake, Utah, USA, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 219: 263-284.

**Comment Q-6.4:** Items in NAC-0032\_R5 “REFERENCES” Incomplete, with Errors or Inconsistencies in Spelling, Formatting, Etc.:

The reference

Schnurrenber, D. J. Russell, and K Kelts, 2003, Classification of lacustrine sediments based on sedimentary components, *Journal of Paleolimnology* 29, p. 141-154.

is incorrect, confusing and incomplete as written. There is one misspelling, one missing comma, and one missing period. The reference should be written as

Schnurrenberger, D., J. Russell, and K. Kelts, 2003, Classification of lacustrine sediments based on sedimentary components, *Journal of Paleolimnology* 29, p. 141-154.

The reference

Currey, D.R., G. Atwood, and D.R. Mabey, Map 73 Major Levels of Great Salt Lake and Lake Bonneville, Utah Geological and Mineral Survey, Salt Lake City, UT, May 1984

is incorrectly combined with another reference as follows:

Cook, E.R., R. Seager, R.R. Helm Jr, R. S. Vose, C. Herweijer, and C. Woodhouse, 2010. Megadroughts in North America: Placing IPCC Projection of Hydroclimatic Change in a Long-Term Palaeoclimate Context, *Journal of Quaternary Science*, 25, Issue 1, 48- 61. Currey, D.R., G. Atwood, and D.R. Mabey, Map 73 Major Levels of Great Salt Lake and Lake Bonneville, Utah Geological and Mineral Survey, Salt Lake City, UT, May 1984

The same type of problem occurs with Sack (1999):

Ruddiman, W.F., 2006. Orbital Changes and Climate, *Quaternary Science Reviews*, Vol. 25, pp. 3092–3112. Sack, D., 1999. The composite nature of the Provo Level of Lake Bonneville, Great Basin, Western North America, *Quaternary Research*, v. 52, 316-327.

This unedited type of error makes it more difficult for a reviewer or the public to find the reference. No article title is given in the following instance:

Kukla, G. J., R. K. Matthews, J. M. Mitchell Jr., *Quat. Res.* 2, 261 (1972)

This also, of course, makes finding the reference more challenging for a reviewer or a member of the public.

Many inconsistencies exist in the formatting of references in the REFERENCES section. These formatting inconsistencies indicate a general lack of editing. Such editing would make the Reference section more accessible to reviewers and others. The following items are among those that are inconsistent in formatting in at least one instance each within the REFERENCES section:

1. journal title underlined vs. journal title not underlined
2. article title written vs. no article title written
3. first letters of all words in title capitalized vs. all letters except for first being lower case
4. period after article title vs. comma after it
5. publication year placed immediately after author names vs. at the end
6. publication year written in parentheses vs. written without parentheses
7. publication year followed by a period vs. not followed by a period
8. initials before the surname vs. initials after the surname – but consistent within single ref
9. initials before the surname vs. initials after the surname – inconsistent within a single ref
10. initials with space between first period and second initial vs initials with no such space
11. first and middle names fully written out vs. initials only
12. period at end of reference vs. no punctuation at end
13. the use of *et al.* in some name lists vs. all names written out even in long lists of names

Together, the collection of references of many different styles in the REFERENCES section does not facilitate quick, at-a-glance comprehension of all types of salient information important when the Division and its consultants do a review or when a member of the public would like to find more information. Please give references a consistent format. Please do this in not only in this portion of Appendix Q, but also in other portions of Appendix Q, as well as in other appendices of the License Application. This should make it easier for reviewers and the public to identify an article correctly and then locate it using a search engine when a need for doing so, or an interest in doing so, arises.

## **ATTACHMENT R — FINANCIAL SURETY CALCULATIONS**

Appendix R of the application contains the proposed Financial Surety Calculations for the Federal Cell Facility. The material in the subject appendix was found to be essentially complete at this time and therefore there are no comments at this time. UDEQ will proceed with the technical review of Appendix R.

## **ATTACHMENT S — EXAMPLE STANDBY TRUST AGREEMENTS**

Appendix S of the application contains a placeholder example Standby Trust Agreement for the Federal Cell Facility. The material in the subject appendix was found to be essentially complete at this time and therefore there are no comments at this time.

## **ATTACHMENT T — LONG-TERM STEWARDSHIP AGREEMENT FOR THE FEDERAL CELL FACILITY**

Appendix T of the application contains the signed “Real Estate Transfer Agreement for the Federal Cell between *EnergySolutions*, LLC and the U.S. Department of Energy” for the long-term stewardship of the Federal Cell Facility. The document was signed April 30, 2020. The material in the subject appendix was found to be essentially complete at this time and UDEQ has no comments at this time.

## **ATTACHMENT U — DRAFT MEMORANDUM OF AGREEMENT**

Appendix U of the application contains a Draft Memorandum of Agreement. The draft agreement establishes Covenants and Restrictions between *EnergySolutions*, LLC and Utah Department of Environmental Quality. The material in the subject appendix is in draft form and therefore was found to be essentially complete at this time. There are no comments at this time.