Enclosure 1

Response to Request for Additional Information

Environmental Acceptance Review Questions of the Louisiana Energy Services' Supplemental Environmental Report Dated September 2012 for URENCO USA (UUSA) Facility

NRC Request 1a)

Does Revision 20f incorporate all the ER revisions prior to the Supplemental ER? If not, LES needs to provide a complete revision that includes all revisions made prior to the Supplemental ER.

UUSA Response to 1a)

Yes, Revision 20f of the UUSA Environmental Report (ER) incorporates all revisions prior to the Supplemental ER.

NRC Request 1b)

What are the differences between the last ER used to develop the Environmental Impact Statement (EIS) (Revisions 1-5) and the current ER (Revisions 6-20)?

UUSA Response to 1b)

A copy of Revision 20f of the UUSA ER highlighting all changes since Revision 5 is provided in Enclosure 4.

NRC Request 1c)

LES should submit an ER with all revisions made to the ER after the EIS was developed through revision 20 with all changes clearly pointed out after Revision 5. (Need all changes in one document.)

UUSA Response to 1c)

A copy of Revision 20f of the UUSA ER highlighting all changes since Revision 5 is provided in Enclosure 4.

NRC Request 1d)

Is there a reason the LES ER (Revision 1-20) is not listed in the references of the Supplemental ER?

UUSA Response to 1d)

The LES Environmental Reports were not referenced in the Supplemental ER as the Supplemental ER was drafted based on the most recent revision of the ER, revision 20f. The Supplemental ER has been administratively updated to reflect the "LES ER (Revisions 1-20)."

NRC Request 2)

Data in the Supplemental ER needs to address and provide information for the proposed operational expansion capacity from 3.0 to 10.0 million separative work units (MSWU). It is unclear in the text and several tables of the Supplemental ER if the information discussed for the life of the plant is for an operational capacity starting from 0 MSWU to 10 MSWU or from 3.0 MSWU to 10 MSWU. Examples are Table 4.10-3, "Estimated Tax Revenue Allocations," Table 3.4-5 which provides data on "Initial Average Plant Water Consumption," and Table 3.4-6 "Anticipated Peak Plant Water Consumption".

UUSA Response to 2)

The Supplemental ER does not contrast or describe the delta between the 3.0 MSWU facility and the proposed 10.0 MSWU, rather, the Supplemental ER provides relevant information and data for the impact of the facility at 10.0 MSWU production. Information regarding the impact of the facility at 3.0 MSWU can be found in the initial LES ER. The following Tables and Sections of the Supplemental ER have been revised to clarify that the information provided in the body of the report, unless otherwise discussed or annotated, is for the 10.0 MSWU facility.

Section 1.1	Introduction to the Environmental Report
Section 3	Description of Affected Environment
Section 3.4	Water Resources
Table 3.4-5	Initial Average Plant Water Consumption (3 MSWU Facility)
Table 3.4-6	Anticipated Peak Plant Water Consumption (10 MSWU Facility)
Table 3.12-3	Estimated Annual Gaseous Effluent (10 MWSU facility)
Table 4.6-1	Peak Emission Rates (10 MSWU facility)
Table 4.10-3	"Estimated Tax Revenue Allocations," annotated "life of plant" to "life of 10 MSWU plant"
Table 4.12-1	"Direct Radiation Annual Dose Equivalent by Source (10 MSWU facility)"
Section 4.15	Summary of Environmental Impacts for the 10 MSWU Facility

NRC Request 3)

The Supplemental ER should be corrected to reflect the increase of capacity from 3.0 MSWU to 10 MSWU.

UUSA Response to 3)

References in the Supplemental ER to 3.7 MSWU design capacity have been changed to 3.0 MSWU in the following Sections and associated Tables:

1.2.5.1	Scenario A
1.2.5.2	Scenario B
1.2.5.3	Scenario C
1.2.5.4	Scenario D
1.2.5.6	Scenario F
1.2.5.7	Scenario G
2.1.1	No-Action Alternative
2.3	No-Action Scenario C and D
4.1.4	No-Action Scenario C and D
4.2.9	No-Action Scenario C and D
4.3.1	No-Action Scenario C and D
4.4.10	No-Action Scenario C and D
4.5.1	No-Action Scenario C and D
4.6.7	No-Action Scenario C and D
4.7.5	No-Action Scenario C and D
4.8.4	No-Action Scenario C and D
4.9.11	No-Action Scenario C and D
4.10.7	No-Action Scenario C and D
4.11.4	No-Action Scenario C and D
4.12.13	No-Action Scenario C and D
4.13.13	No-Action Scenario C and D
7.3	First paragraph

NRC Request 4)

Provide available data on the current status of the facility including current MSWU and information such as number of employees currently employed, tax revenue generated, number of MSWU generated to date, current quantity of feed material, inventory, waste, etc.

UUSA Response to 4)

Per the pre RAI conference call [January 30, 2013], the summary below discusses operational information as of January 1, 2013 and is limited in scope to the examples provided by the NRC.

Current MSWU: UUSA received NRC authorization and began enrichment operations in June 2010. As of January 1, 2013 the annual production rate had increased to 2.136 MSWU.

Number of employees currently employed: As stated in Section 3.2.3 of the Supplemental ER, the current number of UUSA employees is approximately 250 people. (See also Response to RAI #5a)

Tax revenue generated: Section 4.10.5 Regional Impacts Due to Construction and Operation has been revised to state that the Tax Revenue through 2012 was $93.9 million. Table 4-10-2, Estimated Tax Revenue has been revised to include Tax Revenue thru 2012.

Number of MSWU generated to date: UUSA has generated 1.53 MSWU through December 2012.

Current quantity of feed material: Through December 2012 a total of 862 feed cylinders have been received. 518 cylinders were received in 2012. The estimate of 395 shipments of feed cylinders per year in Section 3.2.4 of the Supplemental ER is an average.

Inventory: Through December 2012 UUSA has produced 158 product cylinders (138 in 2012), shipped 90 product cylinders (all during 2012) and created 179 tails cylinders.

Waste: As of December 2012 there had been no decontamination or chemistry laboratory activities and, thus, no wastes from these activities had been generated. Additionally, the ventilation filters have been able to be screened and determined to constitute universal waste. Table 3.12-1 has been revised to include the amount of radiological waste generated through December 31, 2012.

Section 1.2 has been revised to include this information and references have been added to Section 3.10 Socioeconomic, Section 3.11 Public and Occupational Health, Section 3.12 Waste Management, and Section 4.15 Summary of Environmental Impacts.

NRC Request 4a) and b)

Provide projected data when the facility will be fully operational at 3.0 MSWU under the current license.

UUSA Response to 4a) and b)

Effluent monitoring began in January of 2009 and the results routinely reported to the NRC in the Semi-Annual Radioactive Effluent Release Reports (SARERR). The reports are listed below and have been included as references in the Supplemental ER.

- UUSA Semi-Annual Radioactive Effluent Release Report Jan 09 through Jun 09 dated August 26, 2009 (NEF-09-00164-NRC)
- UUSA Semi-Annual Radioactive Effluent Release Report Jul 09 through Dec 09 dated February 26, 2010 (LES-10-00042-NRC)
- UUSA Semi-Annual Radioactive Effluent Release Report Jan 10 through Jun 10 dated September 24, 2010 (LES-10-00202-NRC)

- UUSA Semi-Annual Radioactive Effluent Release Report Jul 10 through Dec 10 dated February 23, 2011 (LES-11-00014-NRC)
- UUSA Semi-Annual Radioactive Effluent Release Report Jan 11 through Jun 11 dated August 24, 2011 (LES-11-00121-NRC)
- UUSA Semi-Annual Radioactive Effluent Release Report Jul 11 through Dec 11 dated March 1, 2012 (LES-12-00031-NRC)
- UUSA Semi-Annual Radioactive Effluent Release Report Jan 12 through Jun 12 dated August 20, 2012 (LES-12-00130-NRC)

During periods for which URENCO USA has had Uranium Hexafluoride (UF_6) on site (beginning with 1st quarter 2009) there has not been a detectable release of Uranic material in excess of the Lower Limits of Detection (LLD) or Minimum Detectable Activity (MDA) in the Liquid or Gaseous Effluents that are routinely monitored. It should be noted that the current waste stream volume is well below projections due to the Cylinder Receipt and Dispatch Building (CRDB) Chemistry Laboratories becoming operational only recently (February 2013). The Decontamination Systems are not yet approved for operation, and is a contributing factor to the limited waste stream volume.

The above discussion was inserted in Sections 4.6.2.1 and 4.12.4

NRC Request 4c)

Starting from page 4.13-10, a number of Tables are presented in Section 4.13, "Radiological Waste." It is not clear if the data in these tables are assumptions or operational data. Also, Table 4.13-1 provides projections for all 5 phases. Since Phase 1 is complete, actual operational data should be provided for this phase.

Response to Question 4c)

To clarify, Phase 1 will complete when the CRDB becomes fully operational with the approval and startup of the Decontamination System. The tables in Section 4.13 contain projected data and present a worst case conservative scenario for radiological waste to be generated. As stated previously, many waste streams have no operational data to report because:

1) No decontaminations and no chemical trap disposals have been performed due to CRDB unavailability. The traps and decontaminations have not been required to be addressed.

2) The wastes haven't been identified to have been generated by current radiological surveys and screening (i.e. the ventilation filters referenced in Table 3.12-1).

A clarifying statement has been added to paragraph 3 of Section 4.13.1 of the Supplemental ER stating that the data provided in Table 4.13-1 reflect projections rather than operational volumes.

NRC Request 4d)

Information presented in Tables 3.12-1 and 3.12-2 beg the question why from June 2010 to March 23, 2012 the facility has 57 kgs of ventilation filter while for the projected annual radiological generation through nominal 3.0 MSWU capacity will produce 30,735kgs of ventilation filter?

UUSA Response to 4d)

The facility capacity as of January 2013 had not yet reached the 3.0 MSWU capacity, therefore the ventilation filter production has been below projected values. The projected numbers are conservative estimates based on operational experience from our sister facility. Until recently (February 2013 for the Chemistry Laboratory), the Cylinder Receipt and Dispatch Building (CRDB) was not approved for use and the Decontamination System within the CRDB is still unapproved for use. The CRDB and more specifically, the Decontamination System is anticipated to be a significant contributor to ventilation filter production.

Table 3.12-1, June 2010 (Plant Startup) to December 31, 2012 Solid Radiological Waste, has been revised to include data through December 31, 2012 and the clarifying discussion above has been included as a footnote to Table 3.12-1.

NRC Request 5a)

Please explain the difference in the workforce numbers, in Section 4.10.3, i.e., Section 4.10.3 "Facility Operation - Jobs, Income, and Population" that states "The average number of workers employed for operation of the UUSA is assumed to continue to be approximately 320, rising slightly to accommodate additional operational permanent employees through the facility capacity expansion to 10 MSWU." In the same section later on, there is the statement, "The UUSA annual operating payroll (including benefits) will be approximately $52.4 million for a workforce of 258 projected in 2020."

UUSA Response to 5a)

The UUSA employees have been adjusted for consistency in the revised text of the Supplemental ER. During initial evaluations of the facility (original ER and EIS development) UUSA employees for the 3.0 MSWU facility were anticipated to be 210. During 2012, while the facility was scaling up to operations of 3.0 MSWU, the actual UUSA employee count associated with operations was approximately 250. The business planning conducted by UUSA for required permanent employees at the proposed expansion to 10.0 MSWU in 2020 yields an employee count of 258. The 320 number of UUSA employees initially discussed in Section 4.10.3 originated internally and was a conservative estimate. Section 4.10.3 has been edited to reflect the 258 employee number projected in the business plan which is considered more realistic and accurate. Socioeconomic impacts associated with the proposed facility capacity expansion are evaluated on the basis of an increase in UUSA employees from 210, as originally evaluated prior to any site construction, and the further very minimal increase from 250 current to 258 at completion of the expansion.

The Supplemental ER sections, as noted in the 5b response have been clarified on the number of contractors and UUSA employees anticipated at the completion of the proposed facility capacity expansion.

NRC Request 5b)

Provide the increase in number of employees due to the proposed facility expansion.

UUSA Response to 5b)

Impacts associated with peak number of employees to support construction were previously (during the original ER and EIS development) estimated to range in number from 800 to 1,000 contractors. For the proposed facility capacity expansion, the range of peak contractors has been increased to 800 to 1,200. The level of contractors at the site will vary due to the specific ongoing construction tasks and required trades during the time period from current to the projected end of construction in 2020. Table 4.10-1 which indicates the Annual Contractor Salary for the years 2012 through 2020 is based on the lower end of the range of peak contractors or 800, tailing off through the end of construction in 2020. The approach indicates the minimum positive impact due to salary to contractors during the proposed period of facility capacity expansion.

The following Table and Sections of the Supplemental ER sections noted in the request (4.10) have been edited to provide clarification on the number of contractors and UUSA employees anticipated at the completion of the proposed facility capacity expansion.

The following table and sections have been revised:

2.1.11	Summary of Potential Environmental Impacts of Expansion
3.2.3	Current Impacts of UUSA Facility on Transportation Routes
4.2.3	Traffic Pattern Impacts
4.6.2	Air Quality Impacts from Operation
4.10.1	Facility Contractor Population
4.10.3	Facility Operation - Jobs, Income, and Population
Table 4.10-1	Annual Contractor Salary
4.11.1	Procedure and Evaluation Criteria
4.13.1.2	Operation
4.13.5.1	Waste Disposal Plans

NRC Request 6)

As part of the current license amendment application is a license amendment process to remove the Treated Effluent Evaporative Basin from the licensing design basis from the original license which is discussed in Section 3.12.9.2 of the

Supplemental ER. This will mean that 662,033 gallons of waste water will be disposed via the sanitary sewer line in the treatment plant in Eunice, NM. There is no environmental impacts assessment for this disposal. Please provide an assessment.

UUSA Response to 6)

Due to the elimination of the Treated Effluent Evaporative Basin (TEEB) and some of the support systems that fed the TEEB, a fraction of the effluent intended for the TEEB was re-routed to Eunice Waste Water Treatment Plant (WWTP). An evaluation was performed by Molzen-Corbin & Associates of the Eunice WWTP and established that "based on a review of the WWTP design, it is in [their] professional opinion that the city of Eunice's WWTP will be able to adequately handle the LES sewer discharge of 20,000 gallons per day," (see reference below). The re-routing of this fraction of effluent does not challenge the estimated 20,000 gallons per day established for the entire UUSA facility. Therefore, a formal environmental impact assessment was not performed.

Reference:
Molzen-Corbin & Associates letter to NMED Ground Water Quality Bureau dated November 14, 2008 - (IN-08-00194-OTHER)

This discussion was inserted into Section 3.12.9.1 and the Molzen-Corbin letter included in the list of references of the Supplemental ER.

NRC Request 7)

Provide Table 3.12-3.

UUSA Response to 7)

Table 3.12-3, Estimated Annual Gaseous Effluent, is provided below and has been inserted into the Supplemental ER Revision 4b.

Table 3.12-3 Estimated Annual Gaseous Effluent

Area	Quantity (yr^{-1})	Discharge Rate m^3/yr (SCF/yr) (STP)
GEVS (Note 1)	NA	3.96×10^8 (1.40×10^{10})
HVAC Systems	NA	NA
Radiological Areas	NA	1.5×10^9 (max) (5.17×10^{10})
Non-Radiological Areas	NA	1.0×10^9 (max) (3.54×10^{10})
Total Gaseous HVAC Discharge	NA	2.5×10^9 (max) (8.71×10^{10})
Constituents:		

Table 3.12-3 Estimated Annual Gaseous Effluent

Area	Quantity (yr^{-1})	Discharge Rate m^3/yr (SCF/yr) (STP)
Helium	440 m^3 (STP) (15,540 ft^3)	NA
Nitrogen	52 m^3 (STP) (1,836 ft^3)	NA
Ethanol	40 L (10.6 gal)	NA
Laboratory Compounds	Traces (HF)	NA
Argon	190 m^3 (STP) (6,709 ft^3)	NA
Hydrogen Fluoride	<1.0 kg (<2.2 lb)	NA
Uranium	<10 g (<0.0221 lb)	NA
Methylene Chloride	610 L (161 gal)	NA

NA – Not Applicable

Note 1. This includes the monitored gaseous discharges from PXGEVS, LXGEVS, CRDB GEVS, and the Centrifuge Test and Post Mortem Facilities Exhaust Filtration System.

NRC Request 8)

The discussion in Section 4.4.9 "Cumulative Impacts on Water Resources" concentrates on the separate impacts from the UUSA facility and the facilities of Waste Control Specialists (WCS) and the proposed International Isotopes Fluorine Products, Inc. (IIFP) facility rather than the cumulative impacts. Same comment for Section 4.6.6 "Cumulative impacts to Air Quality" which concentrates on the UUSA and WCS facility. Similar comments apply to other cumulative impact sections. An example is Section 4.10.6 which concludes "Impacts from the construction and operation of WCS disposal facility and IIFP would be added to the cumulative impacts," with no further assessment. Please provide an assessment of cumulative impacts of the three facilities for each relevant section.

UUSA Response to 8)

The text of the Supplemental ER sections noted in the request #8, as well as other locations addressing cumulative impacts within the document, have been clarified on the assessment of cumulative impacts for the proposed action. The revised text more explicitly addresses the additive or cumulative impacts in total, rather than identifying the potential impacts from other projects that could be considered cumulative to UUSA proposed action.

The following Table and Sections in the Supplemental ER were revised:

2.2	Cumulative Effects
Table 2.2-1	Potential Cumulative Effects for the UUSA Expansion
4.1.3	Cumulative Impacts
4.2.8	Cumulative Impacts
4.3	Geology
4.4.9	Cumulative Impacts on Water Resources
4.5	Ecological resources

4.6.6	Cumulative Impacts to Air Quality
4.7.4	Cumulative Impacts
4.8.3	Cumulative Impacts
4.10.6	Cumulative Impacts
4.12.12	Cumulative Impacts
4.13	Waste Cumulative Effects

NRC Request 9)

LES should provide a Supplemental ER that incorporates all the additions stated above, including those previously addressed by LES, in one document that can be made publically available.

UUSA Response to 9)

The Supplemental ER has been revised as Revision 4b and is included herewith as Enclosure 2.

Enclosure 2
Supplemental Environmental Report Revision 4b

urenco

SUPPLEMENTAL ENVIRONMENTAL REPORT FOR FACILITY EXPANSION REQUEST

FEBRUARY 25, 2013

Revision 4b

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Summary of Changes to Initial Submittal (Revision 4)		
Revision - RAI#	**Date**	**Change**
Rev 4a	12/20/2012	Inserted previously omitted Tables: Table 3.3-3B Table 3.7-2 Table 4.12-3 Tables 4.12-5 through 4.12-7
Rev 4b - RAI1d: Include in the references the LES ER (Revisions 1-20)	2/14/2013	Revisions 1-20f of the UUSA Environmental Report have been included in the Reference Section
Rev 4b - RAI2: Clarify whether the data provided represents the 10 MSWU facility or the delta/difference between the 3 and 10 MSWU facility.	2/14/2013	The following Tables and Sections of the Supplemental ER have been revised to clarify that the information provided in the body of the report, unless otherwise discussed or annotated, is for the 10 MSWU facility: 1.1 Introduction to the Environmental Report 3 Description of Affected Environment 3.4 Water Resources Table 3.4-5 Table 3.4-6 Table 3.12-3 Table 4.6-1 Table 4.10-3, "Estimated Tax Revenue Allocations," annotated "life of plant" to "life of 10 MSWU plant" Table 4.12-1 Direct Radiation Annual Dose Equivalent by Source (10 MSWU facility) 4.15 Summary of Environmental Impacts for the 10 MSWU Facility

Summary of Changes to Initial Submittal (Revision 4)		
Revision - RAI#	**Date**	**Change**
Rev 4b - RAI3: The Supplemental ER should be corrected to reflect the increase of capacity from 3.0 MSWU to 10 MSWU.	2/14/2013	References in the Supplemental ER to 3.7 MSWU design capacity have been changed to 3.0 MSWU in the following Sections and associated Tables: 1.2.5.1 Scenario A 1.2.5.2 Scenario B 1.2.5.3 Scenario C 1.2.5.4 Scenario D 1.2.5.6 Scenario F 1.2.5.7 Scenario G 2.1.1 No-Action Alternative 2.3 No-Action Scenario C and D 4.1.4 No-Action Scenario C and D 4.2.9 No-Action Scenario C and D 4.3.1 No-Action Scenario C and D 4.4.10 No-Action Scenario C and D 4.5.1 No-Action Scenario C and D 4.6.7 No-Action Scenario C and D 4.7.5 No-Action Scenario C and D 4.8.4 No-Action Scenario C and D 4.9.11 No-Action Scenario C and D 4.10.7 No-Action Scenario C and D 4.11.4 No-Action Scenario C and D 4.12.13 No-Action Scenario C and D 4.13.13 No-Action Scenario C and D 7.3 First paragraph
Rev 4b - RAI4: Provide available data on the current status of the facility including current MSWU and information such as number of employees currently employed, tax revenue generated, number of MSWU generated to date, current quantity of feed material, inventory, waste, etc.	2/14/2013	Section 1.2 has been revised to include the current operational information and references have been added to Section 3.10 Socioeconomic, Section 3.11 Public and Occupational Health, Section 3.12 Waste Management, Section 4.15 Summary of Environmental Impacts 4.10.5 Regional Impacts Due to Construction and Operation
Rev 4b - RAI4a) and b): Provide projected effluent data when the facility will be fully operational at 3.0 MSWU under the current license.	2/14/2013	A discussion of the data generated by the Effluent Monitoring program and reported in the Semi-Annual Radioactive Effluent Release Reports (SARERR) was inserted in Sections 4.6.2.1 and 4.12.4

Summary of Changes to Initial Submittal (Revision 4)		
Revision - RAI#	**Date**	**Change**
Rev 4b - RAI4c: Starting from page 4.13-10, a number of Tables are presented in Section 4.13, "Radiological Waste." It is not clear if the data in these tables are assumptions or operational data. Also, Table 4.13-1 provides projections for all 5 phases. Since Phase 1 is complete, actual operational data should be provided for this phase.	2/14/2013	A clarifying statement has been added to paragraph 3 of Section 4.13.1 of the Supplemental ER stating that the data provide in Table 4.13-1 reflect projections rather than operational volumes.
Rev 4b - RAI 4d: Information presented in Tables 3.12-1 and 3.12-2 beg the question why from June 2010 to March 23, 2012 the facility has 57 kgs of ventilation filter while for the projected annual radiological generation through nominal 3.0 MSWU capacity will produce 30,735kgs of ventilation filter?	2/14/2013	Table 3.12-1, June 2010 (Plant Startup) to December 31, 2012 Solid Radiological Waste, has been revised to include data through December 31, 2012 and a clarifying discussion has been included as a footnote to Table 3.12-1.
Rev 4b - RAI5a: Provide the increase in number of employees due to the proposed facility expansion.	2/14/2013	The following sections have been revised 2.1.11 Summary of Potential Environmental Impacts of Expansion 3.2.3 Current Impacts of UUSA Facility on Transportation Routes 4.2.3 Traffic Pattern Impacts 4.6.2 Air Quality Impacts from Operation 4.10.1 Facility Contractor Population 4.10.3 Facility Operation - Jobs, Income, and Population Table 4.10-1 Annual Contractor Salary 4.11.1 Procedure and Evaluation Criteria 4.13.1.2 Operation 4.13.5.1 Waste Disposal Plans
Rev 4b - RAI5b: Please explain the difference in the workforce numbers, in Section 4.10.3	2/14/2013	Revised Sections are listed in RAI5a Change column.

Summary of Changes to Initial Submittal (Revision 4)		
Revision - RAI#	**Date**	**Change**
Rev 4b - RAI6: Section 3.12.9.2 of the Supplemental ER. states that 662,033 gallons of waste water will be disposed via the sanitary sewer line in the treatment plant in Eunice, NM. There is no environmental impacts assessment for this disposal. Please provide an assessment.	2/14/2013	A discussion regarding the Eunice Waste Water Treatment Plant was inserted into Section 3.12.9.1 and the Molzen-Corbin letter included in the list of references.
Rev 4b - RAI7: Provide Table 3.12-3.	2/14/2013	Table 3.12-3, Estimated Annual Gaseous Effluent, has been inserted
Rev 4b - RAI8: Please provide an assessment of cumulative impacts of the three facilities, i.e., UUSA, International Isotopes, and Waste Control Specialist, for each relevant section.	2/14/2013	The following Table and Sections were revised: 2.2 Cumulative Effects Table 2.2-1 Potential Cumulative Effects for the UUSA Expansion 4.1.3 Cumulative Impacts 4.2.8 Cumulative Impacts 4.3 – Geology 4.4.9 Cumulative Impacts on Water Resources 4.5 Ecological resources 4.6.6 Cumulative Impacts to Air Quality 4.7.4 Cumulative Impacts 4.8.3 Cumulative Impacts 4.10.6 Cumulative Impacts 4.12.12 Cumulative Impacts 4.13 Waste Cumulative Effects

Table of Contents

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List of Tables

List of Figures

1 INTRODUCTION

1.1 Introduction to the Environmental Report

This Supplemental Environmental Report (Supplemental ER, or ER) describes the environmental impacts of a proposal by Louisiana Energy Services, L.L.C. (dba URENCO USA (UUSA)) to expand the capacity at its existing gas centrifuge uranium enrichment facility near Eunice, New Mexico, in Lea County ("UUSA facility"). The UUSA facility currently produces enriched Uranium-235 (^{235}U) by the gas centrifuge process. The proposed capacity expansion will increase the production to 10 million separative work units (MSWU).

This Supplemental ER for the proposed UUSA facility capacity expansion serves two primary purposes. First, it provides information that is specifically required by the NRC to assist it in meeting its obligations under the National Environmental Policy Act (NEPA) of 1969, 42 USC 4321-4347, and the agency's NEPA-implementing regulations. Second, it demonstrates that the environmental protection measures proposed by UUSA are adequate to protect both the environment and the health and safety of the public.

UUSA has prepared this Supplemental ER to meet the requirements specified in 10 CFR 51, Subpart A, particularly those requirements set forth in 10 CFR 51.45(b)-(e) and 10 CFR 51.60(a). As appropriate, the organization of this Supplemental ER is consistent with the format for environmental reports recommended in NUREG-1748, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs, dated August 2003.

Under 10 CFR 51.60(a), an ER for a license amendment for which the applicant has previously submitted an environmental report may be limited to incorporating by reference, updating or supplementing the information previously submitted to reflect any significant environmental change. Pursuant to 10 CFR 51.60(a), this Supplemental ER incorporates by reference, updates, or otherwise references extensive sections of the Louisiana Energy Services (LES) National Enrichment Facility License Application ER, originally submitted in 2003 for the currently licensed 3.0 MSWU facility, most recently revised on January 3, 2012 (Revision 20) (LES ER). Tabular information provided in the body of this report, unless otherwise discussed, is for the 10 MSWU facility.

This Supplemental ER evaluates the environmental impacts of the UUSA proposed capacity expansion. Accordingly, this document includes discussions of the following: the proposed action, the need for and purposes of the proposed action, and the applicable regulatory requirements, permits, and required consultations (Chapter 1, Introduction to the Environmental Report); reasonable alternatives to the proposed action (Chapter 2, Alternatives); the currently licensed UUSA facility and the environment potentially affected by the proposed action (Chapter 3, Description of the Affected Environment); the potential environmental impacts resulting from the proposed action and its alternatives (Chapter 4, Environmental Impacts); mitigation measures that could eliminate or lessen the potential environmental impacts of the proposed action (Chapter 5, Mitigation Measures); and environmental measurements and monitoring programs (Chapter 6, Environmental Measurements and Monitoring Programs).

It is not practical to refer to a specific edition of each code, standard, NRC document, etc. throughout the text of this document. Instead, the approved edition of each reference that is applicable to the design, construction, or operation of UUSA is listed in ISAS Table 3.0-1.

1.1.1 The UUSA Organizational Structure

Louisiana Energy Services, L.L.C. (LES) is a wholly owned subsidiary of URENCO USA Inc., which in turn is a wholly owned subsidiary of URENCO Limited. In November 2011 the State of Delaware granted LES approval to use the trade name URENCO USA. Thus LES does business as URENCO USA (UUSA). In June 2012 the NRC approved a license amendment request (LAR 12-05) that changed the facility name from National Enrichment Facility (NEF) to URENCO USA.

1.1.2 Current Operational Information and Status

Below is a summary of pertinent operational information as of January 1, 2013. When compared to the operational metrics of the initial LES ER, are within the predicted bounds.

Current MSWU: UUSA received NRC authorization and began enrichment operations in June 2010. As of January 1, 2013 the annual production rate had increased to 2.136 MSWU.

Number of employees currently employed: As stated in Section 3.2.3 of the Supplemental ER, the current number of UUSA employees is approximately 250 people.

Tax revenue generated: Section 4.10.5 Regional Impacts Due to Construction and Operation has been revised to state that the Tax Revenue through 2012 was $93.9 million. Table 4-10-2, Estimated Tax Revenue has been revised to include Tax Revenue thru 2012.

Number of MSWU generated to date: UUSA has generated 1.53 MSWU through December 2012.

Current quantity of feed material: Through December 2012 a total of 862 feed cylinders have been received. 518 cylinders were received in 2012. The estimate of 395 shipments of feed cylinders per year in Section 3.2.4 of the Supplemental ER is an average.

Inventory: Through December 2012 UUSA has produced 158 product cylinders (138 in 2012), shipped 90 product cylinders (all during 2012) and created 179 tails cylinders.

Waste: As of December 2012 there had been no decontamination or chemistry laboratory activities and, thus, no wastes from these activities had been generated. Additionally, the ventilation filters have been able to be screened and determined to constitute universal waste. Table 3.12-1 has been revised to include the amount of radiological waste generated through December 31, 2012.Purpose and Need for the Proposed Action

1.1.3 Need for and Purpose of the Proposed Action

As set forth in Section 1.3, the proposed action is the issuance of an NRC license amendment under 10 CFR 70, 10 CFR 30, and 10 CFR 40 that would authorize UUSA to possess and use special nuclear material (SNM), source material and byproduct material, and expand the capacity of the existing Lea County, New Mexico, uranium enrichment facility to 10 MSWU.

The purpose and need of this proposed action is to satisfy the need for more reliable and economical domestic enriched uranium.

1.1.4 Current Demand for Enriched Uranium

Uranium enrichment is critical to the production of fuel for U.S. commercial nuclear power plants. These power plants currently supply approximately 19% of the nation's electricity requirements (NEI, 2011).

In 2011, 15 MSWU was purchased under enrichment services contracts in the United States (EIA, 2012 at 2). The Department of Energy's Energy Information Administration forecasts that the annual demand for enrichment services in the United States is likely to be between 13 million and 16 MSWU from 2006 through 2025 (EIA, 2003). U.S. demand is likely to rise above 16 MSWU due to the current approval and active construction of new reactors, power uprates of the existing 104 reactors, and/or potential expansion of the proposed projects.

As of 2010, worldwide demand was 49 MSWU; by 2015 it is expected to rise to 56 MSWU, and by 2020 to 67 MSWU (WNA, 2012). Worldwide forecasts of installed nuclear power generating capacity as of 2003, including forecasts of installed nuclear power generating capacity by country and regions, are included in the LES ER at Section 1.1 and LES ER Table 1.1-1.

There is an additional strategic consideration, i.e., the need for U.S. domestic uranium enrichment capability. Congress has characterized uranium enrichment as a "strategically important domestic industry of vital national interest," "essential to the national security and energy security of the United States," and "necessary to avoid dependence on imports." S. Rep No. 101-60, 101st Congress, 1st Session 8, 43 (1989); Energy Policy Act of 1992, 42 U.S.C. Section 2296b-6. National security and defense interests require assurance that "the nuclear energy industry in the United States does not become unduly dependent on foreign sources of uranium or uranium enrichment services." S. Rep. No. 102-72, 102nd Congress 1st Session 144-45 (1991). Domestically produced enriched uranium may also further non-proliferation goals. Under U.S. Section 123 Agreements for Peaceful Cooperation, which further nuclear non-proliferation, there are generally restrictions on indigenous enrichment and reprocessing plants (NNSA, 2012a). This means Section 123 Agreement partners must rely on imported enriched uranium to fuel their reactors, ideally from U.S. sources. The capacity expansion at the UUSA facility is a prerequisite to increasing exports to further these non-proliferation goals.

1.1.5 Current Supply of Enriched Uranium

In past years, domestic uranium enrichment has fallen to less than 20% of U.S. enrichment requirements (EIA, 2012 at 2, Figure S4).

At present, U.S. enrichment requirements are being met principally through enriched uranium produced at USEC's 50-year-old Paducah gaseous diffusion plant (GDP); the existing UUSA facility; and foreign enrichment facilities. The Paducah GDP produced approximately 5 MSWU in 2011 (USEC, 2012 at 13). However, the Paducah GDP is likely to close after May 2013 (USEC, 2012, DOE, 2012a at 2), when USEC's current contract with DOE to downblend Russian highly enriched uranium (described in more detail below) is set to expire. DOE is currently soliciting for any commercial interest in continuing to operate the plant in whole or part or in utilizing the facilities for other commercial purposes (DOE, 2012b).

As of the beginning of April 2012, capacity at the UUSA facility stood at approximately 1 MSWU but will grow to approximately 3.7 MSWU[1] when currently licensed Separations Building Modules (SBMs) 1001 and 1003 are fully operational (UUSA, 2012). With the exception of the original UUSA facility, no other new domestic enrichment facilities have been constructed.

Much of the foreign-derived low enriched uranium being used in the United States comes from the downblending of Russian high enriched uranium (HEU), pursuant to the 1993 Megatons to Megawatts agreement between the U.S. and Russian governments and administered by USEC. This agreement is scheduled to expire in 2013, but U.S. utilities are expected to continue to import enriched uranium from Russia (USEC, 2012, at 13).

1.1.6 Role of Proposed Action In Meeting Demand for More Reliable and Economical Domestic Enriched Uranium

As discussed below, U.S. demand, currently at approximately 16 MSWU, cannot be met in the long term by continued reliance on the Paducah GDP. In addition, the expansion of installed nuclear power capacity around the globe, primarily in China, Russia, and India, over the next two decades will require enrichment services that could be supplied by foreign sources. (EIA, 2011). The development of nuclear power in emerging markets could affect the amount of enriched uranium available for import to the United States.

Like the original construction in 2006 of the UUSA facility, the expansion of the UUSA facility would create more reliable and economical domestic enriched uranium, and in doing so would further the accompanying energy and national security policy objectives. *See* LES ER Section 1.1; Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico (NUREG-1790) at 1-2 to 1-5 (June 2005), as supplemented by the Atomic Safety and Licensing Board in Louisiana Energy Services (National Enrichment Facility), LBP-06-17, 63 NRC 747 (June 23, 2006); *see also* NIRS v. NRC, 509 F.3d 562, 567 (D.C. Cir. 2007) (approving supplementation).

The expanded UUSA facility would constitute a significant addition to current U.S. enrichment capacity. Further, the expanded UUSA facility would produce enriched uranium with approximately 50 times less energy than gas diffusion processes (NUREG-1790 at 2-41). The advantages of the UUSA facility's centrifuge technology relative to other extant enrichment technologies are discussed in more detail in Supplemental ER Section 2.1.12.1, Alternative Technologies.

1.1.7 Market Analysis and Commercial Considerations of Proposed Action and Six No-Action Scenarios

The consequences for the market supply and demand of enriched uranium under various scenarios are discussed below. These scenarios have been significantly revised from those in

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[1] The initial ER evaluation was based on the UUSA facility having nominal production capacity of 3.0 MSWU. However, once SBM-1001 and 1003 are fully operational, it is expected that they will have a nominal production capacity of 3.7 MSWU. So as to not cause confusion, this Supplemental ER has been prepared to evaluate the environmental impacts associated with the change from a 3.0 MSWU facility to a 10.0 MSWU facility. However, the No-Action Scenarios conservatively assume that the current UUSA facility will reach 3.7 MSWU but reference the 3.0 MSWU capacity.

the LES ER to reflect current market conditions, including the potential closure of the Paducah GDP and new plants proposed and/or licensed since 2003.

Scenario A is the proposed action; Scenarios B-G are variations of the no-action alternative. These scenarios do not represent the only long term possibilities for U.S. and world enrichment supply. Rather, they represent the most likely alternatives apparent at the present time based upon known and planned sources of supply. Of course, combinations of them and variations on them are also possible. These discussions of each individual alternative scenario would still be relevant even if the alternatives are used in combination.

1.1.7.1 Scenario A – (Proposed Action) UUSA expands capacity to 10 MSWU

Scenario A represents the scenario that is being actively pursued by UUSA and includes the capacity expansion of the existing UUSA facility from its maximum current projected capacity of 3.0 MSWU up to 10 MSWU — approximately an additional 6.3 MSWU.

This scenario effectively replaces the 5 MSWU per year of enrichment services from the Paducah GDP, with the additional capacity of 6.3 MSWU per year of enrichment services from UUSA, leaving the total capability of indigenous U.S. primary supply increased and secure for the long term.

This scenario would result in the establishment of a long-term source of energy efficient, low cost, reliable uranium enrichment services in the United States, which is positive with respect to the security of supply objective.

1.1.7.2 Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others; Paducah GDP continues operation

Under this scenario, there is a 6.3 MSWU per year supply deficit (due to the lack of UUSA expansion), with the UUSA plant operating at 3.0 MSWU and the Paducah GDP continuing to operate at 5 MSWU per year.

While providing for indigenous U.S. supply, the long-term viability of this scenario is problematic because there are currently no plans to extend operation of the Paducah plant after May 2013 (DOE, 2012a).

Even if the Paducah plant does not close in May 2013 and continues to produce at a 5 MSWU level, there are significant problems with relying on the Paducah GDP indefinitely, including its significant requirements for electric power (NUREG-1790 at 2-41). The Paducah GDP requires more than fifty times the energy for each SWU as the UUSA facility (NUREG-1790 at 2-41). This creates large economic costs, as well as environmental impacts due to the pollution created by the coal-fired electric power stations that generate this power. Scenario B is not viewed by UUSA as an attractive long-term solution.

1.1.7.3 Scenario C – No UUSA capacity expansion, UUSA facility operates at 3.0 MSWU; Paducah GDP shuts down; Additional enrichment capacity is supplied by a combination of the construction and operation of the AREVA Eagle Rock facility in Idaho Falls, Idaho (proposed capacity 3 MSWU), and GLE in Wilmington, North Carolina (proposed capacity 6 MSWU)

Under this scenario, the 6.3 MSWU supply deficit from not expanding the UUSA facility and the 5 MSWU deficit from Paducah closing is made up in part by a total of 9 MSWU from Eagle Rock and GLE. A 2.3 MSWU deficit would remain.

Neither facility has begun construction. GLE is potentially likely to be built because they have 1) successfully demonstrated a prototype facility over the last 2 years; and 2) are owned by very solvent partners GE, Hitachi, and Cameco (WNA, 2012). While they do not yet have their NRC license, they are in the last stages of the uncontested mandatory hearing process for that license (NRC, 2012b).

The Areva Enrichment Services, L.L.C. Eagle Rock facility has: 1) an NRC license; 2) a $2 billion DOE loan guarantee; and 3) contracts with customers for the first 10 years of output. However, Areva announced in December 2011 that it was postponing breaking ground until a financial partner could be found to help fund the facility's construction (WP, 2012). The company has stated it will now start construction in late 2013 or 2014 (WP, 2012).

If these two new facilities are constructed, they will create significantly larger environmental impacts than the UUSA expansion. Instead of just constructing the additional facilities needed for the expansion, construction at Eagle Rock or GLE would require the construction of a new facility, including the construction of a number of support and shared facilities already in existence at the UUSA site. These shared and support facilities include the following: water and power infrastructure, administration buildings, and site security facilities, with an order of magnitude cost of approximately $1 billion.

In addition, the Areva Eagle Rock site is a greenfield site. In a similar context, the NRC has noted that for greenfield sites, "[t]he siting of a nuclear plant on such a site would be expected to have significant detrimental impacts on land use, ecology, and aesthetics — particularly when compared with the equivalent impacts at sites with existing nuclear power plants" (NRC, 2007 at 230-31).

Scenario C, should it come to fruition, provides for indigenous U.S. supply, but only from two plants that have not yet been constructed. Should the construction not be completed, there would remain an ongoing deficit of indigenous U.S. supply. Because of the uncertainty surrounding the construction of the new facilities, this scenario may not alleviate concerns among U.S. purchasers of enrichment services regarding either long-term security of supply or ensuring a competitive procurement process for U.S. purchasers of these services. Scenario C is not viewed by UUSA as the most advantageous long-term solution.

1.1.7.4 Scenario D – No UUSA capacity expansion, UUSA facility operates at 3.0 MSWU; Paducah GDP shuts down; Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock (proposed capacity 3 MSWU), GLE (proposed capacity 6 MSWU), and the USEC American Centrifuge Plant (ACP) in Piketon, Ohio (planned capacity 3.7 MSWU)

Under this scenario, the 6.3 MSWU supply deficit from not expanding the UUSA facility and the 5 MSWU deficit from Paducah closing is made up by 12.7 MSWU from a combination of Eagle Rock in Idaho Falls, Idaho (proposed capacity 3 MSWU), GLE in Wilmington, North Carolina (proposed capacity 6 MSWU), and the ACP in Piketon, Ohio (planned capacity 3.7 MSWU).

As noted in the discussion of Scenario C, neither the Eagle Rock nor the GLE facility has yet broken ground. ACP is still less likely to become operational in the near future. While the ACP plant does have a license, and received significant federal funding in June 2012, USEC is still conducting research and development, and reportedly has not yet developed a commercially deployable version of centrifuges (WP, 2012, CG, 2012).

In addition, as noted for Scenario C, the environmental impact of incremental expansion of an existing plant (i.e., UUSA) is smaller than constructing a new facility on an existing licensed site (GLE and ACP) and much smaller than developing a greenfield site (Eagle Rock). Because of the uncertainty surrounding the construction of the new facilities, Scenario D is not viewed by UUSA as an attractive long-term solution.

1.1.7.5 Scenario E – No UUSA Expansion; U.S. Highly Enriched Uranium (HEU)-Derived Low-Enriched Uranium (LEU) is Made Available to the Commercial Market

Under this scenario, the 6.3 MSWU supply deficit from not expanding the UUSA facility and the 5 MSWU deficit from Paducah closing is made up by the U.S. government making available additional HEU-derived LEU from DOE to the U.S. commercial market.

The National Nuclear Security Administration states that, as of 2012, a total of 209 metric tons (MT) of U.S. HEU has been declared surplus to U.S. defense needs and designated for downblending to LEU, and 119 of the 209 MT have been already downblended for a variety of federal and commercial uses (NNSA, 2012b).

Based on the discussion presented in LES ER Section 1.1.2.3, the net increase in enrichment services that could be obtained from any additional DOE HEU-derived LEU would be only 24% of the SWU contained in the LEU. Therefore, even if it were assumed that all remaining 90 metric tons of HEU were to made available for commercial use, at the present conversion rate of 0.184 MSWU per MT HEU, multiplied by 24%, the net increase in supply would be only 3.9 (=490x0.184x0.24) MSWU. This is about a quarter of one year of U.S. total requirements for enrichment services.

The issue of replacement capacity for UUSA would not have been solved under Scenario E. Consequently, neither the security of supply objective nor the objective of ensuring a competitive procurement process for U.S. purchasers of these services could be assured.

1.1.7.6 Scenario F – No UUSA Expansion; Russia is Allowed to Increase Sales Into the United States

This scenario also assumes that the UUSA plant does not expand and maintains its maximum current projected capacity of 3.0 MSWU. This scenario does not provide for additional enrichment capacity located in the United States. Under this scenario, it is postulated that Russia is allowed to increase its sales of commercial enrichment services into the United States and Europe to compensate for the 6.3 MSWU per year of enrichment services that would have been provided by UUSA under Scenario A.

However, until 2020, U.S. law only permits Russia to sell, at most, approximately 20% of the U.S. demand, or about 3 MSWU per year, with additional quantities eligible to be imported for use in the initial fueling of new U.S. reactors (USEC 2012, 80).

Scenario F would not alleviate the desire on the part of U.S. purchasers for either additional domestic uranium enrichment capability in the U.S. nor be the equivalent of the 6.3 MSWU to be produced by the UUSA expansion. Consequently, neither the security of supply objective nor the objective of ensuring a competitive procurement process for U.S. purchasers of these services could be assured (USEC 2012, 80).

1.1.7.7 Scenario G – No UUSA Expansion; United States Increases LEU Imports from Foreign Sources

This scenario also assumes that the UUSA plant does not expand and maintains its maximum current projected capacity of 3.0 MSWU. This scenario does not provide for additional enrichment capacity located in the United States. Under this scenario, it is postulated that other countries such as China, France, Germany, the Netherlands, and the United Kingdom increase their sale of enrichment services to the United States to compensate for the 6.3 MSWU per year of enrichment services that would have been provided by UUSA under Scenario A.

However, the expansion of installed nuclear power capacity around the globe, primarily in China, Russia, and India, over the next two decades will require enrichment services that could be supplied by foreign sources (EIA, 2011). The development of nuclear power in emerging markets could affect the amount of enriched uranium available for import to the United States.

Scenario G would not alleviate the need for additional domestic uranium enrichment capability in the United States, and the expansion of nuclear power generation overseas could affect the availability of foreign supply. Consequently, neither the security of supply objective nor the objective of ensuring a competitive procurement process for U.S. purchasers of these services could be assured

1.1.7.8 Conclusion

When the critical nuclear fuel procurement objectives, the total U.S. demand, and the security of supply for U.S. purchasers of these services are considered, it becomes apparent that for long-term planning purposes those alternatives that rely upon additional HEU-derived SWU (Scenario E), additional use of Russian commercial enrichment services (Scenario F), or additional imports from foreign sources (Scenario G) may not be adequate to make up the supply deficit with regard to the enriched uranium available to U.S. commercial nuclear power plants.

This leaves Scenarios A through D, which provide for the use of either existing or new indigenous uranium enrichment capacity in the United States for further consideration. Among these alternatives, Scenarios A and C involve the long-term use of centrifuge technology for uranium enrichment. In Scenario A, UUSA expands capacity to 10 MSWU. In Scenario C, Eagle Rock and GLE construct and operate facilities to deploy up to 9.0 MSWU per year of enrichment capability and the UUSA proposed expansion does not proceed.

In contrast, Scenario B relies either in part or entirely upon the long-term use of the Paducah GDP. In Scenario B, 5 MSWU per year of enrichment capability is provided by the continued operation of the Paducah GDP while the UUSA expansion does not proceed. In Scenario D, UUSA does not increase capacity, but the additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock (proposed capacity 3 MSWU), GLE (proposed capacity 6 MSWU), and ACP (planned capacity 3.7 MSWU).

UUSA believes that the approach that best serves the U.S. owners and operators of nuclear power plants and ultimately the consumers of electricity in the United States would be Scenario A. This approach, which is being actively pursued at the present time, provides for the expansion and continued operation of the UUSA facility, using centrifuge technology that would significantly improve security of supply. This approach will ensure a competitive procurement process for U.S. purchasers of these services. The presence of alternative suppliers with the capability to increase capacity to meet potential supply shortfalls greatly enhances security of supply for both generators and end-users of nuclear electric generation in the United States. Further, the proposed capacity expansion of the UUSA facility would provide additional domestic supply of enriched uranium consistent with national energy security objectives.

1.2 Proposed Action

The proposed action is the issuance of an NRC license amendment under 10 CFR 70, 10 CFR 30 and 10 CFR 40 that would authorize UUSA to possess and use special nuclear material (SNM), source material and byproduct material, and to expand the capacity of its existing uranium enrichment facility to 10 MSWU.

To expand its capacity to 10 MSWU, UUSA would build, in three phases, three new Separations Building Module (SBMs) buildings (see Supplemental ER Figure 4.12-2, Site Layout for UUSA). An additional Cylinder Receipt and Dispatch Building (CRDB) would also be constructed between SBM-1007 and SBM-1009 to accommodate additional cylinder handling requirements. The Uranium Byproduct Cylinder (UBC) storage pad would increase from 2.6 acres to 23 acres to accommodate storage of up to 25,000 DUF_6 cylinders and will require two additional UBC Basins to manage storm water run-off. UUSA would also increase the capacity of its utility substation to accommodate additional 115kV/13kV transformers. The existing substation is built to support additional transformers as required to support the proposed facility expansion. Plant support systems (i.e., compressed air, centrifuge cooling water, and electrical distribution) will be provided by modular units for each new SBM.

The proposed UUSA facility expansion is expected to require 8 additional years of construction (until approximately 2020). Only previously disturbed site surface area will be utilized during the build-out.

1.2.1 The Proposed Expansion Site

The expansion would take place within the footprint of the existing UUSA uranium enrichment facility, located 8 km (5 mi) east of Eunice, New Mexico in Lea County. See Supplemental ER Figure 1.3-1; Figure 1.3-4. The existing site is described in Section 1.2.1 of the LES ER. The UUSA facility is currently licensed for 30 years of operation.

1.2.2 Description of UUSA Operations and Systems

The operations and systems at the existing UUSA facility in Lea County, New Mexico are described in Section 1.2.2 of the LES ER.

To achieve the expanded capacity, UUSA will continue to use the gas centrifuge process to separate natural uranium hexafluoride feed material containing approximately 0.71 Uranium-235 (^{235}U) into a product stream enriched up to the UUSA license limit in isotope ^{235}U and a depleted UF_6 stream containing approximately 0.1 to 0.5 $^{w}/_{o}$ ^{235}U.

1.2.3 Schedule of Major Steps Associated with the Proposed Action

The UUSA capacity expansion will be constructed in phases. Each phase will result in additional SWU capacity, with the first unit beginning operation prior to the completion of the remaining phases.

The anticipated schedule for the next major phases of ongoing construction and decommissioning is as follows:

Milestone	Estimated Date
Completion of SBM-1001 & Extension	November 2012
Completion of SBM-1003 (Phase II)	March 2014
Completion of SBM-1005 (Phase III)	September 2016
Completion of SBM-1007 (Phase IV)	September 2018
Completion of SBM-1009 (Phase V)	September 2020
Submit License Termination Plan to NRC	June 2037
Complete Construction of D&D Facility	June 2040
D&D Completed	June 2050

SBMs or Separations Building Modules represent the construction of and installation of additional centrifuge capacity according to the phased facility capacity expansion.

1.2.4 License Amendments Associated with the Proposed Action

The UUSA expansion requires an amendment to the current NRC materials license. UUSA will request an amendment that addresses the changes to facility layout and physical security features described in Sections 1.3 and 2.1.2 of this Supplemental ER.

The requested license amendment will also address needed changes to the current safety basis as described in the UUSA Integrated Safety Analysis (ISA) Summary, and changes to the UUSA Safety Analysis Report (SAR).

Increasing the annual plant capacity to 10 MSWU will change the current safety basis as described in the UUSA Integrated Safety Analysis (ISA) Summary. Accordingly, the ISA will be changed to reflect an increase in the "product capacity," "Operating Limits," and "enrichment plant capacity" to 10 MSWU. Changes to the descriptions and site layout figures for the SBMs, CRDB2, and the UBC Storage Pad will be made successively to support the construction Phase requirements. Additionally, changes to the ISA section 3.4.11, Material Handling Processes, will be made to identify the flow between CRDB1 and CRDB2, estimated cylinder deliveries to CRDB1 and CRDB2, new crane data for CRDB2, and the revised estimate for the process cylinder generation.

The UUSA Safety Analysis Report (SAR) will be changed to reflect the increased "nominal capacity" and "maximum gross output" of the facility to 10 MSWU. Successive changes to support the construction Phase requirements will include descriptions and site layout figures for the SBMs, CRDB2, UBC Storage Pad, UBC Basins, and the Utility Substation. The SAR will be updated successively by each phase to include the estimated dose rates for the new SBMs and CRDB, increases in site chemical/product inventories, and decommissioning cost estimates. The UBC Storage Pad is already discussed in the SAR, but the cylinder storage capacity is not.

Increasing the annual production capacity to 10 MSWU will not require additional Items Relied on for Safety (IROFS). It should be noted that a new capability is being designed into SBM-1005 that will require the addition of two new administrative IROFS but is not related to the increase in annual production capacity.

The increase in production capacity to 10 MSWU will not require modification of License Conditions 6A or 6B that establish the mass limits for Natural (Feed) and Depleted (Uranium Byproduct) Uranium and Product enriched up to 5% by weight. License Condition 6A establishes the mass limits for Natural (Feed) and Depleted (Uranium Byproduct) Uranium at 136,120,000 kg. The estimated Natural (Feed) and Depleted (Uranium Byproduct) Uranium mass at the 10 MSWU capacity will be below this License Condition 6A limit. The mass limit for Product enriched up to 5% by weight in License Condition 6B is 545,000 kg, and the maximum estimated Product mass onsite for the 10 MSWU facility will be well below this License Condition 6B limit.

License Condition 21 currently limits DUF_6 cylinder storage to 15,727 48Y cylinders or the equivalent amount of Uranium stored in other NRC accepted and DOT certified types of DUF_6 cylinders. The license amendment request (LAR) will request that this limit be changed to 25,000 cylinders consistent with the revised agreement with New Mexico.

License Condition 23 currently requires financial assurance for off-site disposal of 15,727 DUF_6 cylinders. The LAR will request that this limit be changed to 25,000 DUF_6 cylinders.

1.2.5 Pre-Construction Activities

UUSA also plans to perform a number of activities prior to the facility capacity expansion that do not come within the definition of construction under 10 CFR 70.4 and are not subject to NRC's regulatory authority (FR, 2011). Under the NRC's definition, construction does not include, inter alia:

> (3) Preparation of the site for construction of the facility, including clearing of the site, grading, installation of drainage, erosion and other environmental mitigation measures, and construction of temporary roads and borrow areas;
>
> (4) Erection of fences and other access control measures that are not related to the safe use of, or security of, radiological materials subject to this part;
>
> (5) Excavation;
>
> (6) Erection of support buildings (*e.g.,* construction equipment storage sheds, warehouse and shop facilities, utilities, concrete mixing plants, docking and unloading facilities, and office buildings) for use in connection with the construction of the facility;
>
> (7) Building of service facilities (*e.g.,* paved roads, parking lots, railroad spurs, exterior utility and lighting systems, potable water systems, sanitary sewerage treatment facilities, and transmission lines);
>
> (8) Procurement or fabrication of components or portions of the proposed facility occurring at other than the final, in-place location at the facility.

10 CFR 70.4, Construction (3)-(8). Construction also does not include "[t]aking any other action that has no reasonable nexus to: (i) Radiological health and safety, or (ii) Common defense and security." 10 CFR 70.4, Construction (9).

The ongoing pre-construction activities to support the facility capacity expansion create minimal additional disturbance to the existing site features at the project site. No additional access roads will be required to support the ongoing construction of the proposed facility capacity expansion. In addition, the proposed facility capacity expansion will not require the installation of additional water and electrical utility lines.

Certain site preparation and Quality Level (QL) 3 civil construction work (standard commercial activities with no reasonable nexus to radiological safety or security) will be performed for SBM-1005 to support the facility capacity expansion. These activities do not fall within the definition of construction under 10 CFR 70.4. Because the capacity expansion is for an existing operating facility, the pre-construction activities are expected to be limited in nature and take place on disturbed areas. The principal pre-construction activities for SBM-1005 will include the following:

- Begin Site Preparation and Civil Construction - QL-3 Work
- Initiate procurement of QL-1 rebar
- Initiate procurement of QL-1 and QL-3 structural steel
- Initiate procurement of Core/Non-Core Equipment – IROFS

As described in Section 4.14, the impacts from the pre-construction activities will be negligible and are bounded by the impact analysis described in this Supplemental ER.

1.2.6 Construction-at-Risk Activities Subject to Notification or Alternatively for Exemption

In addition to the pre-construction activities referenced above, UUSA plans to commence certain limited construction activities at its own risk for SBM-1005 prior to completion of the NRC Staff's review of the license amendment associated with the facility capacity expansion. The Phase III construction-at-risk activities for SBM-1005 will include the following:

- Begin foundation construction (QL-1)
- Begin erection of structural steel (QL-1)
- Complete weather-tight UF_6 area and Assay Unit 1005

The environmental impacts related to the construction-at-risk work for SBM-1005 were previously evaluated in the 2005 EIS when the facility was designed to consist of three SBM buildings each housing two cascade halls. NUREG-1790, at Section 2.1. The 2005 EIS found that construction impacts were SMALL with the exception of transportation impacts during construction, which were found to be SMALL to MODERATE. For a summary of the impact analysis, see NUREG-1790, at xxiv – xxvii and Table 2-9.

1.2.7 Connected, Cumulative, or Similar Actions to the Proposed Action

Under NEPA, the NRC considers the impacts not only of the proposed action, but of proposed connected and cumulative actions. 40 CFR 1508.23, 1508.25(a). Connected actions are those that (i) "automatically trigger" other actions that may require environmental impact statements; (ii) cannot or will not proceed unless other actions are taken; or (iii) are interdependent parts of a larger action. 40 CFR 1508.25(a)(1). Cumulative actions are other formally proposed actions that, "when viewed with other proposed actions have cumulative significant impacts." 40 CFR 1508.25(a)(2).

The pre-construction activities identified in Section 1.3.5 are connected actions with the proposed action. Their impacts are therefore included in this Supplemental ER in Section 4.14. There are no current formally proposed actions that would have cumulative impacts with the UUSA facility expansion.

NRC may also, at its discretion, analyze the impacts of actions similar to the proposed action. 40 CFR 1508.25(a)(3). Similar actions are proposed actions "which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography." 40 CFR 1508.25(a)(3). There are no proposed actions similar to the proposed action.

1.2.8 Section 1.3 Figures

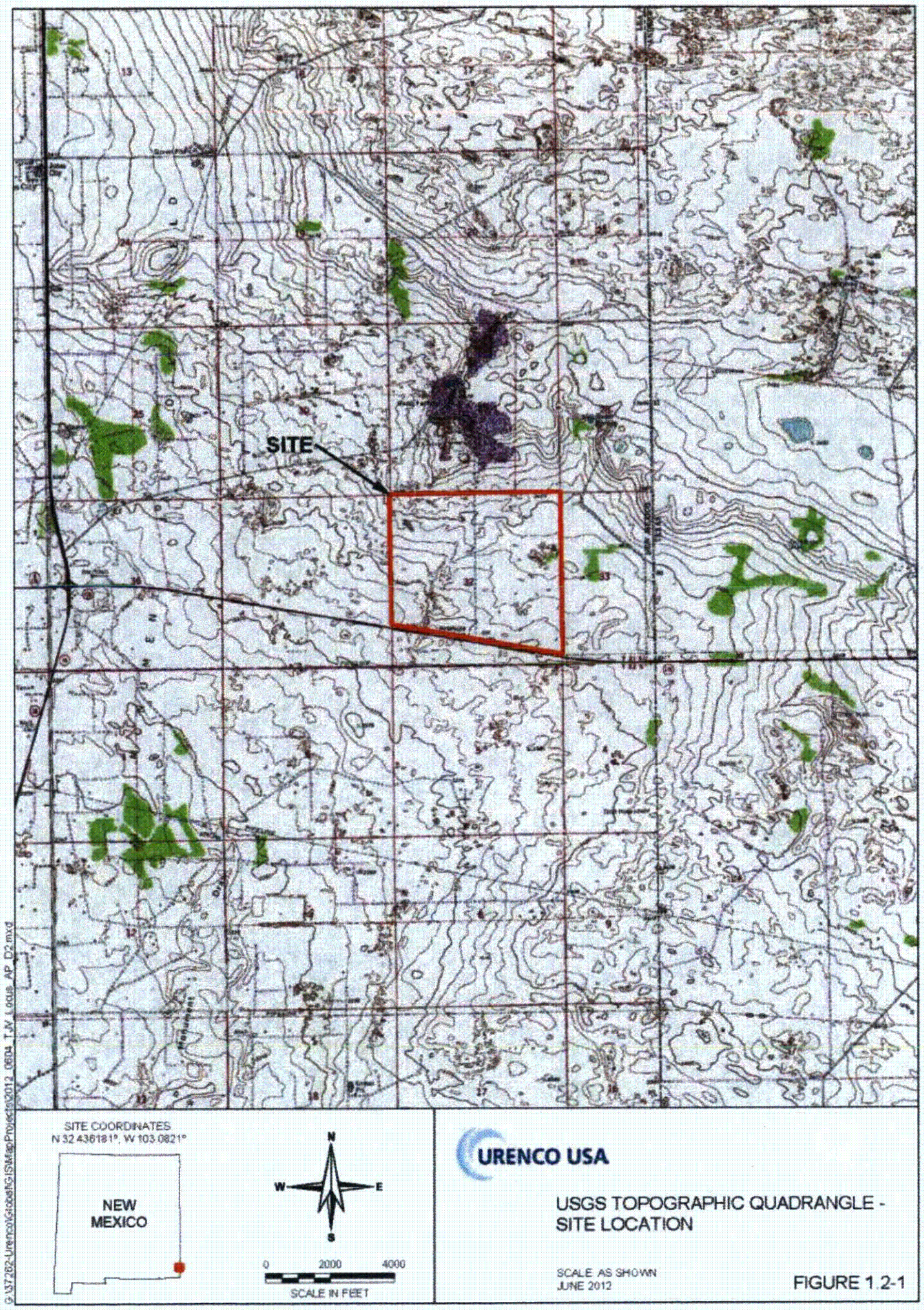

Figure 1.3-1 Site Location

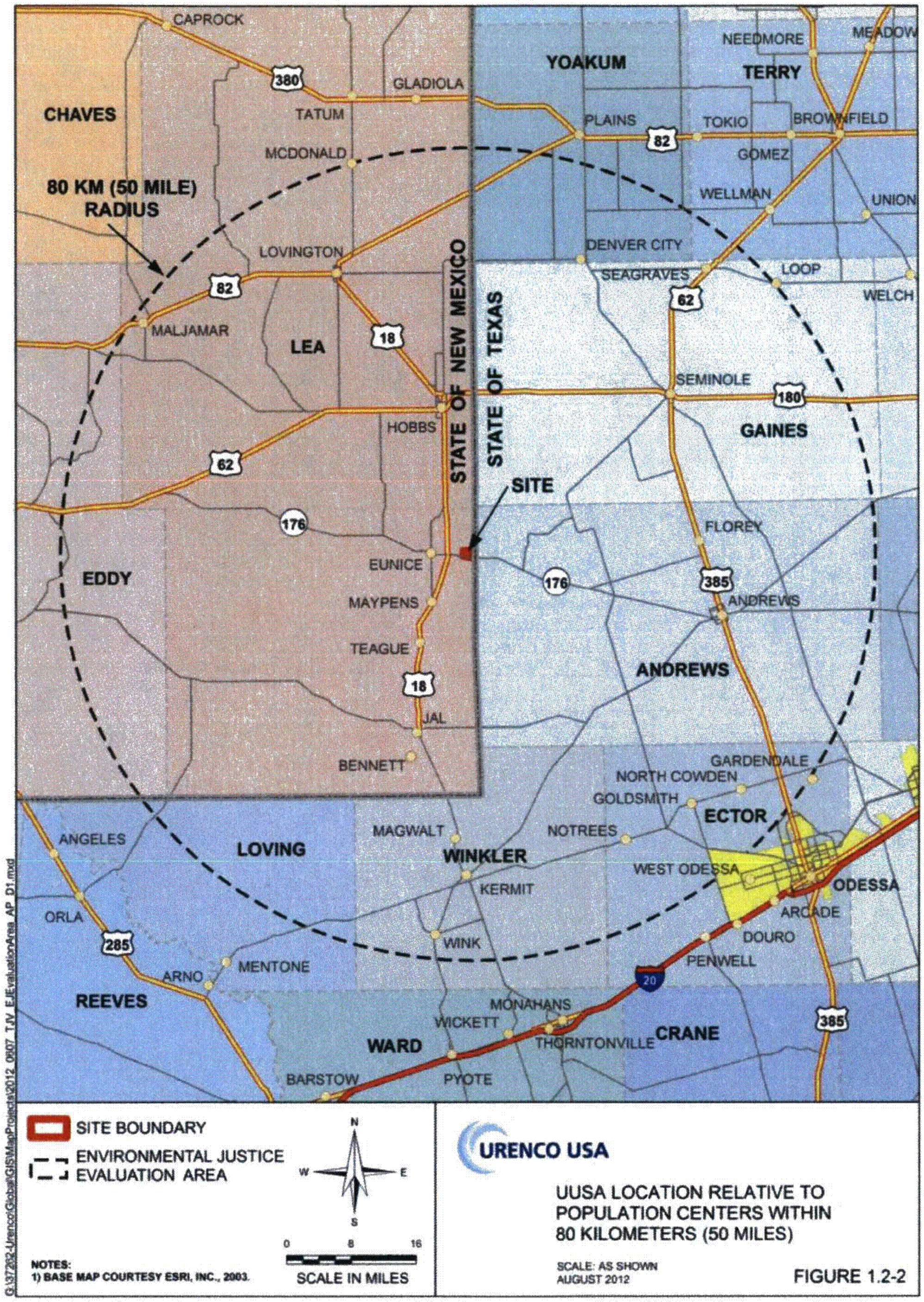

Figure 1.3-2 UUSA Location Relative to Population Centers Within 80-Kilometers (50-Miles)

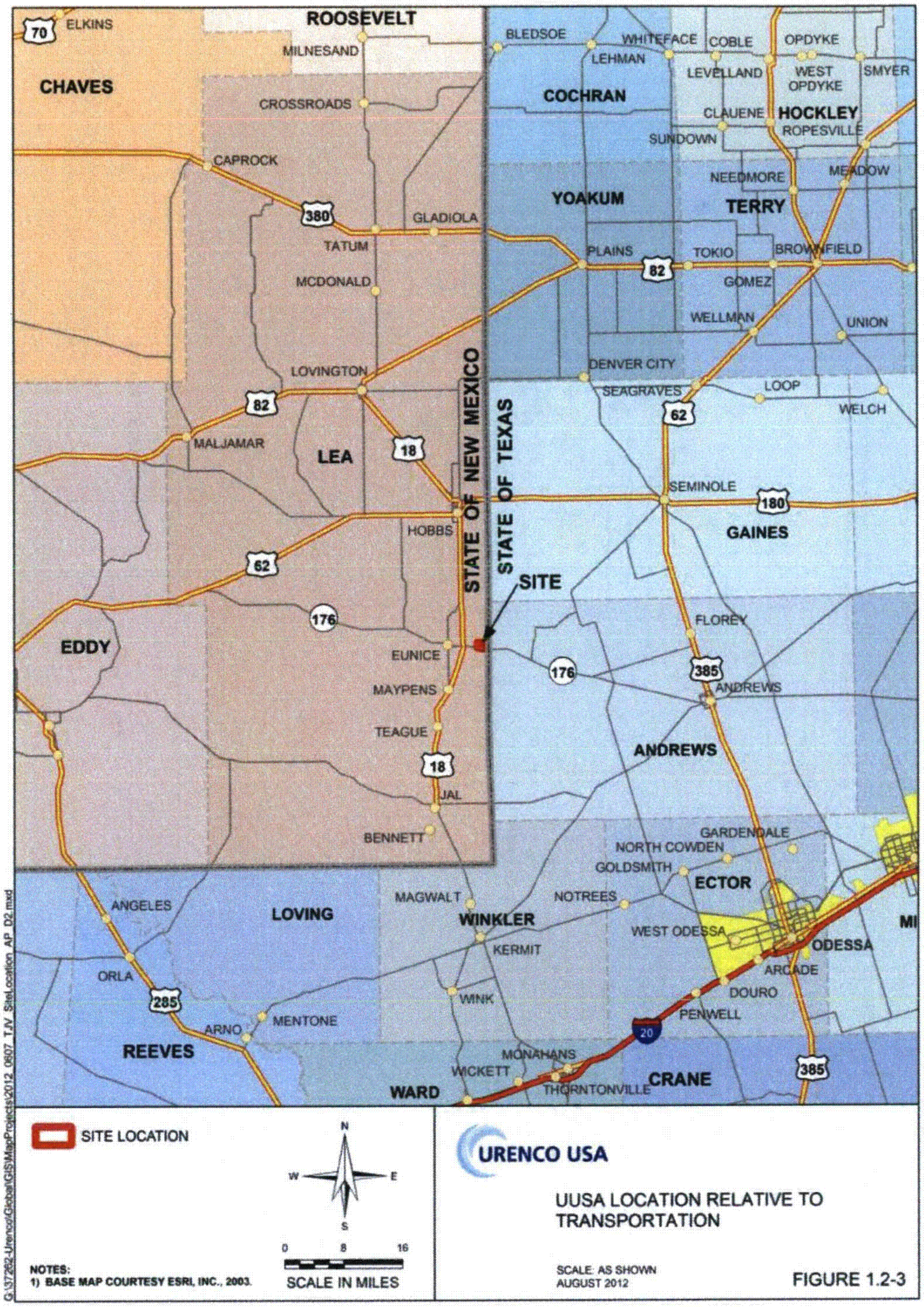

Figure 1.3-3 UUSA Location Relative to Transportation Routes

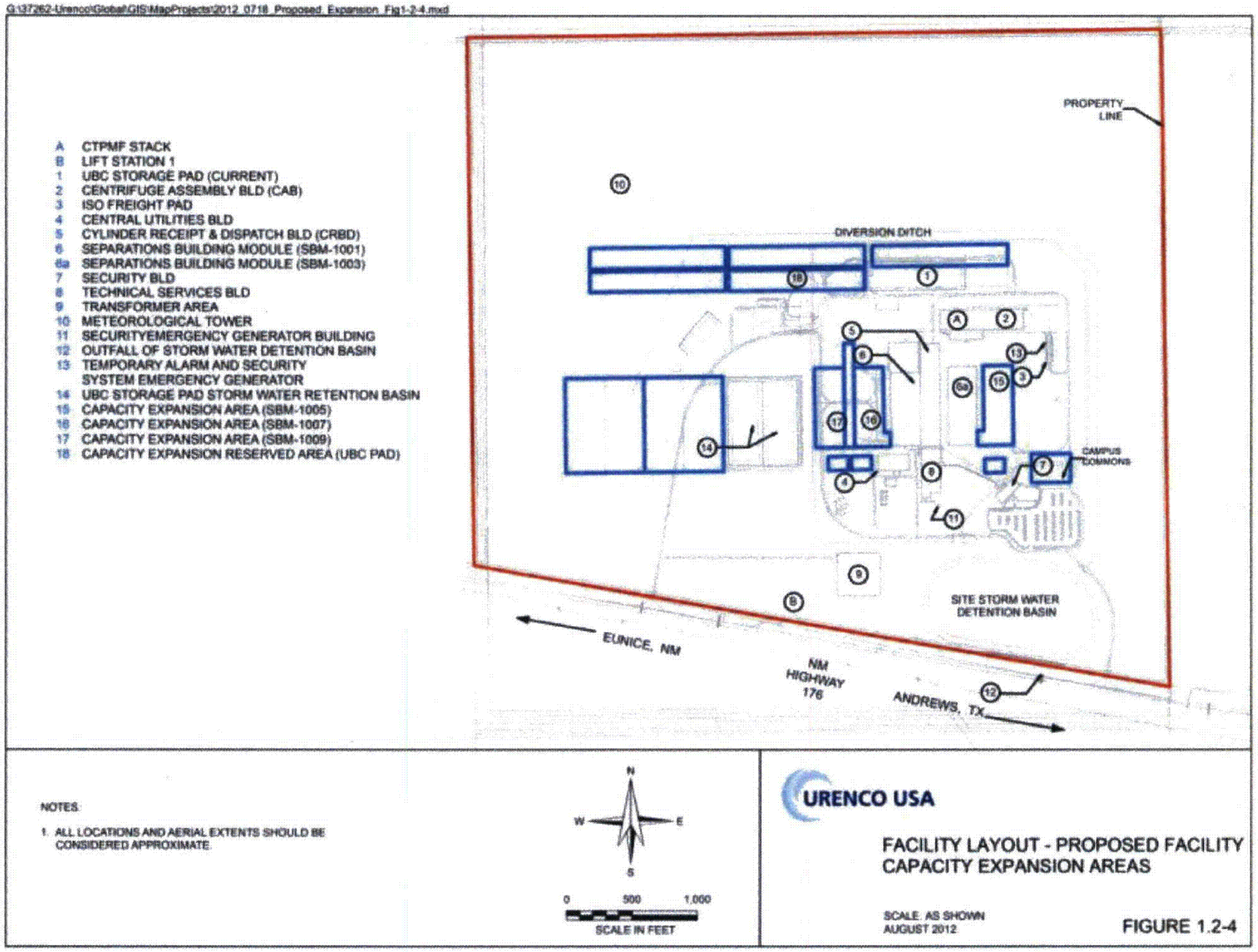

Figure 1.3-4 Facility Layout – Proposed Facility Capacity Expansion Areas

1.3 Applicable Regulatory Requirements, Permits, and Required Consultations

In addition to the NRC licensing and regulatory requirements, a variety of environmental regulations apply to the UUSA facility during the ongoing construction and operation phases. Some of these regulations require permits from, consultations with, or approvals by, other governing or regulatory agencies. Some apply only during certain phases of development, rather than over the entire life of the facility. Federal, state, and local statutes and regulations (non-nuclear) have been reviewed to determine their applicability to the ongoing construction and operation phases of the proposed UUSA facility expansion.

Following is a list of federal, state, and local agencies with which consultations have been conducted. Table 1.4-1, Regulatory Compliance Status, summarizes the status of the permits and approvals required to construct and operate the UUSA facility expansion.

1.3.1 Federal Agencies

Nuclear Regulatory Commission (NRC)

The applicable NRC regulatory requirements, including 10 CFR Parts 30, 40, 70, and 71, are described in Section 1.3.1 of the LES ER. These requirements apply with equal force to this expansion.

U.S. Environmental Protection Agency, (EPA)

The EPA has primary regulatory authority relating to compliance with the Clean Air Act (CAA), Clean Water Act (CWA), Safe Drinking Water Act (SDWA), and Resource Conservation and Recovery Act (RCRA). However, EPA Region 6 has delegated regulatory jurisdiction to the New Mexico Environment Department (NMED) for nearly all aspects of permitting, monitoring, and reporting activities relating to these statutes and associated programs. Applicable state requirements, permits, and approvals are described in Section 1.4.2, State Agencies.

Environmental Standards for the Uranium Fuel Cycle (40 CFR 190 Subpart B) establishes the maximum doses to the body organs resulting from operational normal releases and received by members of the public.

The Safe Drinking Water Act (SDWA) provides for protection of public water supply systems and underground sources of drinking water. 40 CFR 141.2 defines public water supply systems as systems that provide water for human consumption to at least 25 people or at least 15 connections. Underground sources of drinking water are also protected from contaminated releases and spills by this act. UUSA is not using site groundwater or surface water supplies. UUSA obtains potable water from the nearby municipal water supply system of Eunice, New Mexico.

The Emergency Planning and Community Right-to-Know Act of 1986 (40 CFR 350 to 372) establishes the requirements for federal, state and local governments, Indian Tribes, and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals. The Community Right-to-Know provisions help increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and their releases into the environment. States and communities, working with facilities, can use the information to improve chemical safety and protect public health and the environment.

National Pollutant Discharge Elimination System (NPDES) General Permit for Industrial Stormwater: This permit is required for point source discharge of stormwater runoff from industrial or commercial facilities to the waters of the state. All new and existing point source industrial stormwater discharges associated with industrial activity require a NPDES Stormwater Permit from the EPA Region 6 and an oversight review by the New Mexico Water Quality Bureau. UUSA is eligible to claim the "No Exposure" exclusion for industrial activity of the NPDES stormwater Phase II regulations. As such, UUSA submitted a No Exposure Certification immediately prior to initiating operational activities. This certificate will be reevaluated following facility expansion and/or as required by the New Mexico program.

NPDES General Permit for Construction Stormwater: Ongoing construction activities at the UUSA site will continue to involve the grubbing, clearing, grading, or excavation of 0.4 or more ha (1 or more acres) of land coverage and will continue to operate under a NPDES Construction General Permit (CGP) from the EPA Region 6 and an oversight review by the New Mexico Water Quality Bureau. Various land clearing activities such as off-site borrow pits for fill material have also been covered under this general permit. Construction activities, to support the capacity expansion, including the use of additional temporary construction facilities may disturb a small part of the site. UUSA has developed a Stormwater Pollution Prevention Plan (SWPPP) that will continue to be implemented and updated as necessary for the proposed facility capacity expansion.

National Historic Preservation Act of 1966 (16 U.S.C. § 470, et seq.)

The National Historic Preservation Act (NHPA) was enacted to protect the nation's cultural resources. The NHPA is supplemented by the Archaeological and Historic Preservation Act. This act directs federal agencies in recovering and preserving historic and archaeological data that would be lost as the result of construction activities. Seven potential archaeological sites were identified and previously mitigated to recover any significant information from all sites prior to the initial construction of the UUSA facility. No additional site will be disturbed as part of the capacity expansion and ongoing construction.

U.S. Army Corps of Engineers (USACE)

The Clean Water Act established a permit program under Section 404 to be administered by the USACE to regulate the discharge of dredged or fill material into "the waters of the U.S." The USACE also evaluates wetlands, floodplains, dam inspection, and dredging of waterways. The capacity expansion at UUSA will not impact or involve any wetlands, surface waters, dams, or other waterways. By letter dated March 17, 2004, the USACE notified LES of its determination that there are no USACE jurisdictional waters at the UUSA site (USACE, 2004). Therefore, a Section 404 permit was not required for the initial construction and will not be required for the proposed facility expansion.

Other Federal Requirements

All other federal requirements, including the Department of Transportation's regulations for the transport of UUSA UF_6 cylinders at 49 CFR Parts 107, 171, 173, 177, and 178, the Noise Control Act of 1972, the U.S. Department of Agriculture's Natural Resources Conservation Service program, the Hazardous Materials Transportation Act, the Occupational Safety and Health Act of 1970, and the Endangered Species Act are described in Section 1.3.1 of the LES

ER. The expansion is not expected to trigger any new action under these requirements, but these federal requirements will remain in force.

1.3.2 State Agencies

The New Mexico Environment Department (NMED) is charged with the responsibility of managing and protecting human health and the environment in the state of New Mexico. The NMED consists of several divisions that have responsibility for various permits and environmental programs. UUSA continues to consult with NMED regarding NMED permit requirements. The NMED Bureau has the responsibility for reviewing and approving permitting actions. The general and specific NMED permits and permit requirements are discussed below.

New Mexico Air Quality Bureau (NMED/AQB):

The Air Quality Bureau (AQB) Permitting Section processes permit applications for industries that emit pollutants to the air. The Permitting Section consists of two groups: New Source Review and Title V. New Source Review (NSR) is responsible for issuing Construction Permits, Technical and Administrative Revisions or Modifications to existing permits, Notices of Intent (NOIs) for smaller industrial operations, and No Permit Required (NPR) determinations. The two types of Permits issued for larger industrial facilities are as follows (NMAC, 2001b, at Section 20.2.78).

- Construction Permits are required for any person constructing a stationary source, which has a potential emission rate greater than 4.5 kg (10 lbs) per hour or 22.7 MT (25 tons) per year of any regulated air contaminant for which there is a National or New Mexico Ambient Air Quality Standard. If the specified threshold in this subsection is exceeded for any one regulated air contaminant, all regulated air contaminants with National or New Mexico Ambient Air Quality Standards emitted are subject to permit review. Within this subsection, the potential emission rate for nitrogen dioxide shall be based on total oxides of nitrogen, all sources with the potential emission rate greater than 4.5 kg (10 lbs) per hour, or 22.7 MT (25 tons) per year, of criteria pollutants (such as nitrogen oxides and carbon monoxide). Air quality permits must be obtained for new or modified sources.

- Operating Permits (under Title V) are required for major sources that have a potential to emit more than 4.5 kg (10 lbs) per hour or 91 MT (100 tons) per year for criteria pollutants, or for landfills greater than 2.5 million m^3 (88 million ft3). In addition, major sources also include facilities that have the potential to emit greater than 9.1 MT (10 tons) per year of a single Hazardous Air Pollutant, or 22.7 MT (25 tons) per year of any combination of Hazardous Air Pollutants.

Generally, mobile sources are not required to obtain an operating permit from AQB; however, there are provisions for inspection and maintenance of mobile sources in certain non-attainment areas. Lea County, New Mexico is not located in a non-attainment area.

UUSA will continue to emit levels of air pollution below the conditions of 20.2.72 NMAC, Operating Permits, which would require an air quality permit. UUSA, however, will have a potential emission rate for non-exempt equipment greater than 9.1 MT (10 tons) per year and thus be subject to 20.2.73 NMAC, Notice of Intent, for which UUSA has submitted an application to the AQB by letter dated April 20, 2004.

By letter dated May 27, 2004, the AQB acknowledged receipt of the NOI application and notified UUSA that the application will serve as the Notice of Intent in accordance with 20.2.73 NMAC (AQB, 2004). The AQB also notified UUSA of its determination that an air quality permit under 20.2.72 NMAC is not required and that New Source Performance Standards (NSPS) and National Emissions Standards for Hazardous Air Pollutants (NESHAPS) do not apply to the NEF as well. Lastly, the AQB stated that operation of the standby diesel generators and surface coating activities are exempt from permitting requirements, provided all requirements specified in 20.2.72.202.B (3) and 20.2.72.202.B (6) NMAC, respectively, are met. Additional filings will be necessary to support the proposed facility expansion, however, it is anticipated that the total emissions will remain below the threshold requiring the NMED to issue a permit.

New Mexico Water Quality Bureau (NMED/WQB)

National Pollutant Discharge Elimination System (NPDES) General Permit for Industrial Stormwater: This permit is required for point source discharge of stormwater runoff from industrial or commercial facilities to the waters of the state. All new and existing point source industrial stormwater discharges associated with industrial activity require a NPDES Stormwater Permit from the EPA Region 6 and an oversight review by the New Mexico Water Quality Bureau. UUSA is eligible to claim the "No Exposure" exclusion for industrial activity of the NPDES stormwater Phase II regulations. UUSA has submitted a No Exposure Certification prior to initiating the operational activities at the site.

NPDES General Permit for Construction Stormwater: Ongoing construction activities at the UUSA site will continue to involve the grubbing, clearing, grading, or excavation of 0.4 or more ha (1 or more acres) of land coverage and will continue to operate under a NPDES Construction General Permit from the EPA Region 6 and an oversight review by the New Mexico Water Quality Bureau. Various land clearing activities such as off-site borrow pits for fill material have also been covered under this general permit. Construction activities, to support the capacity expansion, including the use of additional temporary construction facilities may disturb a small part of the site. UUSA has developed a Storm Water Pollution Prevention Plan (SWPPP) that will continue to be implemented and updated as necessary for the proposed facility capacity expansion.

Groundwater Discharge Permit/Plan: The New Mexico Water Quality Bureau requires that facilities that discharge an aggregate waste water of more than 7.6 m^3 (2,000 gal) per day to surface impoundments or septic systems apply for and submit a groundwater discharge permit and plan. This requirement is based on the assumption that these discharges have the potential of affecting groundwater. UUSA will discharge stormwater and cooling tower blow-down water to surface impoundments. Domestic sewage and sanitary waste will be sent to the City of Eunice Wastewater Treatment Plant for processing. The groundwater discharge permit DP-1481 has been issued and is required under New Mexico Administrative Codes (NMAC) 20.6.2.3104 NMAC. By letter dated May 17, 2004 (NMED, 2004a), and subsequent letter dated July 9, 2004 (NMED, 2004b), the NMED notified UUSA that the Ground Water Discharge Permit Application received by NMED on April 28, 2004, was determined to be administratively complete. Discharge Permit DP-1481 was issued to UUSA on February 28, 2007, and is currently under renewal with NMED.

Section 401 Certification: Under Section 401 of the federal Clean Water Act, states can review and approve, condition, or deny all federal permits or licenses that might result in a discharge to State waters, including wetlands. A 401 certification confirms compliance with the State water quality standards. Activities that require a 401 certification include Section 404 permits issued by the USACE. The State of New Mexico has a cooperative agreement and joint application process with the USACE relating to 404 permits and 401 certifications. By letter dated March 17, 2004, the USACE notified UUSA of its determination that there are no USACE jurisdictional waters at the UUSA site and for this reason the project did not require a 404 permit (USACE, 2004) for initial construction. As a result, a Section 401 certification is not required.

New Mexico Hazardous Waste Bureau (NMED/HWB)

The New Mexico Hazardous Waste Bureau's (HWB) mission is to provide regulatory oversight and technical guidance to New Mexico hazardous waste generators and treatment, storage, and disposal facilities as required by the New Mexico Hazardous Waste Act [HWA; Chapter 74, Article 4 NMSA 1978] (NMAC 20.4.1) and regulations promulgated under the Act. The bureau issues hazardous waste permits for all phases, quantities, and degrees of hazardous waste management including treating, storing, and disposing of listed or hazardous materials.

Hazardous Waste Permits: These permits are required for the treating, storing, or disposing of hazardous wastes. The level of permit and associated monitoring requirements depend on the volume and type of waste generated and whether or not the waste is treated or just stored for off-site disposal. Any person owning or operating a new or existing facility that treats, stores, or disposes of a hazardous waste must obtain a hazardous waste permit from the New Mexico Hazardous Waste Bureau. As anticipated, small to medium volumes of hazardous waste are stored at the facility for off-site disposal. UUSA generates quantities of hazardous waste that are greater than 100 kg (220 lbs) per month, however these wastes are not stored onsite in excess of 90 days (*see* Supplemental ER Section 3.12, Waste Management). UUSA has filed a U.S. EPA Form 8700-12, Notification of Regulated Waste Activity and received an EPA ID number. Hazardous wastes will continue to be shipped from the site within 90 days of generation to appropriately licensed off-site disposal facilities.

UUSA is committed to pollution prevention and waste minimization practices and has incorporated RCRA pollution prevention goals, as identified in 40 CFR 261.

New Mexico State Land Office (NMSLO):

Right–of-Entry Permit: The Surface Resources section of the NMSLO administers renewable resources and sustainable activities on state trust land and works to enhance environmental quality of the lands, and manages the biological, archeological, and paleontological resources. The Surface Resources section administers agriculture leases, rights of way, and special access permits. It is responsible for mapping, surveying, geographic information systems, and records management. Prior to initial construction and operations, UUSA applied for and received a Right-of-Entry Permit early in the license application preparation phase so that they could conduct environmental surveys on Section 32 prior to the land being transferred, or an easement granted, to UUSA. UUSA obtained ownership of the property in 2004.

Other New Mexico Requirements

All other New Mexico requirements, including the New Mexico Department of Game and Fish Rare, Threatened and Endangered Species Survey requirements, the New Mexico Radiological Control Bureau (NMED/RCB): (X-Ray) Radiation Machine Registration requirement, the New Mexico State Cultural Properties Act and State Historic Preservation Office survey requirements are described in Section 1.3.2 of the LES ER. The expansion is not expected to trigger any new action under these requirements, but these New Mexico requirements will remain in force.

1.3.3 Local Agencies

Plans for the proposed capacity expansion to 10 MSWU are being communicated to and coordinated with local organizations. Officials in Lea and Andrews Counties have been contacted regarding the changes to both the facility and impacts to the surrounding areas. The Eunice municipal water system operators have been contacted to obtain compliance information for the potable water supplies received from this city.

Emergency support services for the entire UUSA facility have been coordinated with the state and local agencies. When contacted, the Central Dispatch in the Eunice Police Department will dispatch fire, Emergency Medical Services (EMS), and local law enforcement personnel. Mutual Aid agreements exist between the Eunice Police Department, Lea County Sheriff's Department, and New Mexico State Police, which are activated if additional police support is needed. Mutual aid agreements also exist between Eunice, New Mexico, the City of Hobbs Fire Department, and Andrews County, Texas for additional fire and medical services. If emergency fire and medical services personnel in Lea County are not available, the mutual aid agreements are activated and the Eunice Central Dispatch will contact the appropriate agencies for the services requested at the facility.

Memoranda of Understanding (MOU) have been signed between UUSA and Eunice Fire and Rescue and the City of Hobbs Fire Department for fire and medical emergency services. MOUs have also been signed with the Eunice Police Department, the Lea County Sheriff's Office and the New Mexico Department of Public Safety, which includes both the New Mexico State Police and the New Mexico Department of Homeland Security and Emergency Management. Memoranda of Understanding have been executed with the agencies that have agreed to support the UUSA facility and are included in UUSA Emergency Plan. The Emergency Preparedness Manager ensures that MOUs with off-site agencies are reviewed annually and renewed at least every four years or more frequently if necessary. The Emergency Preparedness Manager maintains files of the current MOU. These MOUs will continue to apply to the facility with the expansion.

1.3.4 Permit and Approval Status

Several permits associated with the initial construction and operation activities of UUSA were submitted to the appropriate agencies prior to the commencement of initial construction. Construction and operational permit applications were prepared and submitted, and regulatory approval and/or permits were received prior to the initial construction or facility operation. These permits are relevant and appropriate to continue to support the construction activities associated with the capacity expansion.

Consultations have been made with the cognizant agencies with permits in place to support the ongoing construction and operations of UUSA. *See* Table 1.4-1, Regulatory Compliance Status, for a summary listing of the required federal, state, and local permits and their current status.

1.3.5 Section 1.4 Tables

Table 1.4-1 Regulatory Compliance Status

Requirement	Agency	Status	Comments
Federal			
10 CFR 70, 10 CFR 40, 10 CFR 30	NRC	Completed	Facility License
NPDES Industrial Stormwater Permit	EPA Region 6	No exposure certification made 2006	For Entire Site (New Mexico Review)
NPDES Construction General Permit	EPA Region 6	NOI completed, remains in place	For Runoff Water during Construction Phases (New Mexico Review)
Section 404 Permit	USACE	Not Required	No jurisdictional waters
State			
Air Construction Permit	NMED/AQB	Not Required	Emissions below limits
Air Operating Permit	NMED/AQB	Not Required	Emissions below limits
NESHAPS Permit	NMED/AQB	Not Required	Emissions below limits
Groundwater Discharge Permit/Plan	NMED/WQB	Completed	For Stormwater Runoff and Cooling Tower Blowdown Discharges to Retention/Detention Ponds. Sanitary Discharges to the City of Eunice Wastewater Treatment Plant
NPDES Industrial Stormwater	NMED/WQB	No exposure certification made 2006	Oversight Review by New Mexico (see above)
NPDES Construction General Permit	NMED/WQB	NOI completed, remains in place	Oversight Review by New Mexico (see above)
Hazardous Waste Permit	NMED/HWB	Not Required	Waste Storage < 90 days
EPA Waste Activity EPA ID Number	NMED/HWB	Completed	ID number used for manifested shipments
Machine-Produced Radiation-Registration (X-ray inspection)	NMED/RCB	Completed	For Security Non-Destructive Inspection (X-Ray) Machines
Rare, Threatened & Endangered Species Survey Permit	NMDGF	Completed	For conducting RTE species surveys on state-owned land
Right-Of-Entry Permit	NMSLO	Completed	For entry onto Section 32
Class III Cultural Survey Permit	NMSHPO	Completed	To conduct surveys on Section 32
Section 401 Certification	NMED/WQB	Not Required	Co-operative agreement with USACE (see above)

2 ALTERNATIVES

This chapter describes the alternatives to the proposed action described in Supplemental ER Section 1.3, Proposed Action. The range of alternatives considered in detail is consistent with the underlying need for and purposes of the proposed action, as set forth in Supplemental ER Section 1.2, Purpose and Need for the Proposed Action. Accordingly, the range of alternatives considered is based on the underlying need for additional reliable and economical uranium enrichment capacity in the United States—as would be provided by the URENCO USA (UUSA) facility—as well as related commercial considerations concerning the security of supply of enriched uranium. The alternatives considered in detail include (1) the "no-action" alternative under which the proposed capacity expansion at UUSA would not be constructed, (2) the proposed action to issue a Nuclear Regulatory Commission (NRC) license amendment to Louisiana Energy Services (LES) for the capacity expansion at UUSA, (3) alternative technologies available for an operational uranium enrichment facility, (4) design alternatives, and (5) alternative sites for the proposed enrichment capacity expansion.

This chapter also addresses the alternatives that were considered, but ultimately eliminated, as well as the potential cumulative impacts of the proposed action. Finally, this chapter presents, in tabular form, a comparison of the potential environmental impacts associated with the proposed action and various scenarios possibly arising under the no-action alternative.

2.1 Detailed Description of the Alternatives

This section identifies the no action alternative, the proposed action, and reasonable alternatives to the proposed action. Included are the technical design requirements for the proposed action, and its reasonable alternatives.

2.1.1 No-Action Alternative

The No-Action Alternative for UUSA would be to not expand the existing UUSA facility. Under the No-Action Alternative, the NRC would not approve the license amendment application necessary to increase capacity to 10 MSWU, but rather the current capacity will be capped at 3.0 MSWU. Sections 1.2.5 and 2.3 of this Supplemental ER describe six alternative ways (No-Action Scenarios B-G) utility customers may be able to meet their uranium enrichment service needs in the absence of proposed action. The environmental impacts of the most likely of these scenarios are described at the end of each section of Chapter 4.

While small, the No-Action Alternative will have limited environmental impacts at the UUSA site. The pre-construction activities described in Section 1.3.5 and the construction-at-risk activities described in Section 1.3.6 would still take place at the UUSA site.

2.1.2 Proposed Action

The proposed action, as described in Supplemental ER Section 1.3, Proposed Action, is the issuance of an NRC license amendment under 10 CFR 70, 10 CFR 30, and 10 CFR 40 that would authorize UUSA to possess and use byproduct material, source material and special nuclear material (SNM) and to expand and operate its Lea County, New Mexico uranium enrichment plant.

2.1.3 Description of the Site

The UUSA facility is located in southeastern New Mexico near the New Mexico/Texas state line in Lea County. The site comprises about 220 ha (543 acres) and is within county Section 32, Township 21 South, Range 38 East. The approximate center of the UUSA is at latitude 32 degrees, 26 minutes, 1.74 s North and longitude 103 degrees, 4 min, 43.47 s West. Refer to Figure 1.3-2, 80-Kilometer (50-Mile) Radius With Cities and Roads.

The site lies along the north side of New Mexico Highway 176.[2] It is relatively flat with slight undulations in elevation ranging from 1,033 m to 1,045 m (3,390 m to 3,430 ft) above mean sea level (msl) from the overall slope direction to the southwest. The existing facility is in operation and the expansion will not require the construction of additional access roads, lay down areas, or impact undisturbed lands. The existing access road may be moved to accommodate the eventual full expansion of the UBC Pad Basin, and construction lay down areas may be adjusted as well as construction proceeds to the west. The proposed expansion will be constructed within the existing property of the current facility. *See* Figure 1.3-4.

The area surrounding the site consists of vacant land and industrial properties. A railroad spur borders the site to the north. Beyond is a sand/aggregate quarry operated by Wallach Concrete Inc. The quarry owner leases land space to a "produced water" reclamation company (Sundance Services), which maintains three small "produced water" lagoons. There is also a man-made pond stocked with fish on the quarry property. A vacant parcel of land, Section 33, is immediately to the east. Section 33 borders the New Mexico/Texas state line, which is 0.8 km (0.5 mi) east of the site. Several disconnected power poles are situated in front of Section 33, parallel to New Mexico Highway 176. Land further east, in Texas, is occupied by Waste Control Specialists (WCS) L.L.C., a licensed Resource Conservation Recovery Act (RCRA) disposal facility. A large mound of soil exists northwest of WCS. Reportedly, the mound consists of stockpiled soil excavated by WCS. High-voltage utility lines run in a north-south direction near the property line of WCS, parallel to the New Mexico/Texas state line. To the south, across New Mexico Highway 176, is the Lea County Landfill. DD Landfarm, a petroleum contaminated soil treatment facility, is adjacent to the west. Land further north, south, and west has mostly been developed by the oil and gas industry. Land east of WCS is occupied by the Letter B Ranch.

Baker Spring, which contains surface water seasonally, is situated a little over 1.6 km (1 mi) northeast of the site. A historical scenic oil country marker with a few picnic tables is situated about 3.2 km (2 mi) to the west along New Mexico Highway 176. New Mexico Highway 176 intersects New Mexico Highway 18 about 4 km (2.5 mi) to the west. The nearest residences are located along the west side of New Mexico Highway 18, just south of its intersection with New Mexico Highway 176. The city of Eunice, New Mexico (population 2,922) is further west along New Mexico Highway 176 about 8 km (5 mi) from the site (City-Data.com, 2012a). Monument Draw, an area drainage way, is situated a short distance north and east of Eunice. Railroad tracks (Texas-New Mexico Railroad) are located on the east end of town and run north-south, parallel to New Mexico Highway 18. The city of Hobbs, New Mexico (population 30,838) is situated along New Mexico Highway 18 about 32 km (20 mi) to the north, and the city of Jal, New Mexico (population 2,074) is along New Mexico Highway 18 about 37 km (23 mi) to the south (City-Data.com, 2012b). The nearest Texas town, Frankel City, is about 24 km (15 mi) to the east, just north of Texas Highway 176. Andrews, Texas (population 10,448) is further east along Texas Highway 176, about 51 km (32 mi) from the site (City-Data.com, 2012c). The

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2 In the LES ER, this road is identified as New Mexico Highway 234. It was renumbered as 176 in 2006.

nearest, largest population center is Midland-Odessa, Texas (population >100,000), which is approximately 103 km (64 mi) to the southeast.

LES ER Figure 2.1-2, Site Area and Facility Layout Map 1.6-Kilometer (1-Mile) Radius, LES ER Figure 2.1-3, Existing Conditions Site Aerial Photograph, and Figure 2.1-4, UUSA Buildings show the current facility, site property boundary, and the general layout of the proposed new structures to support the capacity expansion.

2.1.4 Applicant for the Proposed Action

Louisiana Energy Services (LES), L.L.C. is a Delaware limited liability company. It has been formed solely to provide uranium enrichment services for commercial nuclear power plants. The corporate identity is described in Section 1.2.1 of the UUSA Safety Analysis Report (SAR). However as stated in Section 1, for the purpose of this Supplemental ER, the site is referred to hereinafter as URENCO USA or UUSA.

UUSA has presented to Lea County, New Mexico a proposal for capacity expansion at the UUSA facility. In response, Lea County has issued its Industrial Revenue Bond (National Enrichment Facility Project) Series 2004 in the maximum aggregate principal amount of $4,000,000,000 to accomplish the first three phases of construction and installation of the project pursuant to the County Industrial Revenue Bond Act, Chapter 4, Article 59 NMSA 1978 Compilation, as amended. The Project is comprised of the land, buildings, and equipment. This amount will be increased after Phase 3 of the expansion is reached.

Under the Act, Lea County is authorized to acquire industrial revenue projects to be located within Lea County but outside the boundaries of any incorporated municipality for the purpose of promoting industry and trade by inducing manufacturing, industrial, and commercial enterprises to locate or expand in the state of New Mexico, and for promoting a sound and proper balance in the state of New Mexico between agriculture, commerce, and industry. After acquiring the project, constructing the facility, and installing the facility equipment, Lea County will lease the project to UUSA, which will operate the facility. Upon expiration of the Bond after 30 years, UUSA will purchase the project.

The County has no power under the Act to operate the project as a business or otherwise or to use or acquire the project property for any purpose, except as lessor thereof under the terms of the lease.

In the exercise of any remedies provided in the lease, the County shall not take any action at law or in equity that could result in the Issuer obtaining possession of the project property or operating the project as a business or otherwise.

UUSA is responsible for the design, quality assurance, construction, operation, and decommissioning of the enrichment facility. The President of UUSA reports to the LES Board of Managers. The LES Board of Managers is discussed in Section 1.2.1.2 of the SAR.

2.1.5 Existing Facility Description

UUSA is designed to separate a feed stream containing the naturally occurring proportions of uranium isotopes into a product stream enriched in ^{235}U and a uranium stream depleted in the ^{235}U isotope.

The nominal plant design capacity as reviewed during initial licensing is 3.0 MSWU per year. At full production, the existing plant receives approximately 8,600 MT (9,480 tons) of UF_6 feed, produces 800 MT (880 tons) of low enriched UF_6, and yields 7,800 MT (8,600 tons) of depleted UF_6.

The existing UUSA operational structures and processes are summarized in Section 2.1.2.3 and Figure 2.1-4 of the LES ER. The UUSA SAR contains a detailed description of facility characteristics, including plant design and operating parameters.

2.1.6 Description of the Proposed Facility Expansion

The proposed plant expansion will increase design capacity to 10 MSWU per year. The expanded production will require approximately 17,500 MT (19,250 tons) of UF_6 feed to produce 1,850 MT (2,035 tons) of low enriched UF_6, and yield 15,700 MT (17,270 tons) of depleted UF_6.

The proposed facility expansion includes the construction of three new SBMs. Each will be constructed adjacent to the current SBMs and will not impact undisturbed lands. Like the existing SBMs, each additional SBM has two Cascade Halls, a UF_6 Handling Area, and a Process Services Corridor. The Cascade Hall contains multiple cascades, each of which is made up of many centrifuges. Natural uranium in the form of UF_6 is fed into the cascades and UF_6 enriched in the ^{235}U isotope (product) and UF_6 depleted in the ^{235}U isotope (tails) are removed. The UF_6 Handling Area contains the Feed System, Product Take-off System, Tails Take-off System, and the Blending and Liquid Sampling Systems. The Process Services Corridor contains gas transport equipment, which connects the cascades to the UF_6 Feed System, Product Take-off System, Tails Take-off System, and Contingency Dump System.

UUSA would also construct an additional CRDB between SBM-1007 and SBM-1009, expand the Storage Pad from 2.6 acres to 23 acres to accommodate storage of up to 25,000 DUF_6 cylinders, build two additional UBC Basins to manage storm water run-off, and increase the capacity of its utility substation to accommodate additional 115kV to 13kV transformers. Changes in physical security control deployments to maintain the expanding Controlled Access Area (CAA) will be made as necessary during build-out and transition to operation.

The proposed UUSA facility expansion is expected to require eight (8) years. Only previously disturbed site surface area will be utilized during the build-out.

2.1.7 Process Control Systems

The UUSA facility uses various operations and Process Controls Systems to ensure safe and efficient plant operations. These are described in Section 2.1.2.4 of the LES ER and Section 3.3 of the SAR.

2.1.8 Site and Nearby Utilities

The city of Eunice, New Mexico provides water to the site. Water consumption for UUSA is currently 8,478 m^3/day (63,423 gal/day) however with the proposed expansion, it is not expected to increase. Peak water usage for fire protection is 23.7 L/s (375 gal/m). Electrical service to the site is provided by Xcel Energy. The projected demand for capacity expansion to 10 MSWU is approximately 100 MVA. Sanitary wastewater is sent to the City of Eunice Wastewater Treatment Plant via a system of lift stations and 8-inch sewage lines.

A 40.6-cm (16-in) diameter underground natural gas pipeline, owned by the Sid Richardson Energy Services Company, is located along the south property line, paralleling New Mexico Highway 176. A parallel 35.6-cm (14-in) diameter gas pipeline is not in use. There are no known onsite underground storage tanks. Monitoring wells and sanitary sewer connections were installed during the initial site construction.

Detailed information concerning water resources and the use of potable water supplies is discussed in Supplemental ER Section 3.4, Water Resources, and the impacts of the expansion on these water resources is discussed in Supplemental ER Section 4.4, Water Resource Impacts. A discussion of the impacts of the expansion related to utilities is included in Supplemental ER Section 4.1, Land Use Impacts.

2.1.9 Chemicals Used at UUSA

UUSA uses various types and quantities of non-hazardous and hazardous chemical materials. A Chemical Safety Program tracks the general locations of hazardous chemicals onsite and the specific hazards associated with these chemicals. This is unchanged for the expansion.

2.1.10 Monitoring Stations

During and after the expansion, as it does now, UUSA will monitor both non-radiological and radiological parameters. Descriptions of the monitoring stations and the parameters measured are described in other sections of this Supplemental ER as follows:

- Meteorology (Supplemental ER, Section 3.6)
- Water Resources (Supplemental ER, Section 3.4)
- Radiological Effluents (Supplemental ER, Section 6.1)
- Physiochemical (Supplemental ER, Section 6.2)
- Ecological (Supplemental ER, Section 6.3)

2.1.11 Summary of Potential Environmental Impacts of Expansion

Following is a summary of impacts from undertaking the proposed expansion and measures used to mitigate impacts. Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios, includes a summary of the impact of the proposed action, by environment resource, and provides a pointer to the corresponding section in Supplemental ER Chapter 4, Environmental Impacts, that includes a detailed description of the impacts. Detailed discussions of proposed mitigation measures and environmental monitoring programs are provided in Supplemental ER Chapter 5, Mitigation Measures, and Chapter 6, Environmental Measurements And Monitoring Programs, respectively.

Like the current operation of UUSA, operation of the UUSA facility capacity expansion would result in the production of additional gaseous, liquid, and solid waste streams. Each stream could contain small amounts of hazardous and radioactive compounds either alone or in a mixed form.

After the expansion, gaseous effluents for both non-radiological and radiological sources will continue to be below regulatory thresholds that would require a permit issued by the New Mexico Air Quality Bureau (NMAQB) and release limits by NRC. This will result in minimal additional potential impacts to members of the public and workers.

Liquid effluents associated with the facility capacity expansion will include stormwater runoff, sanitary waste water, and treated liquid effluents. These effluents all exist within the current operation. Proposed liquid effluents from additional stormwater runoff will be discharged onsite to existing or new construction detention or retention basins. Sanitary wastewater generated by additional staff will be managed through discharges to the Eunice municipal system, consistent with existing management of this wastewater. General site stormwater runoff is collected and released untreated to a site stormwater detention basin. Up to three single-lined retention basins will collect stormwater runoff from the Uranium Byproduct Cylinder (UBC) Storage Pads associated with the additional storage capacity. Stormwater discharges will be regulated, as required, by the State of New Mexico and the EPA. Additional stormwater runoff associated with the proposed facility capacity expansion will be from increased impermeable surfaces associated with buildings and pavement and increased Storage Pad dimensions.

Based on current operating experience, UUSA liquid effluent discharge rates have been lower than the predicted volumes initially evaluated for the operation of a 3.0 MSWU facility. Domestic sewage will continue to be sent to the City of Eunice Wastewater Treatment Plant for processing.

The UUSA water supply will continue to be obtained from the City of Eunice, New Mexico. Current capacities for the Eunice, New Mexico municipal water supply system is 16,350 m^3/day (4.32 million gpd) and current usage is 5,600 m^3/day (1.48 million gpd). Average and peak potable water requirements for operation of UUSA are reported at 478 m^3/day (63,423 gal/day) and with the proposed expansion, this volume is not expected to increase. The proposed facility capacity expansion usage rates will continue to be well within the capacity of the water system.

Solid waste will also continue to be generated, and will fall into the non-hazardous, radioactive, hazardous, and mixed waste categories. Solid waste will be collected and transferred to authorized treatment or disposal facilities off-site as follows:

- All solid radioactive waste generated will be Class A low-level waste as defined in 10 CFR 61. Estimates presented prior to the initial facility construction indicated approximately 86,950 kg (191,800 lbs) of low-level waste to be generated annually. Since the start of operations at the facility (2010 through present), the solid radioactive waste generated has amounted to 1,148 kg (2,525 lbs). Projected amounts of solid radioactive waste at an operating capacity of 10 MSWU is 1,881,200 lbs This quantity is higher than the initial waste volume production rate due to the increased facility capacity, and the revised handling technique to solidify liquid radiological waste for off-site disposal, instead of applying an evaporative treatment technology (the Treated Effluent Evaporative Basin).
- Annual hazardous and mixed wastes generated were expected to be about 1,770 kg (3,930 lbs) and 50 kg (110 lbs), respectively, at the time of the initial construction. UUSA will continue to be a generator of hazardous waste and dispose of the waste by licensed contractors. UUSA does not plan to treat hazardous waste or store quantities longer than 90 days.
- Non-hazardous waste will continue to be collected and disposed of by a County-licensed solid waste disposal contractor. The non-hazardous wastes will be disposed of in the Lea Country landfill, which has adequate capacity to accept UUSA non-hazardous wastes for the life of the facility.

No communities or habitats defined as rare or unique, or that support threatened and endangered species, have been identified as occurring in the vicinity or on the UUSA property.

Thus, no proposed activities are expected to impact communities or habitats defined as rare or unique, or that support threatened and endangered species, within the 220-ha (543-acre) site.

Additional noise generated by the construction and operation of the proposed UUSA facility capacity expansion will be primarily limited to additional truck movements on the road during operations. The construction truck traffic for the proposed facility capacity expansion is anticipated to be consistent with the current construction truck traffic noise. The noise at the nearest residence may slightly increase due to the additional truck traffic; however, it may not be noticeable. The incremental increases in noise level are small, and it is unlikely that residents will experience a disturbance or impact.

The results of the economic analysis show that the greatest fiscal impact of the proposed action will derive from the construction period associated with the proposed facility capacity expansion. The largest impact on local business revenues stems from local construction expenditures, while the most significant impact in household earnings and jobs is associated with construction payroll and employment projected during the construction period. This impact will continue through the capacity increase as the same construction crews/personnel will be retained to continue the expansion.

In the initial evaluation of the UUSA facility to 3.0 MSWU capacity (EIS), the facility operations were predicted to require about 210 employees receiving pay of $10.5 million and $3.1 million in benefits. As expected, most of these jobs were filled by Lea County and other nearby county residents, providing numerous opportunities in construction of new housing, in provision of services, and in education. Current (2012) UUSA employees (excluding contractor staff) at the UUSA facility is approximately 250. For the proposed capacity expansion, UUSA operations could have minor impacts on local public services including education, health services, housing, and recreational facilities, but are anticipated to be minimal because permanent UUSA employees will have increased to approximately 258, only a slight increase over the current level of 250, and a insignificant increase over the previously evaluated level of 210.

Radiological release rates to the atmosphere and retention basins during normal operations were initially estimated prior to initial site construction to be less than 8.9 MBq/yr (240 μCi/yr) and 14 Bq/yr (390 μCi/yr), respectively. Initial evaluations included contribution from the evaporation of liquid effluents in the Treated Effluent Evaporative Basin. The Treated Effluent Evaporative Basin was not constructed as originally proposed, and all radiologically impacted liquid effluents will be managed for off-site disposal. Since this source does not exist at the current operation and will not exist with the proposed capacity expansion, the contribution for radiological releases from this source is not included in the current evaluation.

The remaining potential for radiological runoff is from the UBC Storage Pad, which will increase in area to accommodate the higher storage quantities associated with the facility expansion. The annual runoff concentration is anticipated to be 32pCi/l. Radiological release rates to the atmosphere from operations will increase with an increase in facility capacity. Additional radiological releases will be from additional Gaseous Effluent Vent Systems (GEVS) installed at each of the proposed additional separation building modules (SBM-1005, SBM-1007 and SBM-1009). Average source term releases to the atmosphere are estimated to be 29.7 MBq (800 μCi) per year for the purposes of bounding routine operational impacts. URENCO's experience in Europe indicates that uranium discharges from gaseous effluent vent systems are less than 10 g (0.35 ounces) per year. Therefore, 29.7 MBq (800 μCi) is a very conservative estimate and is based upon an NRC estimate (NRC, 1994a) for a 1.5 MSWU plant that UUSA has proportioned for the 10 MSWU facility.

All radiation impact calculations for the impacts of 25,000 UBC cylinders were performed with the general purpose three-dimensional continuous energy Monte Carlo code MCNP5. Conceptual UBC Storage Pad configurations were assumed in the model. This calculation refines previous calculation inputs and utilizes empirical TLD data to evaluate photon and neutron dose on the UBC Storage Pad. This information was subsequently utilized to evaluate conservative assumptions in the model. Due to a modification in the handling of uncertainty through the calculations, the results analysis shows that the potential impact from a higher total capacity of UBC storage actually results in less impact at the fence line for the proposed facility capacity expansion. This calculation demonstrates that an expansion of the capacity of the UBC Storage Pad to host 25,000 48Y cylinders in a triple stacked arrangement is feasible and will not require additional mitigation provided that adequate distances are maintained from the pad edge to the site boundary. The results demonstrate that a minimum distance of approximately 1,000 ft from the UBC Storage Pad to the north side site boundary and a minimum distance of approximately 550 ft from the UBC Storage Pad to the east/west side site boundary is required to meet the dose rate limit of 25 mrem/year governed by 40 CFR 190.

These dose equivalents due to normal operations are small fractions of the normal background radiation range of 2.0 to 3.0 mSv (200 to 300 mrem) dose equivalent that an average individual receives in the United States (NCRP, 1987a), and within regulatory limits. Given the conservative assumptions used in estimating these values, these concentrations and resulting dose equivalents are insignificant and their potential impacts on the environment and health are inconsequential.

Operation of UUSA at 10 MSWU would also result in the annual nominal production of approximately 1,250 cylinders at full capacity of depleted UF_6. The depleted UF_6 would be stored onsite in Uranium Byproduct Cylinders (UBCs) and would have minor impact while in storage. The maximum annual dose equivalent due to external radiation from the UBC Storage Pad (skyshine and direct) is estimated to be less than 3.8 x 10-2 mSv (3.8 mrem) to the maximally exposed person at the nearest point on the western site boundary (2,000 hrs/yr) to the east, approximately 9.3 x 10^{-2} mSv (9.3 mrem) for the maximally exposed person to the north boundary (2000 hours/yr), and less than 8 x 10-12 mSv/yr (8x10-10 mrem/yr) to the maximally exposed resident (8,760 hrs/yr) located approximately 4.3 km (2.63 mi) from the UBC Storage Pad.

Based on 2010 U.S. Census Bureau data, construction and/or operation of the UUSA facility capacity expansion will not pose a disproportionate impact to the Lea County, New Mexico or Andrews County, Texas minority or low-income populations.

2.1.12 Reasonable Alternatives

This section includes a discussion of alternative enrichment technologies available for an operational enrichment facility, significant alternative designs selected for UUSA to improve environmental protection, and the site selection process UUSA used to select the UUSA for expanded capacity and to identify alternatives to that site.

2.1.12.1 Alternative Technologies

A number of different processes have been invented for enriching uranium; only three (gaseous diffusion, gas centrifuge, and laser excitation) are considered candidates for commercial use, and of those, only the gaseous diffusion and gas centrifuge technologies have been deployed for large-scale industrial use (NRC, 2011b). Other technologies, namely, electromagnetic isotope separation, liquid thermal diffusion, and early-generation laser enrichment, have proven too costly to operate, remain at the research and laboratory developmental scale, or in the case of laser enrichment have been superseded by a more advanced technology (NRC, 2011b). All of these technologies are discussed below, based in large part on NRC's discussion of the same technologies in the 2011 Final EIS for the AREVA Eagle Rock enrichment facility (NRC, 2011b).

2.1.12.1.1 Electromagnetic Isotope Separation Process

In the electromagnetic isotope separation process, a monoenergetic beam of ions of normal uranium travels between the poles of a magnet. The magnetic field causes the beam to split into several streams according to the mass of the isotope. Each isotope has a different radius of curvature and follows a slightly different path. Collection cups at the ends of the semicircular trajectories catch the homogenous streams. Because the energy requirements for this process proved very high (in excess of 3,000 kilowatt hours per SWU) and production was very slow (Heilbron et al., 1981), electromagnetic isotope separation was not considered viable and has been removed from further consideration.

2.1.12.1.2 Liquid Thermal Diffusion

This process is based on the concept that a temperature gradient across a thin layer of liquid or gas causes thermal diffusion that separates isotopes of differing masses. When a thin, vertical column is cooled on one side and heated on the other, thermal convection currents are generated and the material flows upward along the heated side and downward along the cooled side. Under these conditions, the lighter UF_6 molecules diffuse toward the warmer surface and heavier UF_6 molecules concentrate near the cooler side. The combination of this thermal diffusion and the thermal convection currents causes the lighter ^{235}U molecules to concentrate on top of the thin column while the heavier ^{238}U molecules go to the bottom. Taller columns produce better separation. Eventually, a facility using this process was designed and constructed at Oak Ridge, Tennessee, but it was closed after about a year of operation because of cost and maintenance concerns (Settle, 2004). Based on high operating costs and high maintenance requirements, the liquid thermal diffusion process has been eliminated from further consideration.

2.1.12.1.3 Gaseous Diffusion Process

The gaseous diffusion process is based on molecular effusion, a process that occurs whenever a gas is separated from a vacuum by a porous barrier. The gas flows from the high-pressure side to the low-pressure side. The rate of effusion of a gas through a porous barrier is inversely proportional to the square root of its mass. Thus, lighter molecules pass through the barrier faster than heavier ones. The gaseous diffusion process consists of thousands of individual stages connected in series to multiply the separation factor. The Paducah GDP contains 1,760 enrichment stages and is designed to produce UF_6 enriched up to 5.5 percent ^{235}U. The design capacity of the Paducah GDP is approximately 8 MSWU per year, but it has never operated at greater than 5.5 MSWU. The process uses approximately fifty times as much electricity as gaseous centrifuge processes (NUREG-1790 at 2-41). Due to the age of the technology, economic, and energy issues, the Paducah GDP may close in 2013. Therefore, GDP has been eliminated from further consideration.

2.1.12.1.4 Atomic Vapor Laser Isotope Separation

The Atomic Vapor Laser Isotope Separation (AVLIS) process is based on the circumstance that different isotopes of the same element, though chemically identical, have different electronic energies and absorb different colors of laser light. The isotopes of most elements can be separated by a laser-based process if they can be efficiently vaporized into individual atoms or molecules. In AVLIS, uranium metal is vaporized, and the vapor stream is illuminated with a laser light of a specific wavelength that is absorbed only by ^{235}U. The laser selectively adds enough energy to ionize or remove an electron from ^{235}U atoms, while leaving the other isotopes unaffected. The ionized ^{235}U atoms are then collected on negatively charged surfaces inside the separator unit. The collected material (enriched product) is condensed as a liquid on the charged surfaces and then drains to a caster, where it solidifies as metal nuggets. The high separation factor in AVLIS means fewer stages to achieve a given enrichment, lower energy consumption, and smaller waste volume. However, budget constraints compelled USEC to discontinue development of the U.S. AVLIS program in 1999 (USEC, 1999). Because development of the AVLIS process was not continued, it has been eliminated from further consideration.

2.1.12.1.5 Molecular Laser Isotope Separation

Like AVLIS, the Molecular Laser Isotope Separation (MLIS) process uses a tuned laser to excite ^{235}U molecules in the UF_6 feed gas. A second laser then dissociates excited molecules into UF^5 and free fluorine atoms. The enriched UF_5 then precipitates and is filtered as a powder from the feed gas. Each stage of enrichment requires conversion of enriched UF_5 back to UF_6. The advantages of MLIS include low power consumption and the use of UF_6 as a process gas. However, it is less efficient and up to four times more energy intensive than AVLIS. Therefore, all countries except Japan have discontinued development of MLIS. Because development of the MLIS process was not continued, it has been eliminated from further consideration.

2.1.12.1.6 Separation of Isotopes by Laser Excitation

The separation of isotopes by laser excitation (SILEX) process is a third-generation laser-based technology for enriching natural uranium. The SILEX technology is the world's only third-generation laser-based enrichment technology. (NRC, 2011b).

The SILEX technology, developed by Silex Systems Ltd., in partnership with GE-Hitachi Global Laser Enrichment, L.L.C. (GLE) (and formerly, USEC), is similar to the two earlier laser-excitation technologies, MLIS and AVLIS (USEC, 2003). All three laser-based processes isolate uranium-235 by optical rather than mechanical means. The SILEX laser-based technology has several advantages over the conventional technologies of gas diffusion and gas centrifuge, including lower capital costs, lower operating costs, simpler and more versatile deployment, more flexibility in product enrichment, smaller facility footprint for comparable enrichment capacity, and reduced environmental impacts.

In laser excitation enrichment, UF_6 vapor is illuminated with a tuned laser of a specific wavelength that is absorbed only by ^{235}U atoms while leaving other isotopes unaffected. The stream then passes through an electromagnetic field to separate the ionized ^{235}U atoms from other uranium isotopes.

General Electric (GE) is currently conducting research and development—focused enrichment, and will begin commercial operations in the near future, pending approval of its NRC license application. It would be the first enrichment facility to employ the SILEX technology.

GE has "the exclusive rights to complete the process development and commercial deployment of Silex's enrichment technology" (NRC, 2011b). It is possible at some point in the future that GE could decide to license the technology to other companies. However, such a possibility is merely speculative at this time. At present, only GLE has the rights to the SILEX technology, and thus only GLE has the ability to design and build a facility using the technology. Therefore, because this alternative is not available for use by UUSA for the proposed UUSA expansion, it has been eliminated from further consideration.

2.1.12.2 Alternative Sites

Alternative sites were extensively evaluated using the Multi-Attribute Utility Analysis (MUA) methodology as part of the site selection process for initial construction and licensing (*see* LES ER 2.1.3.3, NUREG-1790 at 2-34). This MUA whittled down eighteen sites to a final six, including the current UUSA location in Lea County, New Mexico. NRC then considered these six sites in detail but eliminated the five besides the UUSA site from further analysis due to economic, environmental, national security, or maturity reasons (NUREG-1790 at 2-34).

This screening process and NRC's conclusions apply with equal force to the UUSA capacity expansion because, as described below, the other five facilities have not changed significantly since the construction of the UUSA facility. In addition, expansion at the current site has significant environmental and economic advantages over constructing a new facility at any of the other five sites.

This section briefly examines these alternatives in relation to the proposed expansion.

2.1.12.2.1 Eddy County, New Mexico Site

The Eddy County site scored highest in the MUA but had the potential for extensive delay because the site was federal land managed by the Bureau of Land Management (BLM) (LES ER Section 2.1.3.3.5). Transferring the site to UUSA ownership would be a major federal action by BLM, subject to, among other things, federal law regarding the sale of BLM land, including a bar on the sale of minerals (43 USC 1713), the environmental analysis requirements of NEPA, and the area's current BLM Resource Management Plan. In addition, the site was currently leased for grazing under the Livingston Ridge Allotment No. 77027, and BLM regulations require two years notification for the grazing leaseholder prior to sale (43 CFR § 2711.1.3). *See* NUREG-1790 at 2-38.

As of the most recent BLM published maps, the Eddy County site remains BLM land and its grazing allotment remains active (DOI, 2011, BLM, 2012). As such, the substantial disadvantages of this site due to its federal ownership and active grazing discussed in 2005 EIS (NUREG-1790) and the LES ER remain present.

In addition, creating up to 7 MSWU of new uranium enrichment capacity at the Eddy County site would necessitate the construction of an entirely new facility on a greenfield site. This is both environmentally and economically problematic. Regarding environmental impacts, the construction of an entirely new facility would transform the character and land use of the site significantly. In a similar context, the NRC has noted that for greenfield sites, "[t]he siting of a nuclear plant on such a site would be expected to have significant detrimental impacts on land use, ecology, and aesthetics—particularly when compared with the equivalent impacts at sites with existing nuclear power plants" (NRC, 2007 at 230-31). Building an entirely new facility—rather than just the additional facilities needed for the expansion—would also be economically inefficient. In doing so, UUSA would have to construct a number of support and shared facilities already in existence at the UUSA site—in essence, to unnecessarily duplicate them. These shared and support facilities include the following: water and power infrastructure, administration buildings, and site security facilities with an order of magnitude value of approximately $1 billion.

2.1.12.2.2 Bellefonte, Alabama Site

The two primary problems raised with the Bellefonte site by the NRC in the 2005 EIS were that part of the site is within the historic boundaries of a Cherokee Indian Reservation, which may necessitate a historical preservation assessment, and that high-voltage transmission lines cross the site and would have to be relocated before beginning construction. NUREG-1790 at 2-38. There is no evidence that the borders of the Reservation or the presence of high-voltage lines has changed.

Expansion is also unreasonable at the site because, like the Eddy County site, creating up to 7 MSWU of new uranium enrichment capacity at the Bellefonte site would necessitate the construction of an entirely new facility, including the construction of support and shared facilities already in existence at the UUSA site. Doing so would have far higher environmental impacts and economic costs than the expansion of the UUSA site for the same capacity increase.

2.1.12.2.3 Hartsville, Tennessee Site

The primary problem identified in the LES ER and 2005 EIS with the Hartsfield site was that UUSA was unable to obtain local approval to rezone the site (LES ER Section 2.1.3.3.4.11, NUREG-1790 at 2-38). In addition, unlike most states, Tennessee imposes a resources excise tax on special nuclear material at a rate of $1.30 per separative work unit.

It is unclear if UUSA would be able to obtain local zoning changes at this time. However, the excise tax remains in place and at the same rate for the Hartsville location (TN, 1981).

Expansion is also unreasonable at the site because, like the Eddy County and Bellefonte, Alabama sites, creating up to 7 MSWU of new uranium enrichment capacity at the Hartsville site would necessitate the construction of an entirely new facility on a greenfield site, including the construction of support and shared facilities already in existence at the UUSA site. Doing so would have far higher environmental impacts and economic costs than the expansion of the UUSA site for the same capacity increase.

2.1.12.2.4 Portsmouth, Ohio Site

The Portsmouth site ranked fifth of the six sites in the MUA assessment (NUREG-1790 at 2-38). Contamination on an existing firing range would have to be remediated, and existing waterways and ponds would have to be filled or relocated to make the site useable. Further, due to the proposed construction of the American Centrifuge Plant by USEC in the same immediate area, the finalization of an agreement between DOE, USEC, and LES would be difficult and would delay construction of the facility. These circumstances remain present.

Expansion is unreasonable at the site for additional reasons. Because the ACP plant is not yet operational and may not be operational for quite some time, creating 7 MSWU of additional capacity in the near future would necessitate building not only the facilities relating to the expansion but, similar to the greenfield sites, many of the support and shared facilities already in existence at the UUSA site. As discussed above, doing so would be far less economical than expanding the UUSA site. In addition, this construction would take place at a competitor's site. In the 2007 Dominion North Anna ESP decision, the NRC approved the NRC Staff's decision not to consider an alternative whereby an applicant built a reactor on a site owned by a nonaffiliated competitor, accepting as reasonable the applicant's explanation that doing so would contravene the applicant's business goal of 'maximiz[ing] the competitiveness of its generating costs and rates.'" (NRC, 2007 at 232). This is similar to the purpose and need of this project, providing enriched uranium in an economical manner (see Section 1.2), and, as in the Dominion North Anna ESP decision, it would not be well served by building a new facility on a competitor's site.

2.1.12.2.5 Carlsbad, New Mexico Site

The Carlsbad site is a former Beker Industrial Corporation site. In the LES ER and 2005 EIS, the Carlsbad site ranked sixth in the evaluation, primarily because the active and abandoned facilities around the Carlsbad site, including potash mining and oil-field welding services, created the possibility that the site soil is contaminated with oils, solvents, and industrial waste products (NUREG-1790 at 2-39). This potential contamination required further investigation prior to licensing and could have made site decommissioning and decontamination more difficult. These circumstances remain present at this site.

Expansion is also unreasonable at the site because creating up to 7 MSWU of new uranium enrichment capacity at the Carlsbad site would necessitate the construction of an entirely new facility, including the construction of support and shared facilities already in existence at the UUSA site. As discussed above, doing so would have far higher environmental impacts and economic costs than the expansion of the UUSA site for the same capacity increase.

2.1.12.2.6 UUSA Lea County Site

Expansion at the UUSA site will have less environmental impacts than the creation of a new facility at any of the other five sites, and lower economic costs. Other new information since the initial construction of the UUSA facility also confirms that the existing site is a reasonable and preferable site for the expansion up to a 10 MSWU capacity. Specifically:

- Site size supports a rectangular footprint of approximately 1,600 m (5,250 ft) by 600 m (1,969 ft) for a facility with increased enrichment capacity to 10 MSWU. In the case of the Lea County site, the expansion would not disturb additional lands and would be constructed within the boundaries of the existing site.

- For redundant electrical power supply, it is desirable that there be a dual dedicated power supply on separate feeders capable of delivering 47 Mega Volt-Ampere (MVA) for an expanded facility. In the case of the Lea County site, the 47 MVA would be in addition to the existing 20 MVA currently supplied to the site. Xcel Energy currently provides power to the Lea County Site and currently supplies power to the Waste Control Specialists (WCS) disposal facility, which is close to the Lea County site. Xcel has stated that they can provide redundant power to the site, which would likely come from a 137 kVA transmission line located some 8 to 11 km (5 to 7 mi) from the proposed site, with expansion as needed to supply the proposed capacity expansion. Xcel indicated that historically their power availability rate has been greater than 99.5% and they can supply +5% voltage regulation. The utility has indicated a continued willingness to provide a favorable rate structure, depending upon the commitment from the facility.

- Water is supplied to the Lea County site from the City of Eunice, New Mexico. Eunice receives its water supply from approximately 32 km (20 mi) away, at Hobbs, New Mexico. A water main provides supply water from Hobbs to Eunice with a lateral extension that extends approximately 5.6 km (3.5 mi) to the proposed Lea County site. The additional water needs to support expansion will not significantly increase and therefore the current supply is sufficient.

- Surveys were completed in support of the initial LES ER and are discussed further in Section 3.1 of this document. However, because no additional lands will be disturbed during the proposed capacity expansion, no additional impacts are anticipated.

- No protected species surveys have been completed for the site. However, surveys completed for the Lea County Landfill adjacent to the site found no protected species in the area. Therefore, there should continue to be no protected species issues at the site.

- An archeological survey for the Lea County Landfill site was conducted immediately south of the proposed project site and the results indicated that the probability of significant archeological sites is low. Archeological sites determined during studies completed to support the initial LES ER were appropriately mitigated in accordance with an agency-approved treatment plan. Because the proposed expansion is located within the area of the existing facility site disturbance (see Figure 1.3-4), no additional archeological sites are anticipated. An unanticipated discoveries plan has been prepared.

- No protected properties are near the Lea County site.

- As described in the LES ER, data collected for the Waste Isolation Pilot Plant (WIPP) (DOE, 2001a) included an 80-km (50-mile) radius of influence (ROI) that included the Lea County site. Within the designated ROI, the percentage of Hispanics and the percentage of persons living below poverty level were above the national average and the state averages for New Mexico and Texas. The relative isolation of the proposed facility should avoid impacts to these population groups.

- There are numerous emission sources (e.g., oil and gas extraction wells, Wallach Concrete, Inc., etc.) in the county. These existing sources are not anticipated to affect conditions on new air permits obtained from the New Mexico Environment Department (NMED) for the expanded capacity facility, if future permits are required. Currently the plant has filed an exemption from requiring an air permit, and future emissions will not likely require additional permitting from NMED.

- There are no wetlands or other waters of the United States on the site. A recent survey determined that an arroyo does not exist at the site. Neither a Clean Water Act Section 404 permit nor a State Section 401 Water Quality Certification will be required for further construction on the site.

- The site is currently the location of a uranium enrichment facility that processes a UF_6 feed stream containing the naturally occurring proportions of uranium isotopes into a product stream enriched in ^{235}U. As such, the proposed project will not provide a new radiological hazard to the area. The site is near an existing radiological hazard, but that facility (WCS) does not handle UF_6. The WCS site stores low-level waste and has been recently approved for disposal of low level radioactive waste.

- The proposed site is in an area designated for buildings designed for 112 km/hr (70 mi/hr) winds. The area has potential for violent convectional storms. The WIPP Safety Analysis Report (DOE, 2003) indicates a recurrence interval for 132 km/hr (82 mi/hr) winds every 100 years in southeastern New Mexico, although no winds of this speed or greater velocity have been recorded. Tornado frequency in the area has been estimated as 1 in every 1,235 years (DOE, 2003). There is no significant fire hazard. The area is predominately desert scrub, and trees are absent. Desert range land will burn but does not support a sufficient fuel load to sustain a major fire. The site topography and soil characteristics do not promote ponding. The topography is level, and there is no potential for rock/mud slides.

- Prior to construction of the existing UUSA facility, the site was used as range land for grazing. Limited environmental data was collected as part of the initial facility construction. Based on this data, there is no indication of hazardous or radioactive contamination at the proposed expansion site. There are no known air or groundwater plumes within 3.2 km (2 mi) of the site, and no future migration of contamination is anticipated from nearby facilities (e.g., WCS, Lea County Landfill, and Wallach Quarry), and site operations have not impacted groundwater, soils, or vegetation.

- There is an existing NMED Discharge Permit at the UUSA site. Stormwater runoff is already controlled via collection in the Stormwater Basin and UCB Basin.

- There are no facilities storing or handling large quantities of hazardous chemicals within 8 km (5 mi). However, the nearby WCS site treats and disposes hazardous wastes and low-level radioactive and low-level mixed wastes. There are no major propane pipelines within 3.2 km (2 mi) of the site. There are no commercial airports within 16 km (10 mi), and the site is not located in a general emergency area. Neighboring industries (*e.g.,* Wallach Concrete, Inc., oil and gas extraction wells, etc.) have particulate and organic emissions that could potentially have a negative impact on air quality at the proposed facility.

- Construction activities are anticipated to continue at the neighboring facilities, e.g., Wallach Concrete, Inc., Lea County Landfill, and the WCS Landfill; and these activities could cause nuisance issues, such as dust. However, minimal noise and traffic issues are anticipated as a result of these ongoing activities.

- The local and state governments have indicated strong support for the proposed facility expansion. Strong support has also been expressed by members of the New Mexico Congressional Delegation. There is generally good road access to the proposed site. No additional new permits will be required by the State.

- Strong community support is anticipated for the proposed facility expansion. General discussions with various community representatives have been positive and have indicated that labor groups would also be expected to support the facility expansion.

- With the recent and ongoing construction of the existing UUSA facility, Lea County has sufficient local craft labor to support the construction. The support for the project by local workers is expected to be positive. There is support for travelers, since most of the contractors will come from outside the area and have already gained experience with the construction of the existing facility.

- The Lea County site may draw on the labor pool at the existing facility to support the requirements for operating the expanded plant. By continuing construction, the Lea County site will not lose the current knowledge already onsite and will effectively keep the workers employed while securing site knowledge and training.

- The Lea County site is located approximately 1,636 km (1,016 mi) from the Energy Solutions (formerly Envirocare) facility and approximately 2,574 km (1,599 mi) from the Hanford facility. Truck transportation modes are available and sufficient for shipping the low-level waste. Low-level waste is routinely shipped from the adjoining WCS facility. New Mexico is not allowed to ship waste to the Barnwell facility.

2.2 Cumulative Effects

Cumulative impacts are those impacts that result from the incremental impact of an action added to other past, present, and reasonably foreseeable actions in the future. In conducting this analysis, UUSA considered past, current, and potential activities that could have some potential for cumulative impacts.

The anticipated cumulative impacts of the proposed capacity expansion at UUSA are expected to be inconsequential. Therefore, any incremental impacts caused by the capacity expansion at UUSA should also be inconsequential. Expansion at the existing enrichment facility would also avoid impacts to other more environmentally sensitive sites.

There are several local county and private activities in geographic proximity that could potentially combine with the UUSA operations and expansion to produce a larger impact than the UUSA alone. These facilities are 1) the Waste Control Specialist, L.L.C. (WCS) facility that is 1.6 km (1.0 mi) due east from UUSA; 2) the Wallach Concrete, Inc. quarry that is located just north of the UUSA facility; 3) the Lea County landfill, which is across New Mexico Highway 176, approximately 1.6 km (1 mi) south; 4) the Sundance Industries "produced water" treatment facility collocated with the Wallach quarry; 5) the oil and gas industries that are pervasive throughout southeastern New Mexico; and 6) the proposed International Isotopes Fluorine Products, Inc. (IIFP) facility near the city of Hobbs, New Mexico. A summary assessment of the potential for cumulative impacts is shown in Table 2.2-1, Potential Cumulative Effects for the UUSA Expansion.

The potential local cumulative effects with the greatest likelihood of occurring are decrements in air quality (increases in Total Suspended Particulate (TSP)) from combined WCS, and Lea County landfill and TSP releases that can occur during UUSA construction; increased environmental noise levels from the Lea County landfill and Wallach Concrete, Inc. quarry operations combined with UUSA construction; the proposed IIFP facility, and small increases in the environmental radiation public dose and radiological waste inventories from the WCS low-level radiation waste burial site.

IIFP is currently in the licensing process with the NRC for constructing and operating a facility west of Hobbs, New Mexico (approximately 20 miles from the UUSA facility). Though not adjacent to UUSA, IIFP is proximal. The IIFP facility would deconvert depleted UF_6 to depleted uranium dioxide (UO_2) and fluoride. The fluoride would be produced into specialty fluoride gas products for sale and the depleted UO_2 would be disposed of as low-level waste. The proposed IIFP facility design capacity is 3.4 million kilograms depleted UF_6 per year. The WCS site currently stores low-level waste and has been recently approved for disposal of low-level radioactive waste.

Cumulative impacts from these facilities will be limited by regulatory limits and/or the lack of general public receptors residing near these facilities. In addition, the cumulative impacts section of the WSC EIS included consideration of the URENCO facility and did not determine substantive impacts.

An additionally evaluated potential cumulative effect is from the DOE Waste Isolation Pilot Plant, located approximately 80 km (50 mi) west of the UUSA facility. The WIPP facility is storing transuranic wastes. Since these wastes are drastically different in composition and activity levels, are approximately 80 km (50 mi) away, and are stored in deep underground salt mine shafts, it is not plausible that a cumulative effect would occur between WIPP and the UUSA.

The only other non-local cumulative impact is the cumulative dose to the general public from transportation of UF_6 as feed, product or depleted material and solid waste. Also, there is a dose to the onlooker, worker, and driver.

UUSA evaluation of impacts due to radiological transport (see Section 4.2.6, Radioactive Material Transportation) have shown latent cancer fatalities from incident-free transport were estimated to range between 0.00333 individuals per year for current operations to 0.0168 individuals per year at 10 MSWU facility capacity. Incident-free transport represents the transport of the radioactive shipment without a release from the shipment. Radiological latent cancer fatalities from accidents during shipment range between 0.00314 individuals a year currently to 0.0140 individuals per year at 10 MSWU facility capacity.

There would be no cumulative adverse impacts to geology from the UUSA proposed facility capacity expansion as impacts to this resource from this or other projects will be localized to the project site. The UUSA site is located in a region where there has been contamination of soils and ground-water aquifers from activities related to the oil and gas industry and this condition is relatively unchanged from the initial evaluations conducted. There would be no cumulative adverse impacts to ecological resources as the impacts from the proposed UUSA facility capacity expansion would be restricted to the site, and the UUSA site takes up a negligible percentage of the habitat surrounding the site, thereby not noticeably changing the cumulative impacts already existing from other local and regional activities. There would be no cumulative noise impacts because noise from activities at the UUSA site would not impact any sensitive off-site receptors. There would be no cumulative adverse impacts to cultural or historical resources in the area because previously identified resources at the site have been mitigated in accordance with a treatment plan.

The sum total of all local and non-local cumulative impacts and effects are expected to be insignificant or very minor when compared to the established federal, state, and local regulatory limits. Negative cumulative effects will be balanced by positive cumulative effects, such as the expansion of job opportunities that will diversify the employment opportunities and expand the local tax base and revenues.

2.2.1 Section 2.2 Tables

Table 2.2-1 Potential Cumulative Effects for the UUSA Expansion

ER Section Reference	Effect on:	UUSA Effect	Cumulative Effects
4.1	Land Use	Insignificant.	None, based on current and expected future activities. Proposed action is compatible with current land usage.
4.2	Transportation	Minor, additional personnel vehicles, radiological and non-radiological heavy truck shipments annually.	Cumulative effect will not be noticeable on the highway to the site because of existing traffic volume and mix.
4.3	Geology & Soils	Minimal.	None.
4.4	Water Resources	Minor and not likely to affect water resources. Site groundwater will not be used.	Not expected due to depth of groundwater and lack of surface waters.
4.5	Ecological	Minimal.	None, no local habitats for RTE species.
4.6	Air Quality	Minimal. Increased TSP emissions during ongoing construction.	Potentially minor cumulative TSP effects when combined with WCS and Lea County landfill operations.
4.7	Noise	Not significant. Increased noise levels during ongoing construction, but few nearby receptors.	Potentially minor cumulative environmental noise effects when combined with WCS and Lea County landfill operations.
4.8	Historic and Cultural	Minimal, previous findings have been mitigated.	No measurable change since effects are confined to onsite.
4.9	Visual/Scenic Resources	Generally positive because of natural landscaping. None out of character with existing features.	Not significant since positive effects are confined to onsite.
4.10	Socioeconomic	Positive.	Cumulative effects will be positive when combined with other local industries and increase job opportunities, income and tax revenues.
4.11	Environmental Justice	No disproportionate impact or effect.	None.
4.12	Public & Occupational Health	Increased environmental radiation exposure that are below limits.	Potentially minor cumulative environmental radiation levels from WCS low level waste disposal.
4.13	Waste Management	Minimal. Minor increased quantities of hazardous and radiological wastes.	Potentially minor cumulative waste effects (total local inventory) due to WCS obtaining a 10 CFR 61 license. Unlikely that any cumulative effect would result from the WIPP facility.

2.3 Comparison of the Predicted Environmental Impacts of the No-Action Scenarios

As noted in Supplemental ER Section 1.2.5, there are various scenarios if the capacity expansion at the UUSA facility is not added (i.e., the no-action scenarios). However, only three of the five scenarios discussed are relevant when comparing domestic environmental impacts (B, C, and D).

As of as of August 2012, development of none of the four new projects discussed in these three No-Action Scenarios is a certainty. GLE may be the most likely because they have 1) successfully demonstrated a prototype facility over the last 2 years; and 2) are owned by very solvent partners GE, Hitachi, and Cameco (WNA, 2012). While they do not yet have their NRC license, they are in the last stages of the uncontested mandatory hearing process for that license (NRC, 2012b).

The Areva Enrichment Services, L.L.C. Eagle Rock facility has 1) an NRC license; 2) a $2 billion DOE loan guarantee; and 3) contracts with customers for the first 10 years of output. However, it announced in December 2011 that it was postponing breaking ground until a financial partner could be found to help fund the facility's construction (WP, 2012). The company has stated it will now start construction in late 2013 or 2014 (WP, 2012).

ACP may be the most uncertain of all the new projects. While the ACP plant does have a license, and received significant federal funding in June 2012, USEC is still conducting research and development, and has not yet developed a commercially deployable version of centrifuges (WP, 2012, CG, 2012).

Finally, continued operation of the Paducah GDP beyond May 2013, especially at current levels, is unlikely (USEC, 2012, DOE, 2012a).

The other scenarios (A, E, F, and G) are irrelevant when comparing domestic environmental impacts because they either include the proposed action (A) or require an analysis of environmental impacts in Russia (F) or other foreign countries (G), which is outside of the scope required to be considered in the National Environmental Policy Act, or is a scenario where little is known about where the production would take place, and by whom (E). Therefore, the anticipated effect to the environment for these no-action alternative scenarios, Scenarios B, C, and D, are described below.

Table 2.3-1, Comparison of Potential Impacts for the Proposed Action and the No-Action Scenarios, summarizes the potential impacts of each scenario and compares them against the proposed action in terms of domestic capacity and supply. It also includes the summary of individual environmental categories used in Chapter 4, Environmental Impacts.

Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios, compares each scenario against the proposed action for Chapter 4 environmental categories in relative terms (i.e., impacts are the same, greater than, or less than those anticipated for the proposed action). Chapter 4 contains detailed descriptions of potential impacts of the proposed action on individual resources of the affected environment.

Proposed Action – Under the proposed action, UUSA increases facility capacity to 10 MSWU/yr.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others.

Under this scenario, there is a 6.3 MSWU per year supply deficit, with the Paducah GDP continuing to operate at 5 MSWU per year. This would continue to have negative environmental impacts due to the high energy costs of operating the Paducah GDP and the related air quality impacts from operating the coal-fired electric power stations that supply the required electrical needs of the plant.

While providing for indigenous U.S. supply, the resulting concerns associated with the age of the Paducah GDP and its significant requirements for electric power would not alleviate concerns among US purchasers of enrichment services regarding either long-term security of supply or reasonable economics. Further, this scenario is fairly unlikely because the Paducah GDP will probably cease uranium enrichment in 2013. Scenario B is not viewed by UUSA as an attractive long-term solution.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU, and Paducah GDP closes. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 3 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU).

Under this scenario, there is a 6.3 MSWU supply deficit from UUSA that is made up by Eagle Rock and GLE. However, neither facility has been completed. The environmental impacts from the proposed UUSA capacity increase are significantly smaller than constructing a new facility on an existing licensed site (GLE) and much smaller than developing a greenfield site (Eagle Rock). In addition, this scenario does not completely replace the 5 MSWU currently produced at Paducah. Scenario C is not viewed by UUSA as an attractive long-term solution.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU, and Paducah GDP closes. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 3 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU).

As noted for No-Action Scenario B, the environmental impact of incremental expansion of an existing plant (i.e., UUSA) is smaller than constructing a new facility on an existing licensed site (GLE and ACP) and much smaller than developing a greenfield site (Eagle Rock). Scenario D is not viewed by UUSA as an attractive long-term solution.

Summary

Not expanding the current capacity of the UUSA facility to 10 MSWU could have the following consequences:

- A uranium enrichment supply deficit for which other sources of supply must compensate.
- Continued operation of an aging technology at a high-cost, electric power intensive facility, the Paducah GDP, or the construction of new facilities with higher environmental impacts.
- Diminish the objective of long-term security of supply.

In contrast, the UUSA capacity expansion would expand domestic enriched uranium supplies, providing a means to offset both foreign enrichment supplies and the currently limited domestic enrichment supplies.

While the no-action alternative scenarios would avoid any additional potential impacts to the Lea County, New Mexico and Andrews County, Texas areas due to construction and operation of the UUSA expansion, it would lead to impacts at other locations. If the proposed capacity expansion is not built, there will be a continued and increasing need for uranium enrichment services. The no-action alternative scenarios, as discussed above, would allow for at least three domestic options in regard to continued uranium enrichment supply, Scenarios B, C, and D.

As summarized in Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios, the effects to the environment of all no-action scenarios are anticipated to be greater than the proposed action in both the short and long term. There are potentially lesser impacts, in some environmental categories, but this is based on an unproven commercially demonstrated technology. In addition, the important objective of security of supply is delayed. Hence, it is reasonable to reject the no-action alternative scenarios because the effect to the environment from the proposed action is minimal, as demonstrated in Supplemental ER Chapter 4, Environmental Impacts, and the benefits desirable, as demonstrated in Supplemental ER Chapter 7, Cost-Benefit Analysis.

2.3.1 Section 2.3 Tables

Table 2.3-1 Comparison Of Potential Impacts For The Proposed Action And The No-Action Scenarios

		No-Action Scenarios		
Potential Impact	**Proposed Action**	**B No UUSA capacity expansion and no additional enrichment capacity constructed by others; Paducah GDP continues operation at 5 MSWU**	**C No UUSA capacity expansion, facility operates at 3.0 MSWU; Paducah closes; Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock (proposed capacity 3 MSWU) and GLE (proposed capacity 6 MSWU)**	**D No UUSA capacity expansion, facility operates at 3.0 MSWU; Paducah closes; Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock (proposed capacity 3 MSWU), GLE (proposed capacity 6 MSWU), and ACP (planned capacity 3.7 MSWU)**
Domestic Capacity	Provides 10 MSWU/yr supply (UUSA only)	6.3 MSWU/yr deficit; possibly made up from continued operation of Paducah GDP at 5 MSWU/yr	6.3 MSWU/yr deficit from UUSA and 5 MSWU deficit from closure of Paducah; made up in part by construction of both Eagle Rock and GLE	6.3 MSWU/yr deficit from UUSA and 5 MSWU deficit from closure of Paducah; made up in part by construction of Eagle Rock, GLE, and ACP
Domestic Supply	Reduces security of supply concerns by providing replacement supply for inefficient and noncompetitive gaseous diffusion enrichment plants	Does not alleviate security of supply; reliance on aging high-cost, inefficient GDP technology	Uncertainty because neither facility is built yet, and construction of Eagle Rock has been postponed. Deficits in supply are not fully made up.	Fair amount of uncertainty because neither the GLE nor Eagle Rock facility is built yet, construction of Eagle Rock has been postponed, and ACP's operational technology is not yet fully finished.
Summary of Environmental Impacts (see Table 2.3-2 for list of categories)	Total Scoring[2]: 0	Total Scoring[2]: 0	Total Scoring[2]: -6 to -9.5	Total Scoring[2]: -12

[1]Proposed action assumes the expansion of the current UUSA facility to 10 MSWU.

[2]Scoring Methodology (all No-Action Scenarios compared against Proposed Action). Positive score means less impacts on the environment than proposed action. Negative score means greater impacts on the environment than proposed action.

Table 2.3-2 Comparison of Environmental Impacts For The Proposed Action And The No-Action Scenarios

		No-Action Scenarios[1,3]		
Environmental Category	**Proposed Action**	**B No UUSA capacity expansion and no additional enrichment capacity constructed by others; Paducah GDP continues operation at 5 MSWU**	**C No UUSA capacity expansion, facility operates at 3.0 MSWU; Paducah closes; Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock (proposed capacity 3 MSWU) and GLE (proposed capacity 6 MSWU).**	**D No UUSA capacity expansion, facility operates at 3.0 MSWU; Paducah closes; Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock (proposed capacity 3 MSWU), GLE (proposed capacity 6 MSWU), and ACP (planned capacity 3.7 MSWU).**
Land Use	Minimal (see Supplemental ER Section 4.1)	No impact Scoring: 0	Greater impact at Eagle Rock (greenfield), less impact at GLE since already disturbed land Scoring: -1	Greater impact at Eagle Rock (greenfield), less impact at GLE and ACP since already disturbed land Scoring: -1
Transportation	Minimal (see Supplemental ER Section 4.2)	No impact Scoring: 0	Greater impact because concentrating shipments at multiple locations Scoring: -1	Greater impact because concentrating shipments at multiple locations Scoring: -1
Geology and Soils	Minimal (see Supplemental ER Section 4.3)	Same impact Scoring: 0	Greater impact if undisturbed land at other locations, less impact if already disturbed land Scoring: -1	Greater impact if undisturbed land at other locations, less impact if already disturbed land Scoring: -1
Water Resources	Minimal; low water use (see Supplemental ER Section 4.4)	No impact Scoring: 0	Greater impact for short term because of greater water use by other plants and high water use to meet other electricity needs; greater impact for the long term Scoring: -1 or -0.5	Greater impact for short term because of greater water use by other plants and high water use to meet other electricity needs; greater impact for the long term Scoring: -1.5

Table 2.3-2 Comparison of Environmental Impacts For The Proposed Action And The No-Action Scenarios

		No-Action Scenarios[1,3]		
Environmental Category	**Proposed Action**	**B No UUSA capacity expansion and no additional enrichment capacity constructed by others; Paducah GDP continues operation at 5 MSWU**	**C No UUSA capacity expansion, facility operates at 3.0 MSWU; Paducah closes; Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock (proposed capacity 3 MSWU) and GLE (proposed capacity 6 MSWU).**	**D No UUSA capacity expansion, facility operates at 3.0 MSWU; Paducah closes; Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock (proposed capacity 3 MSWU), GLE (proposed capacity 6 MSWU), and ACP (planned capacity 3.7 MSWU).**
Ecological Resources	Minimal (see Supplemental ER Section 4.5)	No impact Scoring: 0	Greater impact due to the construction at the additional locations Scoring: -1 or -0.5	Significantly greater impact because of construction at the additional locations and increased electric energy demand to support increased capacity at other plants Scoring: -1.5
Air Quality	Minimal; less than regulatory limits (see Supplemental ER Section 4.6)	No impact, but current negative air quality impacts would continue Scoring: 0	Greater impact because of increased electric energy needs to support increased capacity at other plants Scoring: -1 or -0.5	Significantly greater impact because of increased electric energy needs to support increased capacity at other plants Scoring: -1.5
Noise	Minimal; typically within HUD and EPA limits (see Supplemental ER Section 4.7)	No impact Scoring: 0	Greater impact in short term due to construction of each plant Scoring: -1 or -.5	Greater impact in short term due to construction of each plant Scoring: -1.5
Historic and Cultural	Minimal (see Supplemental ER Section 4.8)	No impact Scoring: 0	Likely greater since Eagle Rock is constructed on a greenfield. Scoring: -.5	Likely greater since Eagle Rock is constructed on a greenfield. Scoring: -.5

Table 2.3-2 Comparison of Environmental Impacts For The Proposed Action And The No-Action Scenarios

		No-Action Scenarios[1,3]		
Environmental Category	**Proposed Action**	**B No UUSA capacity expansion and no additional enrichment capacity constructed by others; Paducah GDP continues operation at 5 MSWU**	**C No UUSA capacity expansion, facility operates at 3.0 MSWU; Paducah closes; Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock (proposed capacity 3 MSWU) and GLE (proposed capacity 6 MSWU).**	**D No UUSA capacity expansion, facility operates at 3.0 MSWU; Paducah closes; Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock (proposed capacity 3 MSWU), GLE (proposed capacity 6 MSWU), and ACP (planned capacity 3.7 MSWU).**
Visual/Scenic	Minimal; no visual impacts out of character with existing site (see Supplemental ER Section 4.9)	No impact Scoring: 0	Greater since new facilities are constructed Scoring: -1	Greater since new facilities are constructed Scoring: -1
Socioeconomic	Same as now (see Supplemental ER Section 4.10)	Same as now. Scoring: 0	Positive impact Scoring: +1	Greater impact building new plants Scoring: +1.5
Environmental Justice	No disproportionate impact (see Supplemental ER Section 4.11)	No impact Scoring: 0	Same impact Scoring: 0	Same impact Scoring: 0
Public and Occupational Exposure	Minimal; doses below NRC and EPA regulatory limits (see Supplemental ER Section 4.12)	No impact Scoring: 0	Greater impact in short term due to more effluents and operational exposure at other plants; same or greater impact in long term Scoring: -1 or -.5	Greater impact in short term due to more effluents and operational exposure at other plants; same or greater impact in long term Scoring: -1.5

Table 2.3-2 Comparison of Environmental Impacts For The Proposed Action And The No-Action Scenarios

		No-Action Scenarios[1,3]		
Environmental Category	**Proposed Action**	**B No UUSA capacity *expansion and no* additional enrichment capacity constructed by others; Paducah GDP continues operation at 5 MSWU**	**C No UUSA capacity expansion, *facility operates at 3.0 MSWU;* Paducah closes; Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock (proposed capacity 3 MSWU) and GLE (proposed capacity 6 MSWU).**	**D No UUSA capacity expansion, facility operates at 3.0 MSWU; Paducah closes; Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock (proposed capacity 3 MSWU), GLE (proposed capacity 6 MSWU), and ACP (planned capacity 3.7 MSWU).**
Waste Management	Minimal; reduced waste streams due to new and highly efficient technology (see *Supplemental ER* Section 4.13)	No impact Scoring: 0	Greater impact in short term because waste streams are larger; same in long term Scoring: -1 or 0	Greater impact because of increased capacity at other plants Scoring: -1.5

[1]If impact was unknown, the impact was conservatively assumed to be the same or less than proposed option

[2]Proposed action assumes both LES and USEC deploy centrifuge plants and GDP is shutdown when USEC centrifuge plant comes on line. The proposed action receives a neutral score of zero (i.e., baseline impact on the environment).

[3]Scoring Methodology (all No-Action Scenarios compared against Proposed Action). Positive score means fewer impacts on the environment than proposed action. Negative score means greater impacts on the environment than proposed action.

Less +1
Same or less +0.5
Same 0
Same or less positive -0.5
Same or greater -0.5
Less positive -1
Greater -1
Significantly greater -1.5

3 DESCRIPTION OF AFFECTED ENVIRONMENT

This chapter supplements and updates the information and data for the affected environment at the UUSA site and surrounding vicinity found in the LES ER. The updates in this section reflect in particular the construction and operation of the current UUSA facility. While the UUSA facility became operational in 2010, construction is ongoing and it is not yet at its full capacity. Accordingly, this chapter describes not only the current environment and the plant's current impacts but those that are projected to occur under the current license once SBM-1001 and 1003 are fully operational. Tabular information provided in the body of this report, unless otherwise discussed or annotated, is for the 10 MSWU facility.

3.1 Land Use

3.1.1 Surrounding Land Uses

Land uses near the UUSA site prior to construction are described in Section 3.1 of the LES ER. For the proposed expansion, land use surrounding the current operating facilities has been reevaluated.

The surrounding land usage has not shown change in comparison to the conditions prior to the initial facility construction. A comparison of photo imagery taken throughout the 2005 (date of NRC EIS, NUREG-1790) through 2011 time frame of a 5-mile radius surrounding the site indicates that land use has not varied for the area during that time frame and the conditions and descriptions remain as previously evaluated prior to construction at the site (Figure 3.1-1).

An updated table summarizes the 2007 Agricultural Census for Lea County, New Mexico and Andrews County, Texas (Table 3.1-1). Although various crops are grown within Lea and Andrews Counties, the land use identified in the nearby site vicinity continues to be livestock ranching. Crop lands and dairy farms are not identified within the 5 mile radius of the UUSA site. Note that the 2007 agricultural census data is the most current information presently available.

Except for the ongoing construction of the UUSA facility and the potential siting of a low-level radioactive waste disposal site in Andrews County, Texas, there are no other known current, future, or proposed land use plans, including staged plans, for the immediate vicinity. Similarly, as the site is not subject to local or county zoning, land use planning or associated review process requirements, there are no known potential conflicts with land use plans, policies, or controls.

3.1.2 Existing UUSA Site

The State of New Mexico owns the UUSA site and has granted UUSA a 35-year easement. This site is currently developed by the existing UUSA facility.

The UUSA site comprises an area of approximately 220 ha (543 acres). Construction activities, including additional permanent plant structures and temporary construction facilities have previously disturbed approximately 394 acres of the total 543 acres for the property. The contractor lay-down and parking area will be restored after completion of plant construction. Select engineered fill material will continue to be imported from a neighboring facility to achieve the backfill specifications for building footprints and the excavated native soil will be stockpiled to the northeast of the facility on the property. The current UUSA facility (November 2011) showing existing buildings, construction laydown areas, and proposed further building locations is shown on Figure 4.9-1, Existing Conditions Site Aerial Photograph.

The amount of disturbed acres is currently higher than anticipated in the 2005 EIS by 200 acres (NRC, 2005; ER Figure 4.9-1). However, the impacts identified in the 2005 EIS relative to the previous land use (cattle grazing) have not changed because cattle grazing remains restricted on the entire site no matter the areas disturbed, and there is an abundance of nearby grazing land.

During the ongoing construction phase of the UUSA site, conventional earthmoving and grading equipment is used. The removal of very dense soil or caliche may require the use of heavy equipment with ripping tools. Soil removal work for foundations will be controlled to reduce over-excavation to minimize construction costs. In addition, loose soil and/or damaged caliche will be removed prior to installation of foundations for seismically designed structures. The maximum anticipated excavation depth for ongoing construction at the UUSA site is 32 feet.

Wildlife on the site is limited due to the existing facility and currently erected fencing. Any small wildlife has the opportunity to move to areas of suitable habitat bordering the UUSA site.

The ongoing construction activities create a short-term increase in soil erosion. However, this is mitigated by the continuing use of proper construction best management practices (BMPs). These practices include minimizing the construction footprint to the extent possible, limiting site slopes to a horizontal to vertical ratio of three to one or less, the use of a sedimentation detention basin, protection of undisturbed areas with silt fencing and straw bales as appropriate, and site stabilization practices such as placing crushed stone on top of disturbed soil in areas of concentrated runoff. In addition, as indicated in Supplemental ER Section 5, Mitigation Measures, onsite construction roads are periodically watered down, if required, to control fugitive dust emissions. Water conservation is considered when deciding how often dust suppression sprays will be applied. After construction is complete, the site will be stabilized with natural, low-water maintenance landscaping and pavement.

Impacts to land and groundwater are controlled during current construction through compliance with the National Pollution Discharge Elimination System (NPDES) Construction General Permit obtained from Region 6 of the Environmental Protection Agency (EPA). BMPs are used to prevent releases; however, should a release occur, site procedures will identify individuals and their responsibilities for implementation of corrective measures and provide instructions for prompt notifications of state and local authorities, as required.

Waste management BMPs are used to minimize solid waste and hazardous materials. These practices include the placement of waste receptacles and trash dumpsters at convenient locations and the designation of vehicle and equipment maintenance areas for the collection of oil, grease, and hydraulic fluids. Where practicable, materials suitable for recycling are collected. If external washing of construction vehicles is necessary, no detergents are used, and the runoff is diverted to onsite retention basins. Adequately maintained sanitary facilities are provided for construction crews.

3.1.3 Section 3.1 Tables

Table 3.1-1 2007 Census of Agriculture – County Data

ITEM		Lea County, New Mexico	Andrews County, Texas
Farms	number	572	175
Land in farms	acres	2,365,168	808,474
Average size of farm	acres	4,135	4,620
Median size of farm	acres	210	229
Estimated market value of land and buildings:			
Average per farm	dollars	926,712	1,572,018
Average per acre	dollars	224	340
Estimated market value of all machinery and equipment:			
Average per farm	dollars	70,813	90,734
Farms by size:			
1 to 9 acres		80	31
10 to 49 acres		98	32
50 to 179 acres		90	21
180 to 499 acres		82	28
500 to 999 acres		31	19
1,000 acres or more		191	44
Total cropland	farms	337	100
	acres	128,433	62,247
Harvested cropland	farms	140	43
	acres	35,345	21,385
Irrigated land	farms	178	37
	acres	39,078	12,244
Market value of agricultural products sold	$1,000	93,644	15,919
Average per farm	dollars	163,713	90,965
Crops, including nursery and greenhouse crops	$1,000	17,037	11,362
Livestock, poultry, and their products	$1,000	76,607	4,556
Farms by value of sales:			
Less than $2,500		271	102
$2,500 to $4,999		52	16
$5,000 to $9,999		37	14
$10,000 to $24,999		51	6
$25,000 to $49,999		39	8
$50,000 to $99,999		32	3
$100,000 or more		90	26
Government payments	farms	155	64
	$1,000	3,237	1,634
Total income from farm-related sources, gross before taxes and expenses (see text)	farms	69	25
	$1,000	1,878	1,830
Total farm production expenses	$1,000	86,340	12,764
Average per farm	dollars	150,944	72,938
Net cash farm income of operation (see text)	farms	572	175
	$1,000	12,419	6,619

ITEM		Lea County, New Mexico	Andrews County, Texas
Average per farm	dollars	21,711	37,822
Principal operator by primary occupation:			
Farming	number	230	63
Other	number	342	112
Principal operator by days worked off farm:			
Any	number	346	110
200 days or more	number	232	66
Livestock and poultry:			
Cattle and calves inventory	farms	290	51
	number	82,199	10,982
Beef cows	farms	231	41
	number	33,143	7,480
Milk cows	farms	20	-
	number	19,850	-
Cattle and calves sold	farms	241	41
	number	47,091	6,109
Hogs and pigs inventory	farms	16	5
	number	75	(D)
Hogs and pigs sold	farms	14	4
	number	251	138
Sheep and lambs inventory	farms	18	15
	number	2,304	1,270
Layers inventory (see text)	farms	48	4
	number	1,010	68
Broilers and other meat-type chickens sold	farms	-	1
	number	-	(D)
Selected crops harvested:			
Corn for grain	farms	4	1
	acres	801	(D)
	bushels	118,928	(D)
Corn for silage or greenchop	farms	15	-
	acres	3,022	-
	tons	64,503	-
Wheat for grain, all	farms	14	2
	acres	3,665	(D)
	bushels	185,000	(D)
Winter wheat for grain	farms	14	2
	acres	3,665	(D)
	bushels	185,000	(D)
Spring wheat for grain	farms	-	-
	acres	-	-
	bushels	-	-
Durum wheat for grain	farms	-	-
	acres	-	-
	bushels	-	-
Oats for grain	farms	-	-
	acres	-	-
	bushels	-	-
Barley for grain	farms	-	-
	acres	-	-
	bushels	-	-
Sorghum for grain	farms	8	1
	acres	468	(D)
	bushels	23,624	(D)
Sorghum for silage or greenchop	farms	6	-
	acres	600	-

ITEM		Lea County, New Mexico	Andrews County, Texas
	tons	9,200	-
Soybeans for beans	farms	-	-
	acres	-	-
	bushels	-	-
Dry edible beans, excluding limas	farms	-	-
	acres	-	-
	cwt	-	-
Cotton, al	farms	16	14
	acres	12,089	16,507
	bales	22,643	31,051
Upland cotton	farms	16	14
	acres	12,089	16,507
	bales	22,643	31,051
Pima cotton	farms	-	-
	acres	-	-
	bales	-	-
Forage - land used for all hay and all haylage, grass silage, and greenchop (see text)	farms	92	19
	acres	13,727	1,708
	tons, dry	57,901	3,651
Rice	farms	-	-
	acres	-	-
	cwt	-	-
Sunflower seed, all	farms	-	-
	acres	-	-
	pounds	-	-
Sugarcane for sugar	farms	-	-
	acres	-	-
	tons	-	-
Peanuts for nuts	farms	5	6
	acres	(D)	2,238
	pounds	(D)	9,160,000
Vegetables harvested for sale (see Text)	farms	1	-
	acres	(D)	-
Potatoes	farms	-	-
	acres	-	-
Sweet potatoes	farms	-	-
	acres	-	-
Land in orchards	farms	39	13
	acres	528	68

NOTES:
SOURCE = National Agricultural Statistics Service, United States Department of Agriculture (USDA), National Agricultural Statistics Service. 2007 Census of Agriculture County Summary Highlights.
http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_US_State_Level/
(-) = Represents zero
(D) = Withheld to avoid disclosing data for individual farms
(H) = Standard error or relative standard error of estimate is greater than or equal to 99.95 percent
(IC) = Independent city
(L) = Standard error or relative standard error of estimate is less than 0.05 percent
(NA) = Not available
(X) = Not applicable
(Z) = Less than half of the unit shown
Cwt = Hundredweight
sq ft = Square feet

3.1.4 Section 3.1 Figures

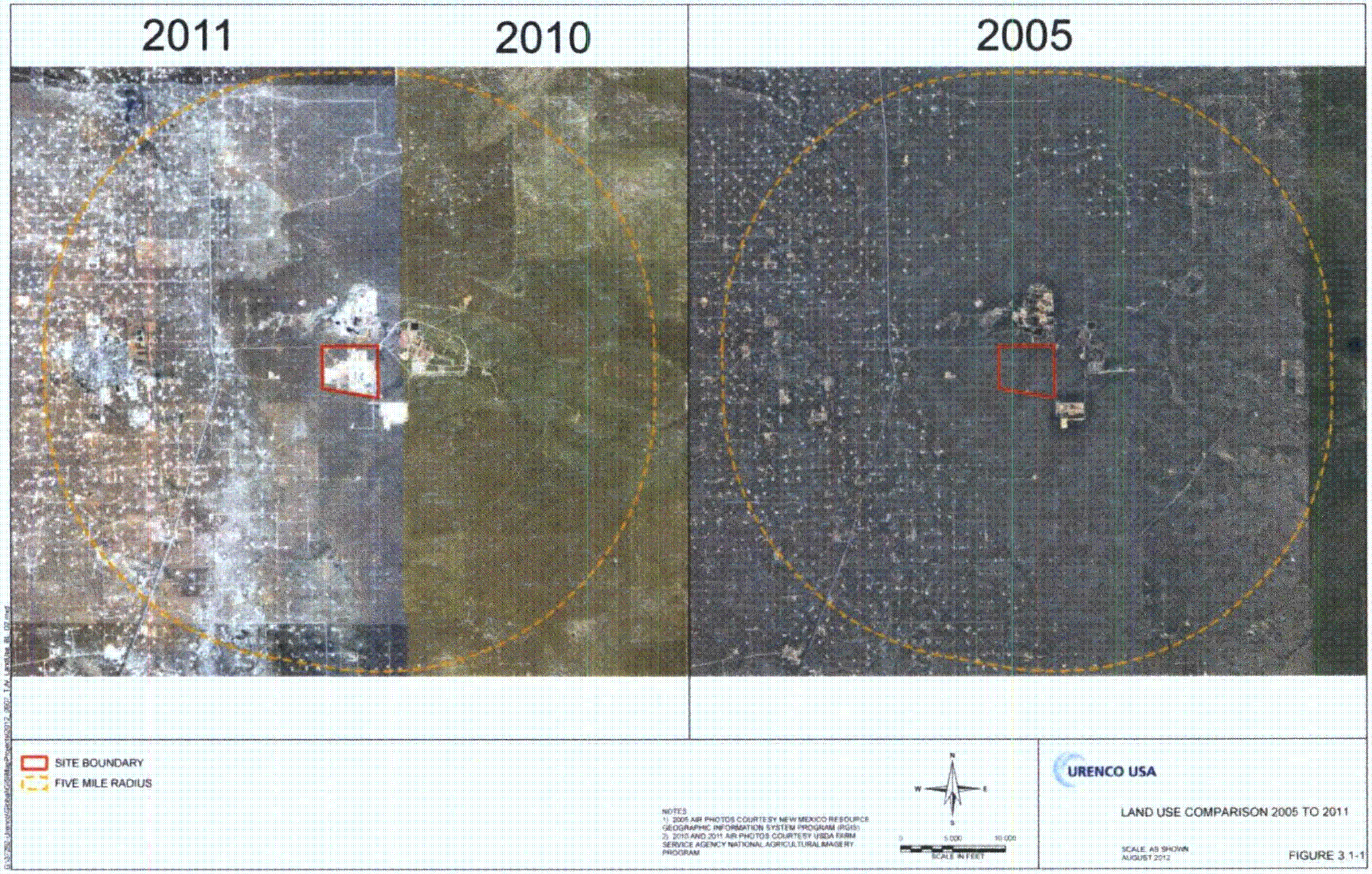

Figure 3.1-1 Land Use Comparison 2005 to 2011

3.2 Transportation

This section is an update of the discussion of transportation facilities at or near the UUSA site found in Section 3.2 of the LES ER; it also includes a discussion of current UUSA facility transportation impacts. The section provides input to various other sections of this Supplemental ER, such as Section 3.11, Public and Occupational Health, and Section 3.12, Waste Management, and includes information on access to and from the plant, current transportation routes, and applicable restrictions.

3.2.1 Transportation of Access

The existing UUSA facility is located in southeastern New Mexico near the New Mexico/Texas state line in Lea County, New Mexico. The site lies along the north side of New Mexico Highway 176, which is a two-lane highway with 3.7-m (12 ft) driving lanes, along with deceleration, acceleration, and turning lanes. At its widest, across from the facility, the highway is 14.63-m (48 ft) across with an 8 ft shoulder on its southern edge. Across from the facility, the shoulder varies from 2.4-m (8 ft) and about 0.8-m (2.5 ft) along its northern edge. The highway runs within a 61-m (200 ft) wide right-of-way easement.

New Mexico Highway 176 provides direct access to the site. To the north, U.S. Highway 62/180 intersects New Mexico Highway 18 providing access from the city of Hobbs south to New Mexico Highway 176. New Mexico Highway 18 is a four-lane divided highway, which was rehabilitated in the last 10 years north of its intersection with New Mexico Highway 176. It was also improved south of its intersection with New Mexico Highway 176. To the east in Texas, U.S. Highway 385 intersects Texas Highway 176 providing access from the town of Andrews west to New Mexico Highway 176. To the south in Texas, Interstate 20 intersects Texas Highway 18, which becomes New Mexico Highway 18. West of the site, New Mexico Highway 8 provides access from the city of Eunice east to New Mexico Highway 176. See Supplemental ER Figure 1.3-2, 80-Kilometer (50-Mile) Radius With Cities and Roads.

Current traffic volume for these road systems is shown below:

Average Annual Daily Traffic Counts for Nearby Roadways

Roadway	Intersecting Roadway	AADT (vehicles per day)
NM Highway 176/234	NM Highway 18	1,500
NM Highway 18	NM Highway 176/234 East	1,800
NM Highway 62/180	NM Highway 18	6,561
Texas Highway 176	At NM Border	2,800
Texas Highway 385	Texas Highway 176	9,300
I-20	NM/TX Highway 18	7,700
I-27	Plainview, Texas State Road 70	11,800

Source: NMDOT 2012b; TXDOT 2012

The Texas–New Mexico Railroad (TNMR) operates an active rail transportation line in Eunice, New Mexico, approximately 5.8 kilometers (3.6 miles) west of the UUSA site. The rail line connects with the Union Pacific Lines in Texas south of the site. The railroad primarily serves the oil fields of west Texas and southeast New Mexico. The primary commodities hauled are oilfield chemicals and minerals, construction aggregates, industrial waste and scrap (Iowa Pacific 2012). Trains travel on this rail line at an average rate of one train per day. An active rail spur is located along the northern property line of the proposed site. The rail spur is owned by WCS (Waste Control Specialists), owner of the neighboring property to the east. Trains travel on this rail spur at an average rate of one train per week. The trains that travel on the spur typically consist of five to six cars. The rail spur has a speed limit of 16 kilometers (10 miles) per hour.

The nearest commercial airport is the Lea County Regional Airport, located 40 kilometers (25 miles) northwest of the UUSA site near Hobbs, New Mexico. The nearest non-commercial airport is located approximately 24 kilometers (15 miles) west of the site near Eunice. The airport is used by privately owned planes and has no control tower. The airport has two runways that are 1,000 meters (3,280 feet) and 780 meters (2,550 feet) in length. Three additional local airports are located within Lea County and adjacent Texas counties:

- Lea County/Jal Airport is located approximately 40 kilometers (25 miles) south-southwest of the site.
- Andrews County Airport is located approximately 48 kilometers (30 miles) east of the site.
- Gaines County Airport is located approximately 48 kilometers (30 miles) northeast of the site.

Two international airports are located within approximately 161 kilometers (100 miles) of the UUSA site. The nearest is the Midland International Airport (also known as the Midland/Odessa Airport). This four-runway airport (with approximately 200 operations daily) is located in Texas about 103 kilometers (64 miles) southeast of the site and is owned and operated by the City of Midland. Lubbock Preston Smith International Airport, located along Interstate 27 in Texas, approximately 160 kilometers (100 miles) northeast of Eunice, can also serve the site. The Lubbock International Airport is a three-runway airport with approximately 213 operations daily.

3.2.2 Transportation Routes for the Existing Plant Operations and Construction

The transportation route used by UUSA for the ongoing construction from areas north and south of the site is New Mexico Highway 18 to New Mexico Highway 176. The intersection of New Mexico Highways 18 and 176 is a short distance west of the UUSA site. Construction material may also be transported from the east by way of Texas Highway 176, which becomes New Mexico Highway 176 at the New Mexico/Texas state line. UUSA construction material transported from the west are by way of New Mexico Highway 8, which becomes Highway 176 near the city of Eunice, west of the site.

The mode of transportation for conveying construction material is over-the-road trucks, ranging from heavy-duty 18-wheeled delivery trucks, heavy-duty trucks, and dump trucks, to box and flatbed type light-duty delivery trucks. Due to the presence of a quarry directly north of the site, concrete mixing trucks use the onsite gravel road, which currently leads to the quarry, avoiding adding traffic to public roadways.

3.2.3 Current Impacts of UUSA Facility on Transportation Routes

The current (2012) operational workforce at UUSA is approximately 250 people. See LES ER Section 4.10.2.1. The maximum potential increase to traffic due to these UUSA employees has been approximately 250 roundtrips per day. This is an upper bound estimate since all workers do not work on any given day. Operational shift changes for site personnel are estimated to average 40 to 50 vehicles per shift change. The range of vehicles per shift change is based on three shifts per day, seven days per week. This yields a total of 21 shift changes per week. Based on five shifts per employee per week, it would require approximately 4.2 employees to staff each position around the clock each week. Since the operational staff numbers approximately 250, this results in an average of approximately 60 positions per shift on average. Allowing for some routine absences, i.e., sick and vacation time and carpooling, the average vehicles per shift should be less than 50. The day shift (first shift) during the normal work week will generate more vehicles per shift change since some of these positions are not staffed around the clock (*e.g.,* some administration positions). Second and third shifts as well as weekend shifts will have less vehicles per shift change than the average since all staff positions will not routinely work during these off shifts. Most vehicles would likely travel west from the site on New Mexico Highway 176, towards the city of Eunice, New Mexico or turn north onto New Mexico Highway 18 toward the city of Hobbs, New Mexico or south towards the city of Jal, New Mexico. Eastbound vehicles would travel from the site on New Mexico Highway 176 and continue on Texas Highway 176. Operational deliveries and waste removal for the existing plant have created an approximate maximum additional 4,300 roundtrips per year. See LES ER Section 4.2.3.

During the initial construction of the site (a level that will continue with the proposed expansion), there have also been approximately 800-1,000 contractors at the site. *See* LES ER Section 4.2.3. The maximum potential increase to traffic due to contractors has been 1,000 roundtrips per day. The current size of the construction crew does not cause noticeable traffic impacts on New Mexico Highway 176. The majority of large construction-related vehicles remain on the site and do not travel to and from the site on a daily basis.

3.2.4 Transportation of Radioactive Materials

All radioactive material shipments are transported in packages that meet the requirements of 10 CFR 71 and 49 CFR 171-173. Uranium feed, product, depleted uranium, and associated low-level waste (LLW) are transported to and from the UUSA site. The following distinguishes each of these conveyances and associated routes.

Uranium Feed

The uranium feed for UUSA is natural uranium in the form of uranium hexafluoride (UF_6). The UF_6 is transported to the facility in 48Y cylinders. These cylinders are designed, fabricated, and shipped in accordance with American National Standard Institute N14.1, Uranium Hexafluoride - Packaging for Transport. Feed cylinders are transported to the site by 18-wheeled trucks, one per truck (48Y). Currently, there are approximately 395 shipments of feed cylinders per year.

Uranium Product

The product generated at the UUSA facility is transported in 30B cylinders. These cylinders are designed, fabricated, and shipped in accordance with ANSI N14.1, Uranium Hexafluoride - Packaging for Transport. Product cylinders are transported from the site to fuel fabrication facilities by modified flatbed truck—typically two per truck although up to six product cylinders could be transported on the same truck. A maximum of 13,800 kg (30,360 lbs) (2,277 kg (5,010 lbs) per cylinder) of enriched uranium could be transported per shipment.

Uranium Wastes

Waste materials are transported in packages by truck via highway in accordance with 10 CFR 71 and 49 CFR 171-173. Detailed descriptions of radioactive waste materials that will be shipped from the UUSA facility for disposal are presented in Supplemental ER Section 3.12, Waste Management. LES ER Table 3.12-1, Estimated Annual Radiological and Mixed Wastes, presents a summary of these waste materials.

Depleted Uranium

Depleted uranium in UBCs will be shipped to conversion facilities via truck in 48Y cylinders similar to feed cylinders. These cylinders are designed, fabricated and shipped in accordance with ANSI N14.1, Uranium Hexafluoride – Packaging for Transport. UBCs will be transported from the site by 18-wheeled trucks, one per truck (48Y). At present, UBCs are temporarily stored onsite until conversion facilities are available.

3.2.5 Agency Consultations

Based on conversations with officials from the New Mexico State Highway and Transportation Department and the Texas Department of Transportation, except for potential weight, height, and length restrictions placed on trucks traveling certain routes, there are no roadway restrictions.

3.2.6 Land Use Transportation Restrictions

The UUSA site is on land currently owned by the State of New Mexico; UUSA has been granted a 35-year easement for the site. Highway easements associated with state trust land are for highway use only, although applications for other uses (i.e., installation of utilities) may be submitted to the state. There are no known restrictions on the types of materials that may be transported along the important transportation corridors. This was confirmed with both the State of New Mexico and Texas officials.

3.2.7 Section 3.2 Tables

Table 3.2-1 Possible Radioactive Material Transportation Routes

Facility	Description	Estimated Distance, km (mi)
UF_6 Conversion Facility Port Hope, Ontario	Feed	2,869 (1,782)
UF_6 Conversion Facility Metropolis, IL	Feed	1,674 (1.040)
Fuel Fabrication Facility Richland, WA	Product	2,574 (1,599)
Fuel Fabrication Facility Columbia, SC	Product	2,264 (1,406)
Fuel Fabrication Facility Wilmington, NC	Product	2,576 (1,600)
Barnwell Disposal Site Barnwell, SC	LLW Disposal	2,320 (1,441)
Envirocare of Utah/ Energy Solutions Clive, UT	LLW and Mixed Disposal	1,636 (1,016)
GTS Duratek Oak Ridge, TN	Waste Processor	1,993 (1,238)
*Depleted UF_6 Conversion Facility Paducah, KY	Depleted UF_6 Disposal	1,670 (1,037)
*Depleted UF_6 Conversion Facility Portsmouth, OH	Depleted UF_6 Disposal	2,243 (1,393)

*While these are not currently operational, they may be so in the future.

3.3 Geology and Soils

This section supplements and updates the description of geological, seismological, and geotechnical characteristics of the 220-ha (543-acres) UUSA site and its vicinity in Section 3.3 of the LES ER.

Topographic relief on the UUSA site is relatively level, with elevations ranging from approximately 3,390 to 3,430 feet above mean sea level (msl). The site topography is shown on Figure 3.3-1, and overall land surface topography slopes southwest at approximately 25 feet per mile. Localized topographic features within the site include engineered design of stormwater retention basin and finished site grades. The higher elevations extending regionally toward the north and northeast are associated with the Red Bed Ridge, an escarpment of about 15 m (50 feet) in height, which is a prominent buried ridge developed on the upper surface of the Triassic Dockum Group "red beds". The Red Bed Ridge origin appears to be the result of the relative resistant character of the claystone of the Chinle Formation and to caliche deposits that cap the ridge.

The primary difference between the Pecos Plains (to the west of the UUSA site) and the Southern High Plains (to the east of the UUSA site) physiographic sections is a change in topography. The Southern High Plains is a large flat mesa, which uniformly slopes to the southeast. In contrast, the Pecos Plains section is characterized by its more irregular erosional topographic expression (WBG, 1998).

UUSA has continued to monitor wells since the facility was approved. The site geology has been characterized using information derived from monitoring well boring logs (MW-1 through MW 26) as supplemented with historic groundwater and geotechnical test boring explorations. Figure 3.3-2, Site Location Plan – Cross-Section Lines, includes the locations of site borings and typical site cross-section representative geologic profiles, which are included on Figures 3.3-3A, 3.3-3B, and 3.3-3C.

Generally, the uppermost 250 feet of the site includes of the following stratigraphy (consistent with the regional setting stratigraphy provided above), in descending order from land surface:

- Dune sand (5-10 feet thick);
- Caliche (10-30 feet thick);
- Weakly cemented, alluvial sand and gravel (0-20 feet thick);
- Triassic-aged Cooper Canyon Formation red beds, consisting of reddish, moderately indurated claystone with occasional siltstone/silty sandstone interbeds (the depth to the top of the red beds is on the order of 40 feet at the UUSA site).

Specifically, the claystone of the Cooper Canyon Formation represents low energy lake deposits, while the siltstone and silty sandstone intervals represent a somewhat higher depositional energy environment. References on this formation indicate that these higher energy periods did not typically result in single, tabular siltstone layers, but rather created zones with silts and silty sands deposited in braided stream and distributary fan delta deposits. The siltstone interbeds within the Cooper Canyon Formation are typically discontinuous layers, surrounded by claystone. The discontinuous nature of the siltstones within the Cooper Canyon Formation indicates that groundwater within the siltstone would not be part of a regional, laterally-extensive aquifer.

Within Lea County, New Mexico and Andrews County, Texas there are water-bearing strata used for water production. North and east of the UUSA site, beneath the High Plains, the Ogallala Aquifer is the most productive of these regional aquifers. West of the site, in the alluvial deposits of Monument Draw, subsurface flow is also locally used as a minor aquifer. Lastly, the Santa Rosa Formation of the Lower Dockum Group and sandy lenses in the Upper Dockum Chinle formation are occasionally used as aquifers on a regional basis.

The most shallow strata to produce measurable quantities of water is an undifferentiated siltstone seam of the Chinle encountered at approximately 65 to 68 m (214 to 222 ft) below ground surface (WBG, 1998), although observed recharge rates from site wells are relatively low. There is also a 30.5-meter (100-foot) thick water-bearing sandstone layer at about 183 m (600 ft) below ground surface. However, the uppermost aquifer capable of producing significant volumes of water is the Santa Rosa Formation located approximately 340 m (1,115 ft) below ground surface (CJI, 2004), which is below elevations investigated by the site borings and monitoring wells.

3.3.1 Stratigraphy and Structures

The stratigraphy of the UUSA site is discussed in Section 3.3.1 of the LES ER. This Supplemental ER supplements that more complete discussion.

As shown in Table 3.3-1, Summary of Stratigraphic Units Proximate to the UUSA site, the subsurface in, at, and near the UUSA site vicinity can include a profile of silty fine sand, dune sand, caliche, and alluvium overlying the Chinle Formation of the Triassic Age Dockum Group. The Chinle Formation is predominately red to purple moderately indurated claystone, which is highly impermeable (WBG, 1998). Red Bed Ridge is a significant topographic feature in this regional plain that is just north and northeast of the UUSA site, and is capped by relatively resistant caliche. Ground surface elevation increases about 15 m (50 ft) from +1,045 m (+3,430 ft) to +1,059 m (+3,475 ft) across the ridge. An interpolated contour map of the red beds subcropping surface in the vicinity of the UUSA site is shown on Figure 3.3-4.

Recent surficial deposits at the site are primarily dune sands derived from Permian and Triassic rocks overlying caliche, alluvium (sand and gravel), and red beds. The surficial dune sands, also identified locally as Mescalero Sands, cover approximately 80% of Lea County.

3.3.2 Potential Mineral Resources at the Site

No significant non-petroleum mineral deposits are known to exist at the UUSA site. The surface cover of silty sand and gravel overlies a claystone of no economic value. Based on 2008 mapped mineral resources information published by the USGS and New Mexico Bureau of Geology and Mineral Resources, seven mineral commodity operations (pits, quarries, or processing) are identified in Lea County, (*e.g.*, aggregate, crushed rock, caliche, potash, salt, sulfur, etc.). A 2012 New Mexico Mining and Minerals division report identifies that the closest active, permitted operations is an aggregate/clay and shale pit located within a mile north of the UUSA facility (the Eunice Pit is operated by Wallach Concrete, Inc.) (NMEMNRD, 2012). The topographic quadrangle map that contains the site (USGS, 1979) contains 10 locations where sand and gravel have been mined from surface deposits, spread across the quadrangle (an area about 12 by 14 km (7.5 by 8.9 mi)), suggesting that suitable surficial deposits for borrow material are widespread. Small, abandoned caliche pits are also common throughout Lea County based on historic use for construction and cement, which suggest significant local resource alternatives exist and the potential future likelihood of mineral resource use from the site is low.

Exploratory drill holes for oil and gas are absent from the site area and its vicinity, but are common 8 km (5 mi) west in and around the city of Eunice, New Mexico (*see* Supplemental ER Figure 3.4-1, Water and Oil Wells in the Vicinity of the UUSA Site, for nearby well locations). No active oil and gas mineral resources are present at the UUSA site, and the distribution and the time period of exploration since the inception of exploration for this area suggest that the potential for productive oil drilling at the UUSA site is not significant.

3.3.3 Site Soils

Site soil characteristics, the results of previous surface soil samples on the site, and previously completed geotechnical investigations on nearby properties are discussed in Section 3.2 of the LES ER. This Supplemental ER adds a discussion of more recent soil samples.

Subsequent periodic surface soil sampling (from 2009 through 2012) has continued as part of the site's environmental monitoring program, including radiological sampling and non-radiological sampling. The mapped soil survey units for the site are shown on Figure 3.3-5, Site Soil Survey. A summary of the mapped soil units and description is provided on Table 3.3-2.

The non-radiological chemical analyses include a combination of analytes (volatiles, semi-volatiles, metals, organochlorine pesticides, organophosphorous compounds, polychlorinated biphenyls, chlorinated herbicides, and fluoride). Representative sample locations were selected as background conditions. The approximate locations of the onsite periodic soil samples are shown on Figure 3.3-6A-B, Site Soil Sample Locations.

The non-radiological analytical results are generally non-detect or at trace levels in limited samples for selected volatile or semi-volatiles (e.g., styrene, acetone, ethylbenzene, xylene, etc.). Metal analytes were detected in the initial eight samples and periodic monitoring, including at background and other site locations. A summary of historic sample results are provided in LES ER Table 3.3-3A, and supplemental soil sample results are provided in Table 3.3-3B of this Supplemental ER, Summary of Metals (Non-Radiological) Chemical Analyses of UUSA Site Soil.

The UUSA site does not contain any prime designated farmland soils or unique classified farmlands; however, selected soil associations at the UUSA site are identified as farmlands of statewide importance. The Brownfield-Springer association (BO), Brownfield-Springer Association - Hummocky (BS), and Portales and Gomez fine sandy loams (PG) are classified as farmlands of statewide importance. A summary of the soil characteristics mapped at the UUSA site is provided in Table 3.3-2.

3.3.4 Seismology

The seismology of the UUSA site is described in Section 3.3.3 of the LES ER. This discussion supplements the LES ER with more recent seismographical information.

3.3.4.1 Seismic History of the Region and Vicinity

Section 3.3 of the LES ER included a comprehensive data summary of earthquakes through 2003 and historical seismic events from various data sources and is incorporated by reference. The study of historical seismicity includes earthquakes in the region of interest known from felt or damage records and from more recent instrumental records (since the early 1960s). Most earthquakes in the region have left no observable surface fault rupture. A summary of the region's seismic events (revised to include earthquakes or events since 2003) is provided on

Figure 3.3-7 (which presents regional seismicity of the area based on events occurring from 1973 to April 25, 2012). This revised data set is generally consistent with the previously summarized historic data set (prior to 1973). The earthquakes data is obtained from USGS, National Earthquake Information Center earthquake catalogs. Current data does not show any major changes in seismicity of area in the 322 km (200 mile) radius of the UUSA site.

3.3.4.2 Correlation of Seismicity with Tectonic Features

Earthquake epicenters are present within the Central Basin Platform but occur within the Delaware and Midland Basins. Figure 3.3-8 shows the updated probabilistic seismic hazard map in the format of Peak Ground Acceleration (PGA) at 2% probability of exceedance in 50 years (equivalent to 2,475-year return period). This map and similar maps for different spectral accelerations or different return periods (collectively known as National Seismic Hazard Maps) are produced by USGS and are used to estimate earthquake loads and hazards for structures. They are produced based on seismologic information (including magnitude, location, occurrence frequency, and shaking strength of all likely earthquakes) using seismic, geologic, and geodetic models, which incorporate decay in ground shaking with distance and effect of varying soil type and faulting style. At the UUSA site, the PGA for rock is estimated around 11.6%g at 2% probability of exceedance in 50 years.

3.3.5 Section 3.3 Tables

Table 3.3-1 Summary of Stratigraphic Units Proximate to the Site

Formation	Geologic Age	Descriptions	Stratigraphic Estimates[1]	
			Depths: m (ft.)	**Thickness: m (ft.)**
Topsoils	Recent	Silty fine sand with some fine roots - eolian	Range: 0 to 0.6 (0 to 2) Average: 0 to 0.4 (0 to 1.4)	Range: 0.3 to 0.6 (1 to 2) Average: 0.4 (1.4)
Mescalero Sands/ Blackwater Draw Formation	Quaternary	Dune or dune-related sands	Range (sporadic across site): 0 to 3 (0 to 10) Average: NA	Range (sporadic across site): 0 to 3 (0 to 10) Average: NA
Gatuña/ Antlers Formation	Pleistocene/ mid-Pliocene	Pecos Valley alluvium: Sand and silty sand with interbedded caliche near the surface and a sand and gravel base layer	Range: 0.3 to 17 (1 to 55) Average: 0.4 to 12 (1.4 to 39)	Range: 6.7 to 16 (22 to 54) Average: 12 (38)
Mescalero Caliche	Quaternary	Soft to hard calcium carbonate deposits	Range: 1.8 to 12 (6 to 38) Average: 3.7 to 8 (12 to 26)	Range: 0 to 6 (0 to 20) Average: 1.4 to 4.3 (5 to 14)
Chinle Formation	Triassic	Claystone and silty clay: red beds	Range: 7 to 340 (23 to 1,115) Average: 12 to 340 (39 to 1,115)	Range: 323 to 333 (1,060 to 1,092) Average: 328 (1,076)
Santa Rosa Formation	Triassic	Sandy red beds, conglomerates and shales	Range: 340 to 434 (1,115 to 1,425) Average: NA	Range: NA Average: 94 (310)
Dewey Lake	Permian	Muddy sandstone and shale red beds	Range: 434 to 480 (1,425 to 1,575) Average: NA	Range: NA Average: 46 (150)

Notes:

1. Site-specific site stratigraphy based on test borings and monitoring well installation provided in further detail in site geology section.
2. Estimated depths and thicknesses of stratigraphic units proximate to the site as reported in 2005 proposed EIS. Those identified as NA were not available in historic data set. (Sources: CJI, 2003; CJI, 2004; DOE, 1997b; MACTEC, 2003; TTU, 2000). Near surface depth and thickness information is primarily from sources (CJI, 2003) and (MACTEC, 2003). Deeper depth and thickness information is from source (CJI, 2004).

Table 3.3-2 Mapped Site Soil Characteristics

Soil Association	Soil Map Symbol	Description
Active Dune Land	**Aa**	Active dune land (Aa) is made up of light colored loose sands. Active dune land is closely associated with most of the coarse textured soils. Only a slight accumulation of organic matter and darkening has taken place in the upper few inches and the color ranges from light gray to reddish brown. The slope range is 5 to 12 percent or more. Permeability is very rapid and runoff is very slow. The hazard of soil blowing is very severe.
Brownfield-Springer Association	**BO**	Brownfield Springer association 0 to 3 percent slopes (BO). This mapping unit is about 60 percent Brownfield fine sand, 30 percent Springer loamy fine sand, and 10 percent inclusions of Tivoli Gomez Patricia and Amarillo soils. The landscape is one of billowy and undulating low sand dunes intermingled with nearly level sandy areas. This association is on low dunes in places. Runoff is very slow. Water intake is rapid and available water holding capacity is 6 to 8 inches. Roots penetrate to a depth of 60 inches and more. Soil blowing is a severe hazard.
Brownfield-Springer Association – Hummocky	**BS**	Brownfield Springer association hummocky 0 to 3 percent slopes (BS). This mapping unit is about 65 percent Brownfield soils, 25 percent Springer soils, and about 10 percent inclusions of Tivoli Amarillo Arvana soils. Hummocks and dunes form a pattern of concave and convex rolling terrain. They are 3 to 6 feet high and 5 to 20 feet or more in diameter. Soil blowing has exposed the red sandy clay loam, fine sandy loam subsoil in the concave barren areas.
Kermit soils and Dune Land	**KM**	Kermit soils and Dune Land 0 to 12 percent (KM). This mapping unit is about 45 percent Kermit soils, 45 Active Dune Land, and about 10 percent Maljamar Palomas Wink and Pyote soils. The Kermit soil is hummocky and undulating and is adjacent to or surrounds the Dune Land areas. Dune Land consists of large barren sand dunes hills and ridges of wind deposited sands that shift and drift with the wind. It is described under heading Active Dune Land.
Portales and Gomez fine sandy loams	**PG**	Portales and Gomez fine sandy loams 0 to 3 percent slopes (PG). This mapping unit is about equal parts Portales fine sandy loam and Gomez fine sandy loam. The Portales soil is sloping or undulating. The Gomez soil is in slightly concave areas. Runoff is slow. Soil blowing is a severe hazard.
Mixed Alluvial land	**MU**	Mixed alluvial land (MU) consists of unconsolidated stratified alluvium of varying texture. The alluvium is generally no more than 24 to 36 feet thick over a buried soil or the parent material of adjacent soils. Evidence of the origin of this material is the stratification, the location in drainageways, and the debris from floods that has accumulated on the vegetation within the drainageway. The alluvium consists of recently deposited soil material from adjacent slopes. Permeability is moderate to rapid. Runoff is slow. Water intake is moderate to rapid and the water holding capacity is 4 to 7 inches. Roots penetrate to a depth of about 40 to 60 inches or more. The vegetation consists of mid grasses, forbs, and shrubs. Erosion is a moderate hazard.

Table 3.3-3B Summary of Metals (Non-Radiological) Chemical Analyses of UUSA Site Soil

TABLE 3.3-3 Summary of Metals (Non-Radiological) Chemical Analyses of UUSA Site Soil

Analyte Group	Sample Date	Sample Type	Matrix											
Analyte Name				Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Iron
CAS Number				7429-90-5	7440-38-2	7440-39-3	7440-41-7	7440-43-9	7440-70-2	16887-00-6	7440-47-3	7440-48-4	7440-50-8	7439-89-6
Units				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
OnSite-SO-East	04/21/2009	Primary	Soil	2320	<2.5 U	28.7	<0.2 U	ND U	3380	5.56	3.33	0.74	1.94	2650
OnSite-SO-East	10/20/2009	Primary	Soil	4470	<0.50 U	37.3	<0.20 U	<0.20 U	4130	<2.0 U	5.06	0.9	2.39	3740
OnSite-SO-East	04/14/2010	Primary	Soil	6650	< 2.5 U	68.5	0.2	< 0.20 U	19300	7.24	6.16	1.07	2.99	5110
OnSite-SO-East	10/12/2010	Primary	Soil	2910	< 2.5 U	46.1	< 0.200 U	< 0.20 U	9360	< 2.00 U	3.74	0.86	1.75	3,180
OnSite-SO-East	01/20/2011	Primary	Soil	1990 J	1.1 J	27.4	0.131 J	0.489 U	3360	3.3	3.1	0.773	2.14	2720
Onsite-SO-East	07/12/2011	Primary	Soil	3300 J	1.28 J	61.1 J	.143 J	0.458 U	11900 J	12.7	4.44	1.23	2.81	3880 J
OnSite-SO-East	04/11/2012	Primary	Soil	2650	1.25 J	49.5	.187 J	0.460 U	12500	3.76	3.59	.856	2.08	3280
OnSite-SO-North	04/21/2009	Primary	Soil	1600	<2.5 U	29.7	<0.2 U	ND U	995	25.8	2.77	<0.6 U	1.39	2100
OnSite-SO-North	10/20/2009	Primary	Soil	2810	<2.5 U	36.8	<0.20 U	<0.20 U	1650	<2.0 U	3.61	0.63	1.56	2630
OnSite-SO-North	04/14/2010	Primary	Soil	4150	< 2.5 U	66.2	< 0.200 U	< 0.20 U	3260	5.57	4.49	0.7	2.3	3740
OnSite-SO-North	10/12/2010	Primary	Soil	2450	< 2.5 U	54.7	< 0.200 U	< 0.20 U	3240	< 2.00 U	3.63	0.77	1.78	2970
OnSite-SO-North	01/20/2011	Primary	Soil	-	-	-	-	-	-	-	-	-	-	-
OnSite-SO-North	01/20/2011	Primary	Soil	5000 J	2.33 J	72.8	0.317 J	0.483 U	9510	9.38	5.76	1.44	3.33	5750
Onsite-SO-North	07/12/2011	Primary	Soil	6300 J	2.76 J	97 J	.326 J	0.499 U	13000 J	29.2	7.17	1.88	4.06	6740 J
Onsite-SO-North	07/12/2011	Duplicate	Soil	6320 J	2.71 J	91 J	.319 J	0.495 U	12400 J	6.47	7.52	1.85	3.96	6830 J
OnSite-SO-North	04/11/2012	Primary	Soil	5360	2.81	89.6	.374 J	0.451 U	13900	6.13	6.02	1.52	3.4	6000
OnSite-SO-Northeast	04/21/2009	Primary	Soil	2590	<2.5 U	49.6	<0.2 U	ND U	2230	20.9	3.63	0.93	2.74	2900
OnSite-SO-Northeast	10/20/2009	Primary	Soil	4860	<2.5 U	44.7	<0.20 U	<0.20 U	2480	<2.0 U	5.46	1.11	2.91	4080
OnSite-SO-Northeast	04/14/2010	Primary	Soil	6440	< 2.5 U	63.7	0.3	< 0.20 U	4340	4.28	6.62	1.23	3.77	5750
OnSite-SO-Northeast	10/12/2010	Primary	Soil	3690	< 2.5 U	52.2	0.26	< 0.20 U	3340	< 2.00 U	5.06	1.23	3.13	4,490
OnSite-SO-Northeast	01/20/2011	Primary	Soil	-	-	-	-	-	-	-	-	-	-	-
OnSite-SO-Northeast	01/20/2011	Duplicate	Soil	-	-	-	-	-	-	-	-	-	-	-
OnSite-SO-Northeast	01/20/2011	Primary	Soil	2650 J	1.21 J	76.5	0.17 J	0.503 U	2300	10.4	4.11	1.04	2.67	3700
OnSite-SO-Northeast	01/20/2011	Duplicate	Soil	2680 J	1.1 J	78.8	0.176 J	0.494 U	2360	10.3	4.3	1.04	2.83	3780
Onsite-SO-Northeast	07/12/2011	Primary	Soil	3610 J	1.54 J	93.1 J	.204 J	0.500 U	4810 J	13.3	5.4	1.57	3.57	4700 J
OnSite-SO-Northeast	04/11/2012	Primary	Soil	3190	1.94 J	120	.256 J	0.477 U	8510	6.26	4.55	1.15	3.03	4280
OnSite-SO-Northwest	04/21/2009	Primary	Soil	1630	<2.5 U	21.6	<0.2 U	ND U	829	4.3	2.75	<0.6 U	1.18	2190
OnSite-SO-Northwest	10/20/2009	Primary	Soil	2180	<2.5 U	20.9	<0.20 U	<0.20 U	706	<2.0 U	2.98	<0.60 U	1.14	1980
OnSite-SO-Northwest	04/14/2010	Primary	Soil	3290	< 2.5 U	25	< 0.200 U	< 0.20 U	2090	< 2.00 U	3.74	< 0.60 U	1.5	3150
OnSite-SO-Northwest	10/12/2010	Primary	Soil	1520	< 2.5 U	12.6	< 0.200 U	< 0.20 U	532	< 2.00 U	2.55	< 0.60 U	< 1.00 U	2,140
OnSite-SO-Northwest	01/20/2011	Primary	Soil	-	-	-	-	-	-	-	-	-	-	-
OnSite-SO-Northwest	01/20/2011	Primary	Soil	1280 J	0.709 J	13	0.477 U	0.477 U	628	2.9	2.74	0.501	1.15	2430
Onsite-SO-Northwest	07/12/2011	Primary	Soil	1600 J	.975 J	15.6 J	0.477 U	0.477 U	999 J	5.80	2.8	.596	2.14	2320 J
OnSite-SO-Northwest	04/11/2012	Primary	Soil	1250 J	.679 J	10.7	.111 J	0.450 U	420 J	1.82 J	2.43	.501	.73 J	2400
OnSite-SO-Northwest	04/11/2012	Duplicate	Soil	1350 J	1.04 J	12	.115 J	0.433 U	473 J	1.97 J	2.87	.569	1	2710
OnSite-SO-South	04/21/2009	Primary	Soil	2090	<2.5 U	34.3	<0.2 U	ND U	5710	8.41	3.03	0.7	1.77	2380
OnSite-SO-South	10/20/2009	Primary	Soil	2560	<2.5 U	21.6	<0.20 U	<0.20 U	1170	<2.0 U	3.37	<0.60 U	1.47	2290
OnSite-SO-South	04/14/2010	Primary	Soil	5650	< 2.5 U	57.1	< 0.200 U	< 0.20 U	10300	< 2.00 U	5.52	0.85	2.56	4560
OnSite-SO-South	10/12/2010	Primary	Soil	1790	< 2.5 U	23.4	< 0.200 U	< 0.20 U	1840	< 2.00 U	2.74	< 0.60 U	1.19	2,220
OnSite-SO-South	01/20/2011	Primary	Soil	-	-	-	-	-	-	-	-	-	-	-
OnSite-SO-South	01/20/2011	Primary	Soil	4990 J	3.17	33.2	0.324 J	0.491 U	4510	5.62	5.52	1.23	2.94	5910
Onsite-SO-South	07/12/2011	Primary	Soil	6170 J	2.51 J	44.1 J	.27 J	0.480 U	12400 J	13.8	6.33	1.56	2.85	6140 J
OnSite-SO-South	04/12/2012	Primary	Soil	2660	1.48 J	26.4	.183 J	0.497 U	4220	1.75 J	3.53	.708	1.36	3050

3.3.6 Section 3.3 Figures

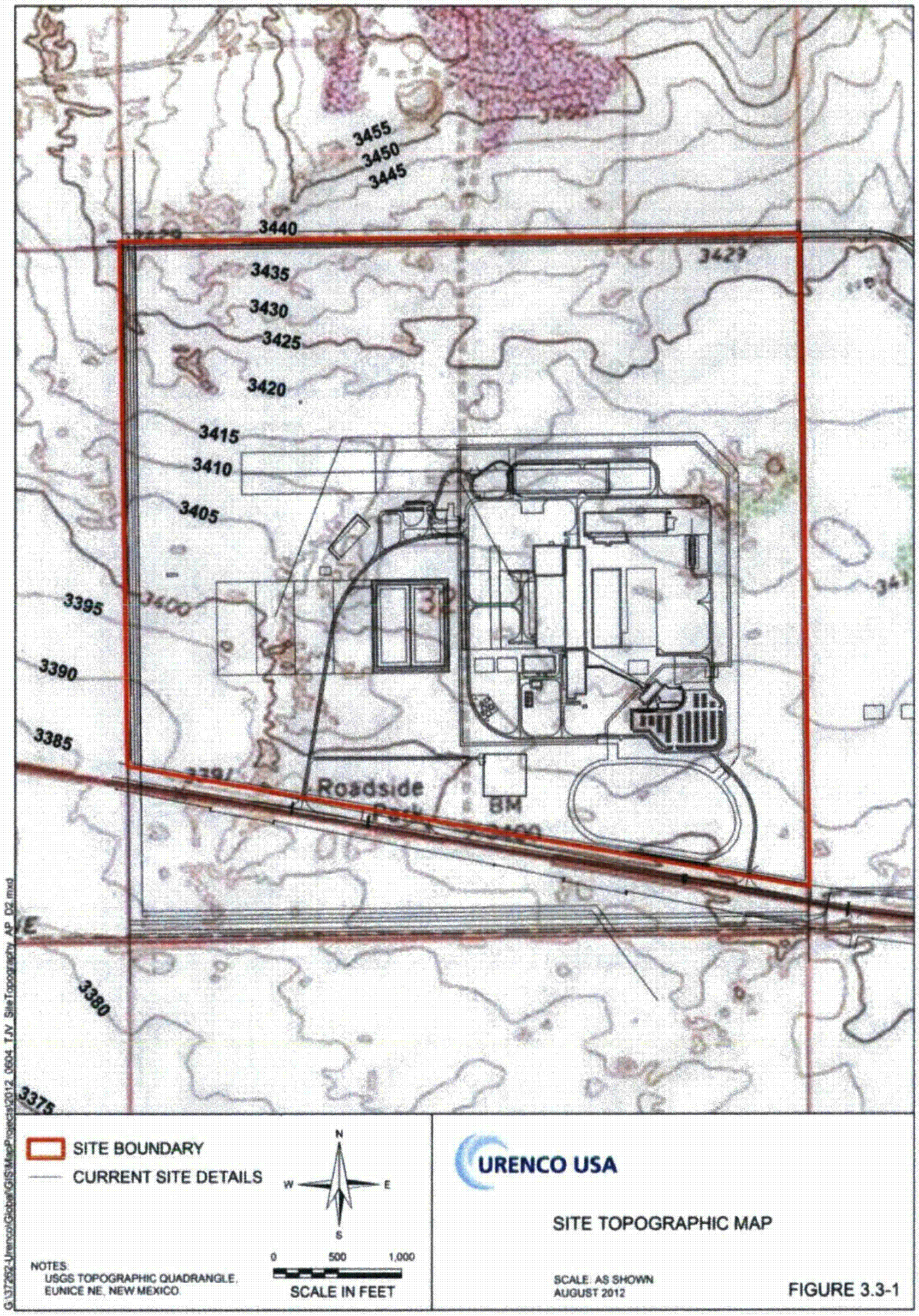

Figure 3.3-1 Site Topographic Map

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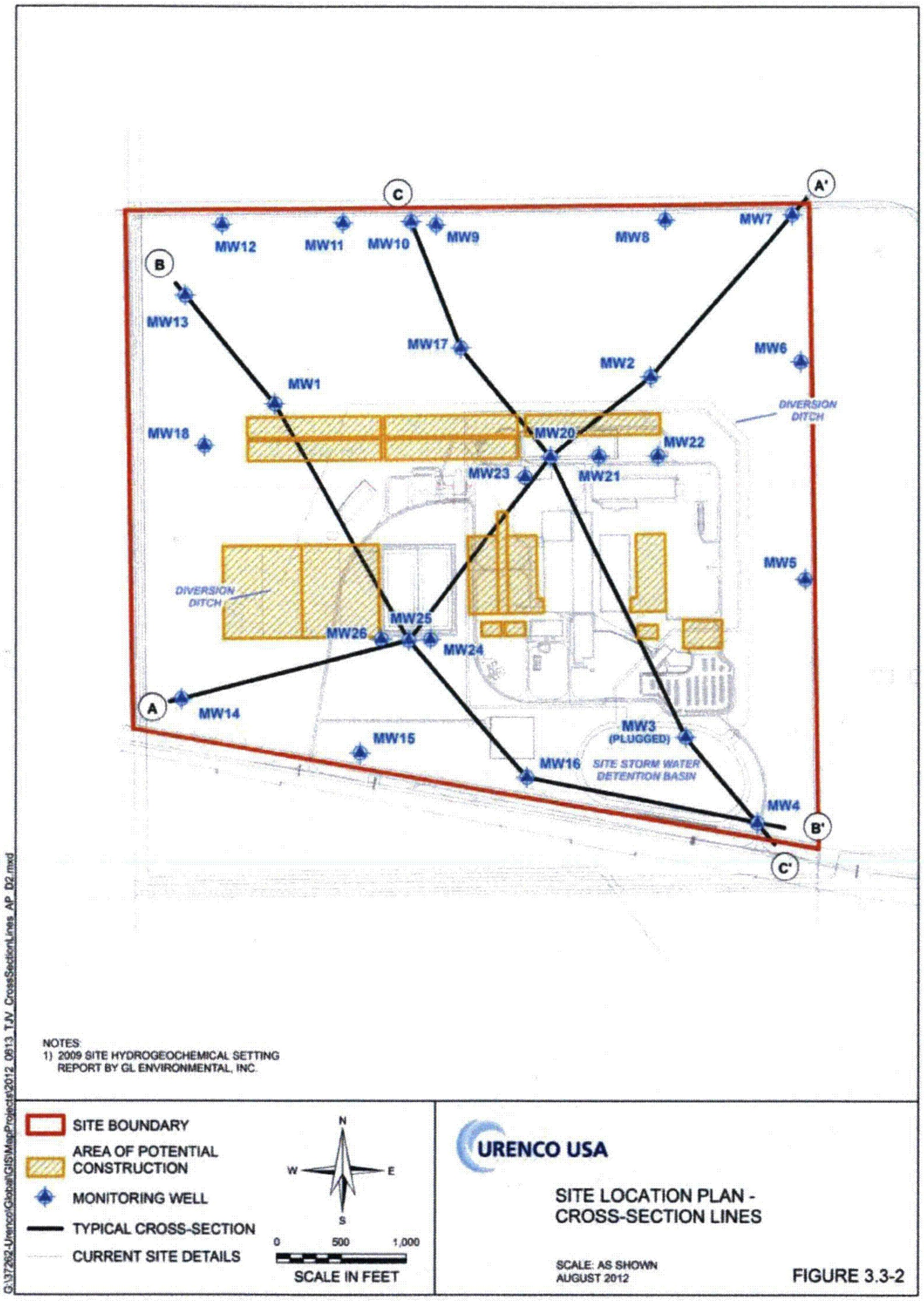

Figure 3.3-2 Site Location Plan – Cross-Section Lines

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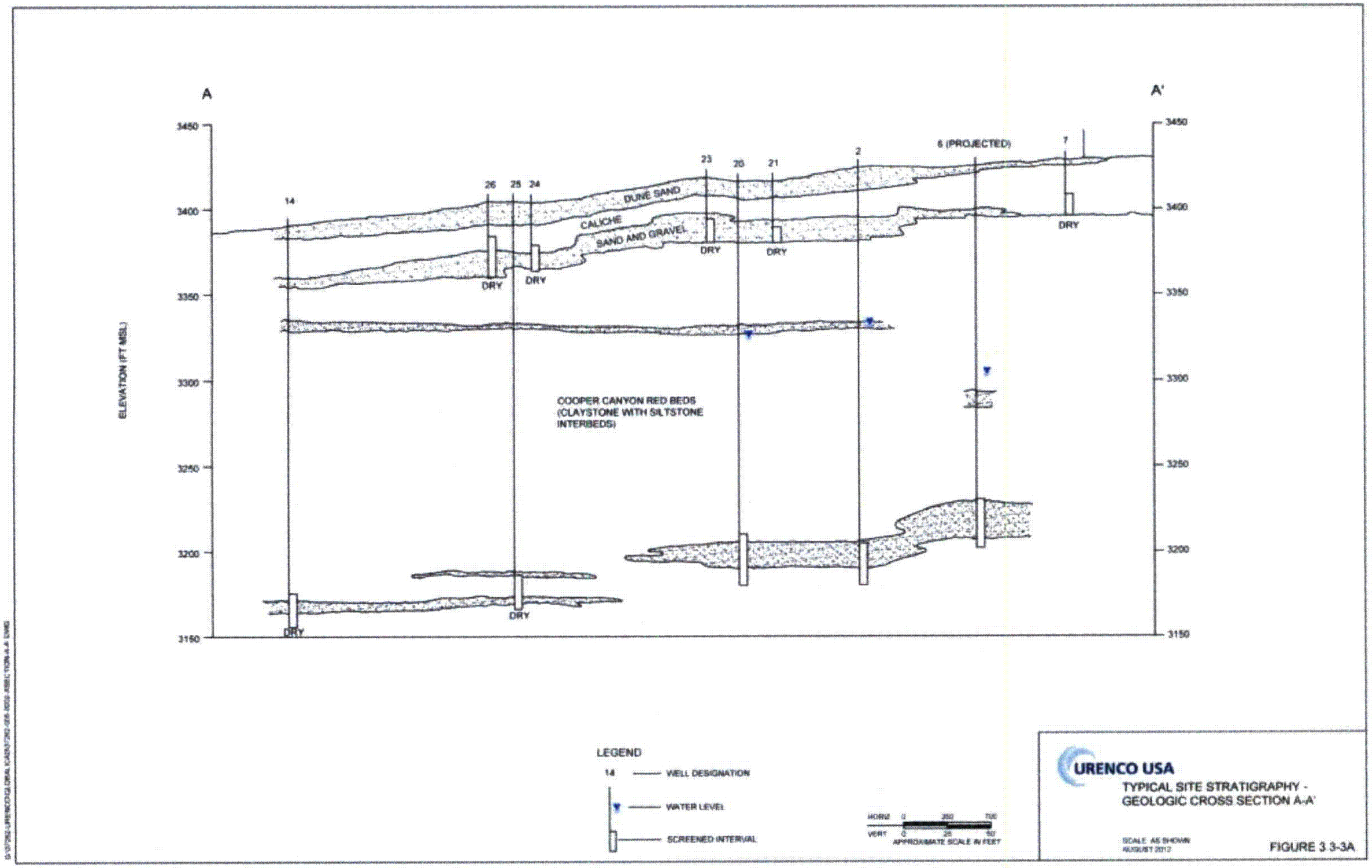

Figure 3.3-3ATypical Site Stratigraphy – Geologic Cross Section A-A'

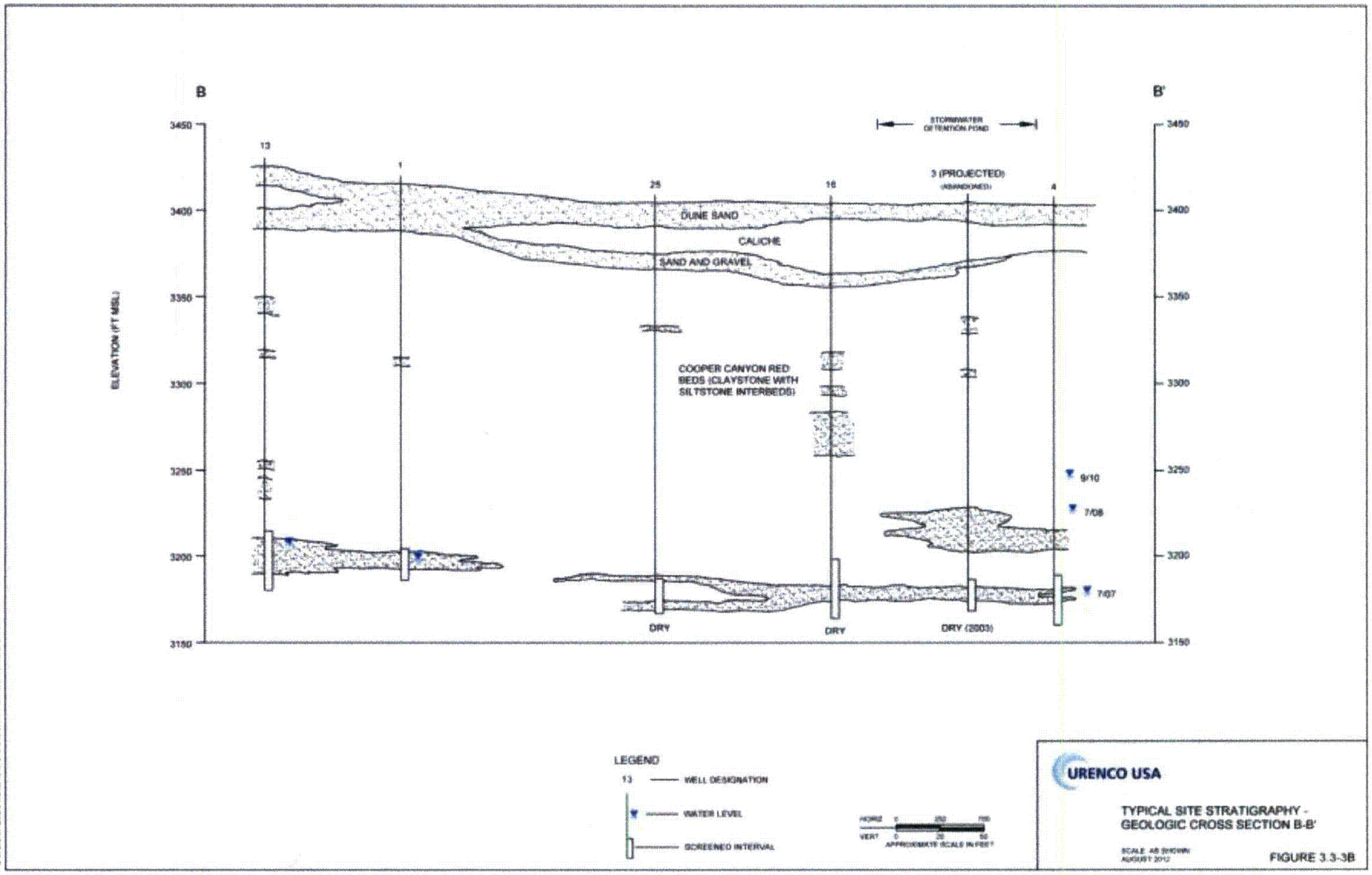

Figure 3.3-3B Typical Site Stratigraphy – Geologic Cross Section B-B’

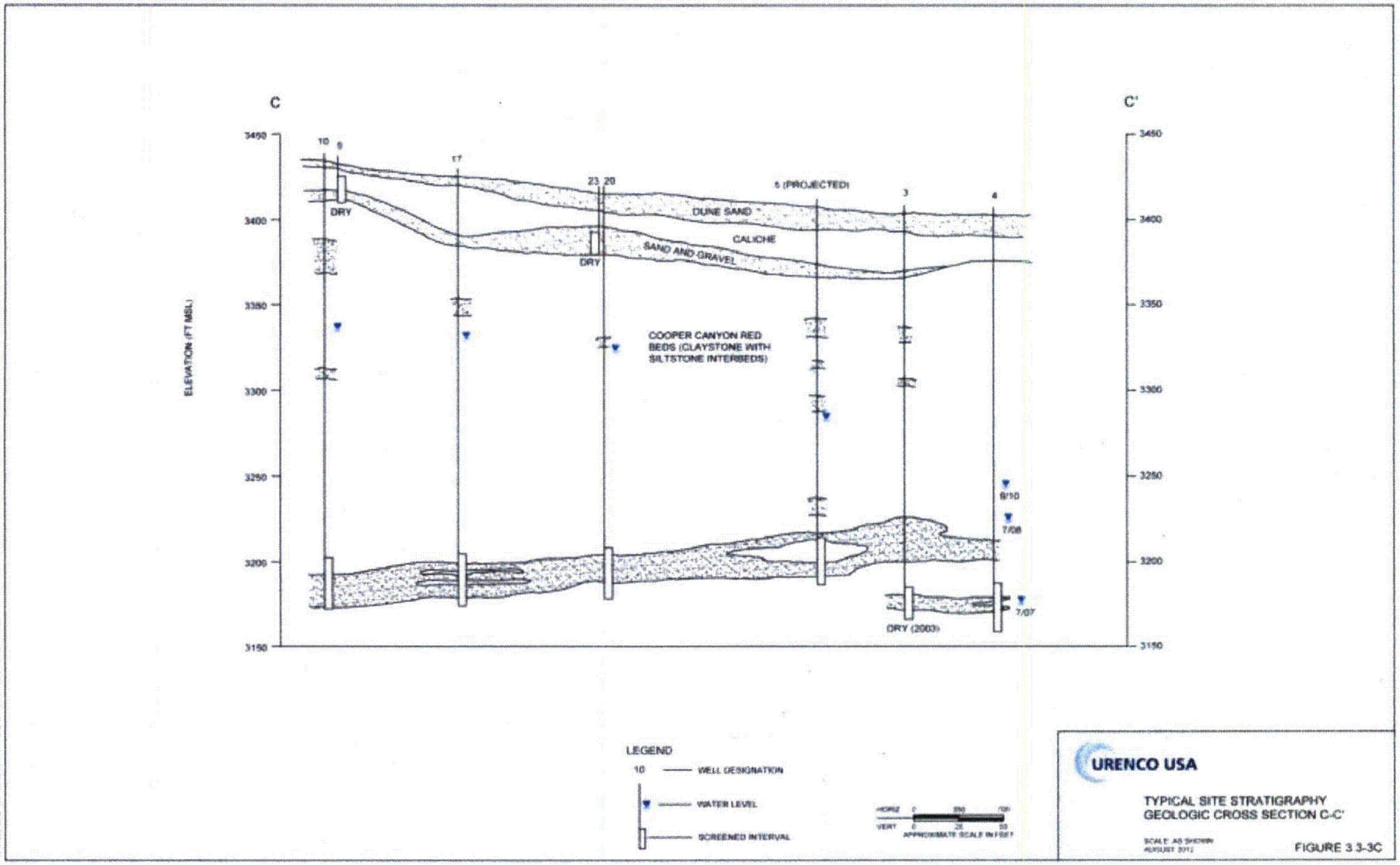

Figure 3.3-3C Typical Site Stratigraphy – Geologic Cross Section C-C

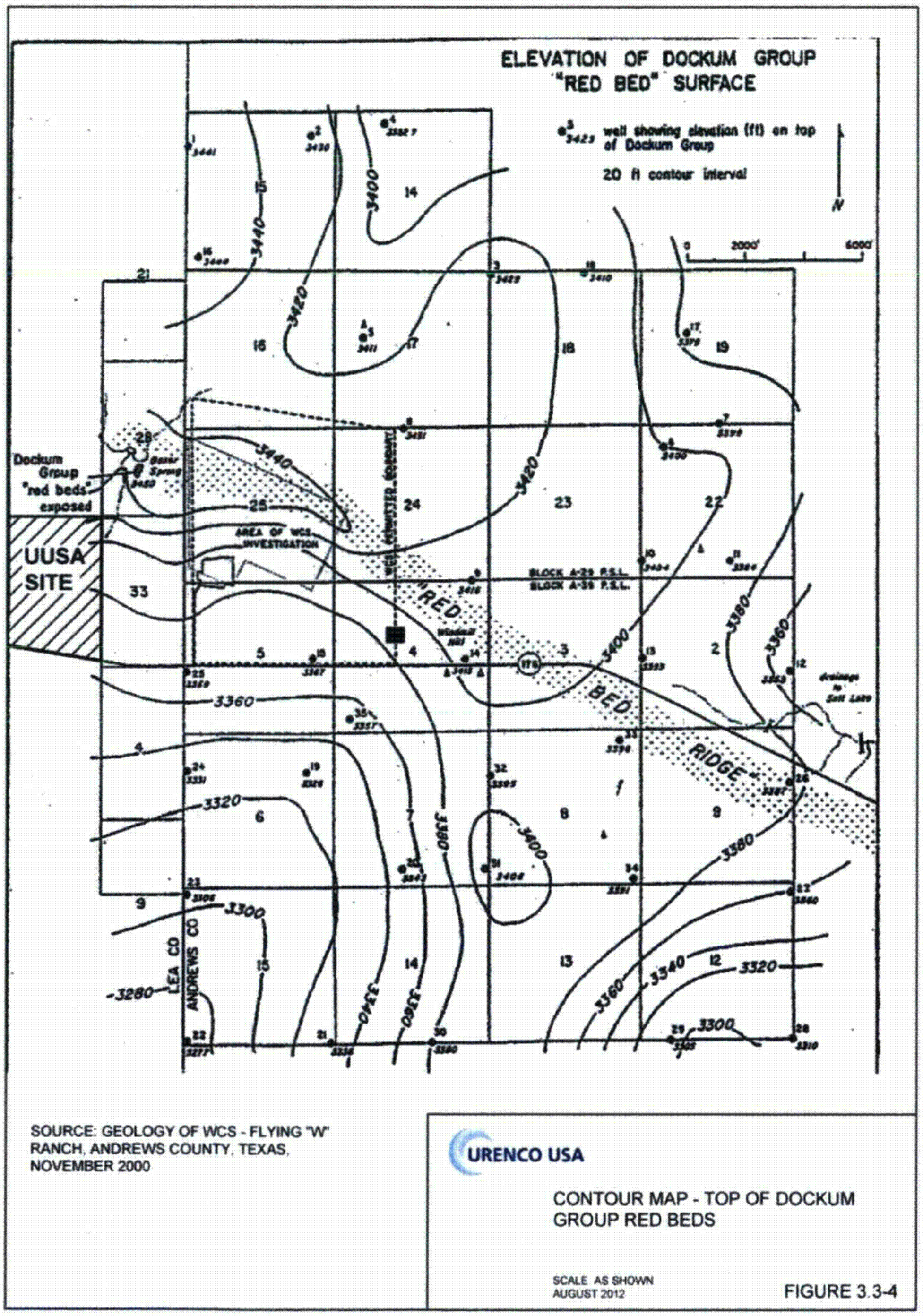

Figure 3.3-4 Contour Map – Top of Dockum Group Red Beds

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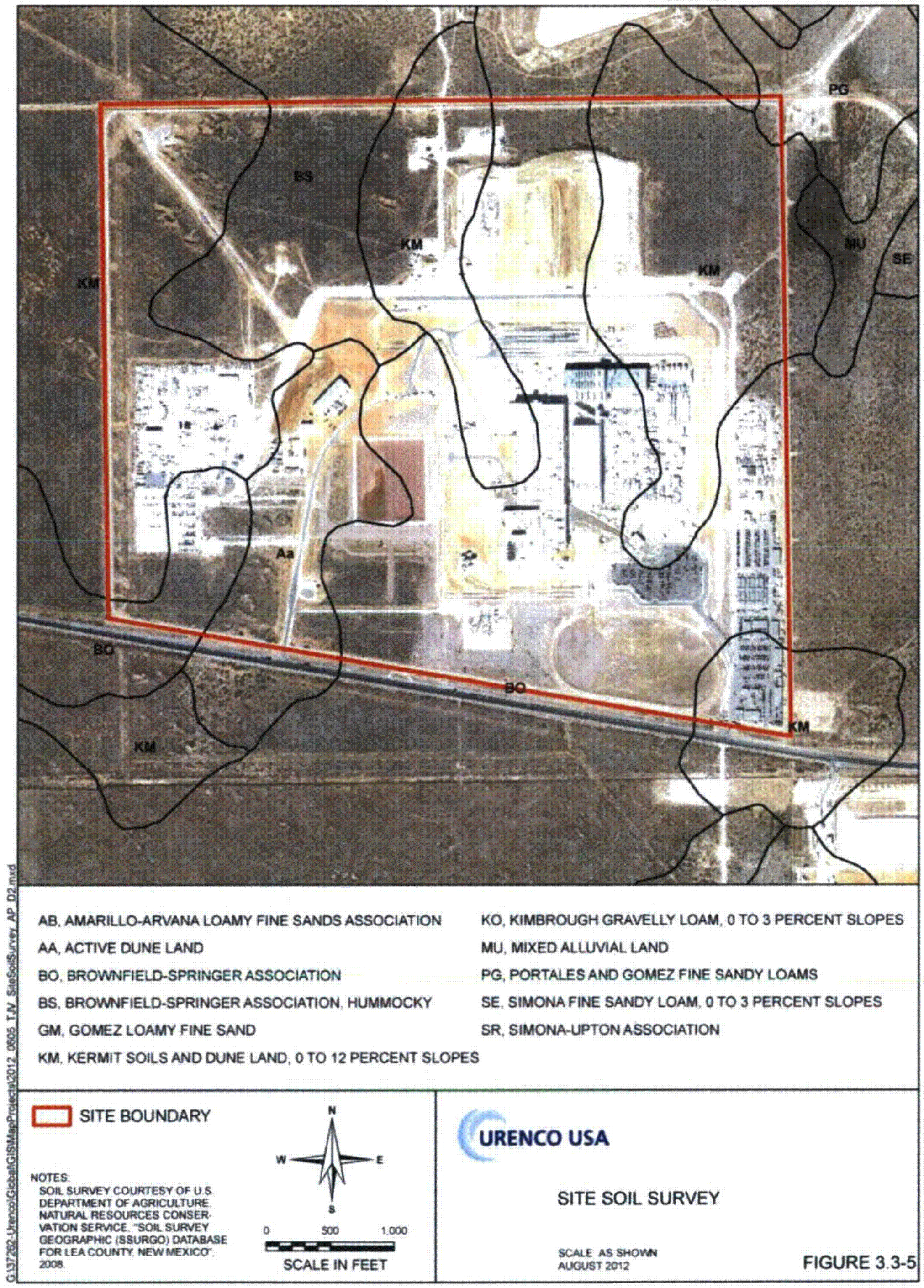

Figure 3.3-5 Site Soil Survey

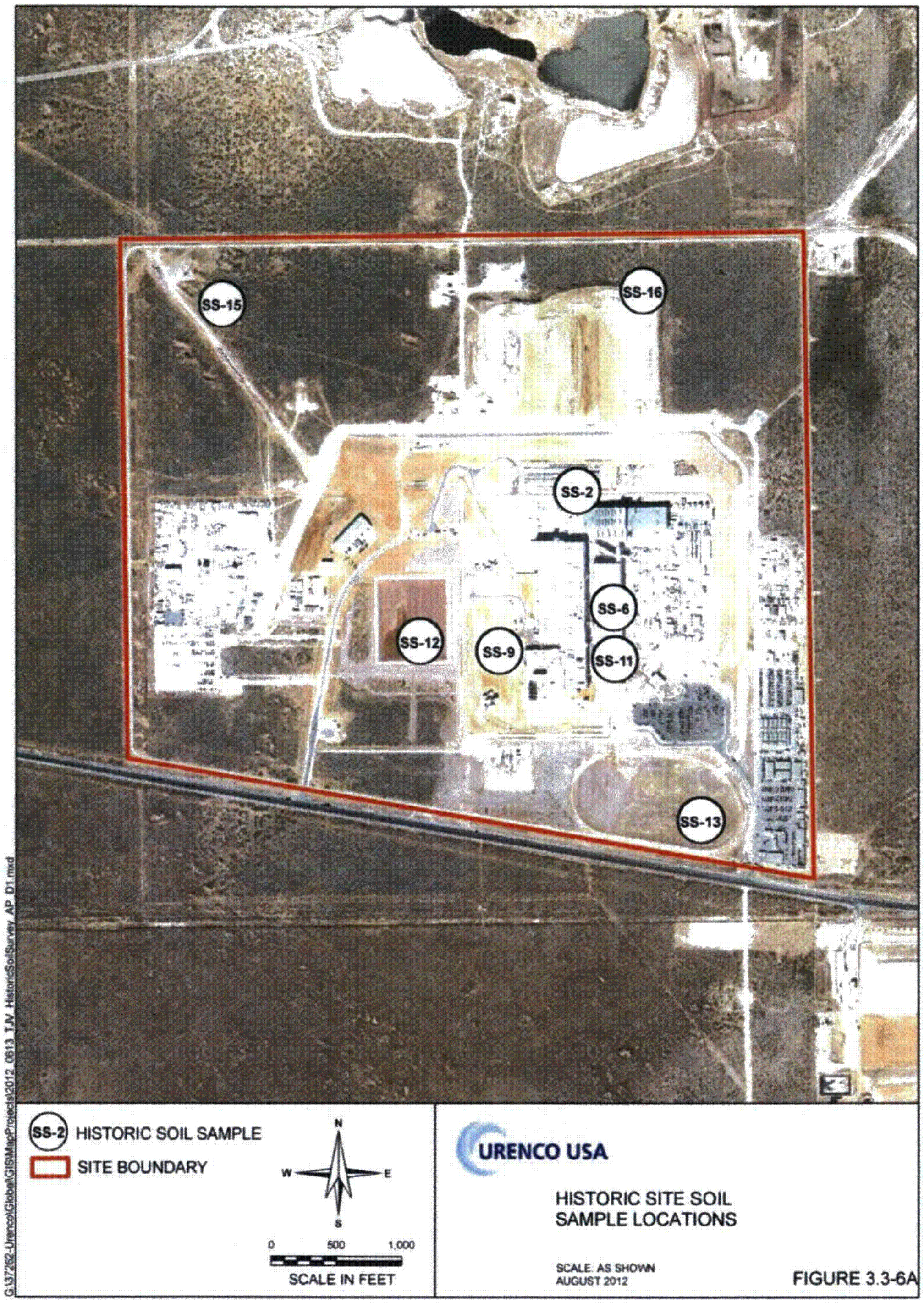

Figure 3.3-6A Historic Site Soil Sample Locations

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Figure 3.3-6B Site Soil Sample Locations

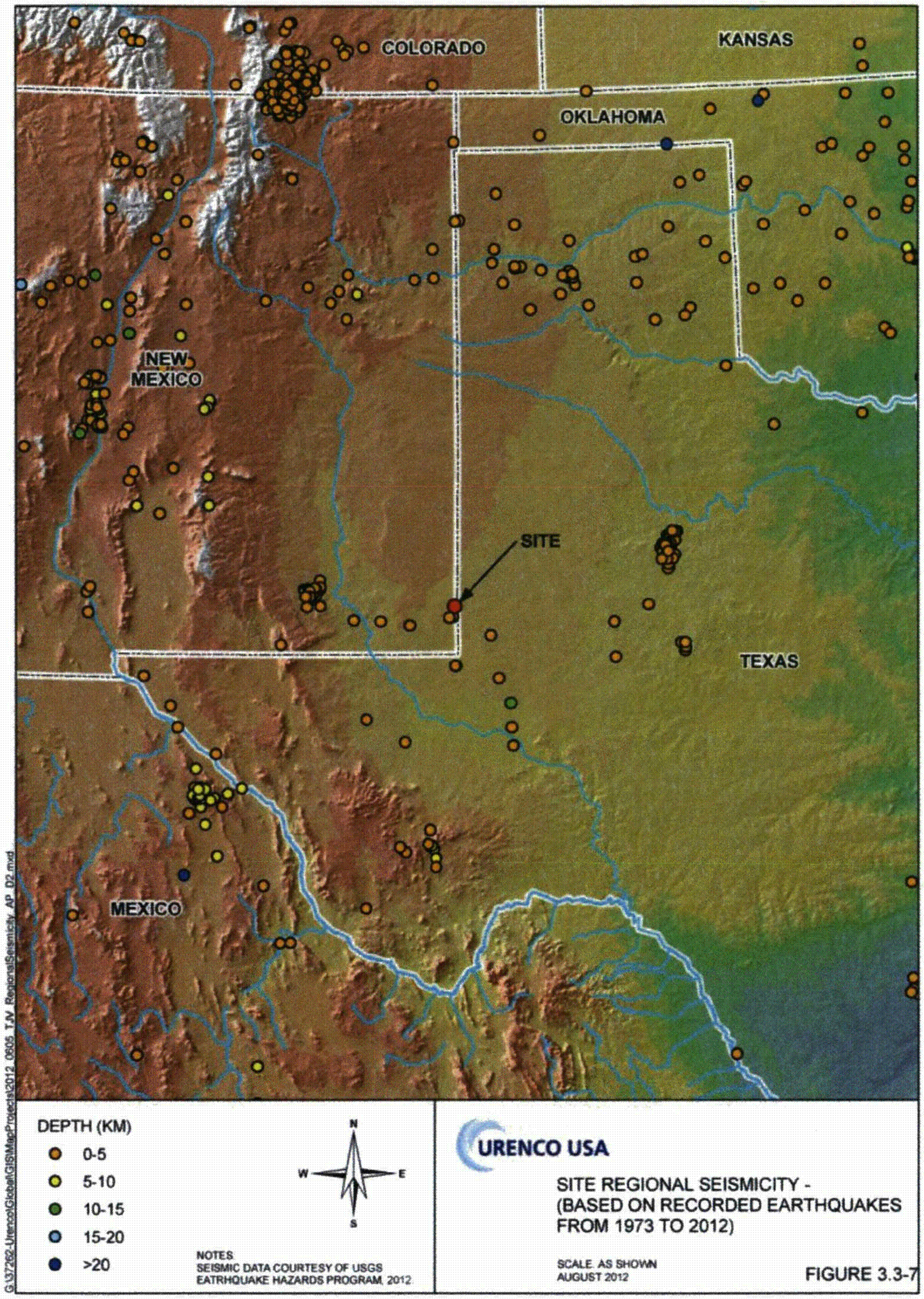

Figure 3.3-7 Site Regional Seismicity – (Based on Recorded Earthquakes from 1973 to 2012)

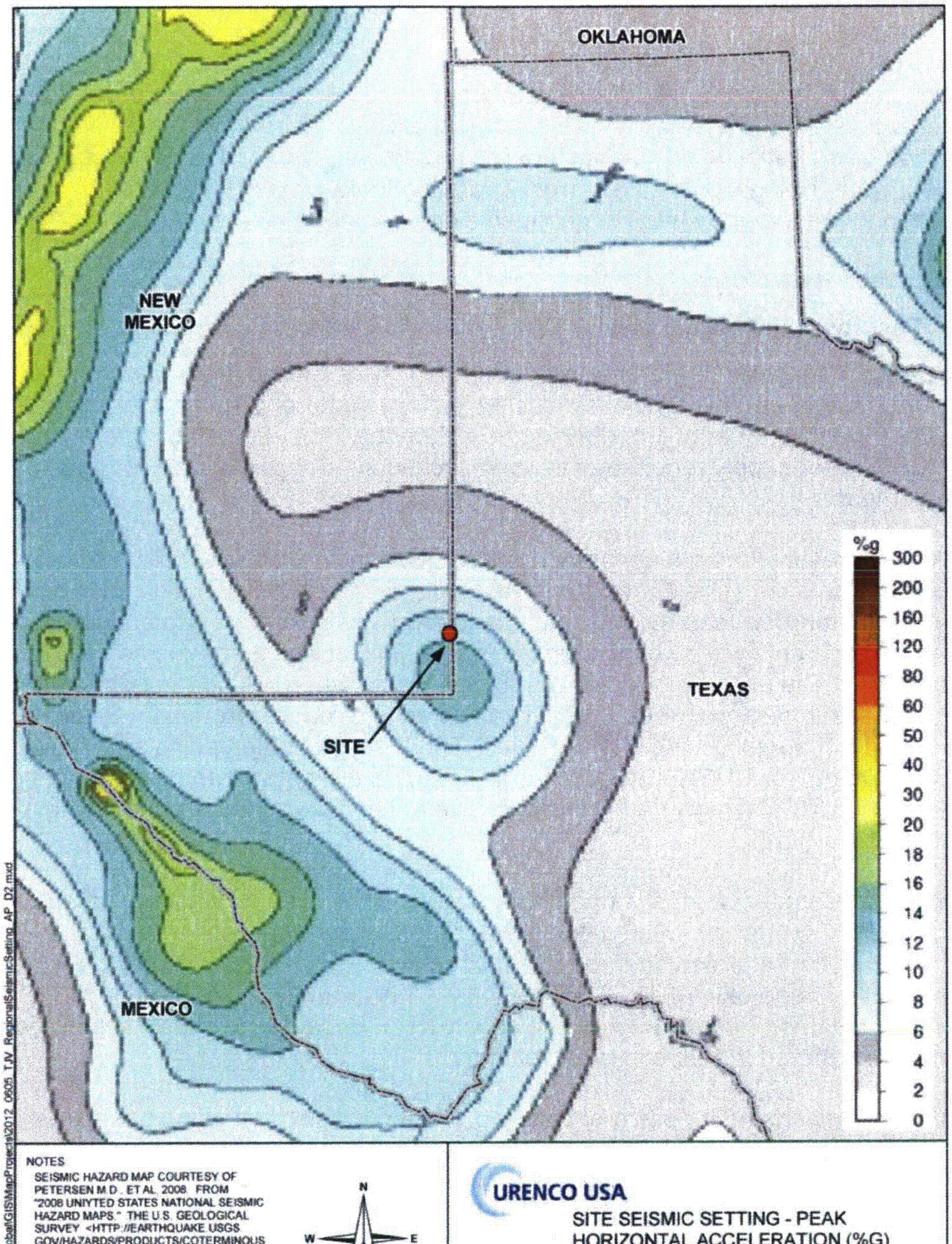

Figure 3.3-8 Site Seismic Setting – Peak Horizontal Acceleration (%G) with 2% Probability of Exceedance in 50 Years

3.4 Water Resources

Section 3.4 of the LES ER describes the site's surface water and groundwater resources for the 3.0 MSWU facility and is incorporated by reference. This discussion is intended to supplement the LES ER with a discussion of more recent environmental monitoring for the proposed 10 MSWU facility.

The initial pre-construction evaluation of water resources was intended to provide a baseline characterization of the site's water resources prior to any disturbances associated with construction or operation of the facility. For the proposed action of the facility capacity expansion, water resources for the current operating facilities were reevaluated. This reevaluation found that they had not changed since originally evaluated.

3.4.1 Surface Hydrology

3.4.1.1 Facility Withdrawals and/or Discharges to Hydrologic Systems

The UUSA plant receives its water supply from the City of Eunice, New Mexico municipal water system and thus no water is drawn from either surface water or groundwater sources at the UUSA site. Supply of nearby groundwater users are thus not affected by operation of the UUSA plant. UUSA water supply requirements are discussed in Supplemental ER Section 4.4, Water Resource Impact.

The UUSA operation does not generate process discharges from the facility to surface or groundwater at the site. Discharge of routine facility liquid effluents, which have not been impacted by radioactive material will be to the Eunice sewer system. Potentially impacted process liquid effluents will be containerized then solidified and managed as solid LLW for offsite disposal. The ultimate disposal of process waste water will be through solidification and shipment for offsite disposal. The UBC Storage Pad Stormwater Retention Basins will collect stormwater runoff from the UBC Storage Pad. The location of the basins are shown in Figure 4.12-2, Site Layout for UUSA. Evaporation will provide the only means of liquid removal from this basin. The UBC Storage Pad Stormwater Retention Basins will include a single membrane liner.

Prior to UUSA construction, the impacts associated with an annual waste generation rate for liquid radiological wastes of 7,850 gallons evaporated or treated were evaluated. The current annual generation rate projected through construction and operation of the UUSA facility (SBM-1001 and 1003) is approximately 28,000 gallons. This quantity is significantly more than the quantity evaluated for impacts prior to site construction because no evaporation processes are currently being utilized to reduce waste volumes.

Stormwater from parts of the site are collected in retention and detention basins, as shown in Figure 4.12-2, Site Layout for UUSA. The Site Stormwater Detention Basin at the south side of the site collects runoff from various developed parts of the site including roads, parking areas, and building roofs. It is unlined and has an outlet structure to control discharges above the design level. The normal discharge is through evaporation/infiltration into the ground. The basin is designed to contain runoff for a volume equal to that for the 24-hour, 100-year return frequency storm, a 15.2 cm (6.0 in) rainfall. The basin has approximately 123,350 m^3 (100 acre-ft.) of storage capacity. Area served is the majority of the developed portion of the 220-ha (543-acre) UUSA site. In addition, the basin has 0.6 m (2 ft) of freeboard beyond the design capacity. The basis is designed to discharge post-construction peak flow runoff rates from the outfall that are equal to or less than the pre-construction runoff rates from the site area.

The Uranium Byproduct Cylinder (UBC) Storage Pad Stormwater Retention Basin is utilized for the collection and containment of water discharges from stormwater runoff from the UBC Storage Pad. The ultimate disposal of basin water is through evaporation of water and impoundment of the residual dry solids after evaporation. It is designed to contain runoff for a volume equal to twice that for the 24-hour, 100-year return frequency storm, a 15.2-cm (6.0-in) rainfall. The currently constructed UBC Storage Pad Stormwater Retention Basin is designed to contain a volume of approximately 77,700 m^3 (63 acre-ft.). Area served by the basins includes the total area of the existing and proposed UBC Storage Pad. This basin is constructed with a membrane lining to minimize infiltration into the ground.

Sanitary waste water is sent to the City of Eunice Wastewater Treatment Plant.

3.4.1.2 Water Quality Characteristics

Water quality is comprehensively discussed in Section 3.4.2 of the LES ER. This discussion summarizes the results of more recent monitoring and analyses.

Tables 3.4-3, Recent Chemical Analyses of UUSA Site Groundwater and 3.4-4, Pre-Operational Chemical Analyses of UUSA Site Groundwater, summarize the minimum and maximum concentrations of chemicals in groundwater collected from UUSA monitoring wells completed in the Chinle formation. Table 3.4-3 summarizes inorganic and uranium results for quarterly groundwater samples collected from wells MW-4, MW-5, MW-10, and MW-20 during the period of April 2011 through March 2012. Table 3.4-4 summarizes results for inorganics, metals, volatile organic compounds, pesticides, semi-volatile organic compounds, polychlorinated biphenyls, and radiochemical results for groundwater samples collected from monitoring wells MW-2 in 2003; MW-6 and MW-7 in 2007; MW-20 in 2009; and MW-4, MW-5, MW-10, and MW-20 during the period of 2007 through 2009. In 2007, fifteen ground water monitoring wells were drilled at locations depicted on Figure 6.1-3, and monitoring well MW-3 was plugged and abandoned because of its location in the footprint of the Stormwater Detention Basin.

In 2008, eight ground water monitoring wells were drilled adjacent to the currently constructed UBC Storage Pad and UBC Storage Pad Stormwater Retention Basin. Monitoring well locations are depicted on Figure 6.1-3.

Groundwater analyses listed in Table 3.4-3 represent the recent monitoring program and include inorganic components and isotopic uranium. The table includes the parameter, minimum, and maximum UUSA sample results and two regulatory limits. The first limit is the New Mexico Water Quality Control Commission (NMWQCC) standard for discharges to surface and groundwater (NMWQCC, 2002). The second limit is the EPA Safe Drinking Water Act (SDWA) maximum contaminate levels (MCLs) for potable water supplies. These MCLs include both the Primary and Secondary Drinking Water Standards. In general, the water is of low quality compared to drinking water standards. Total dissolved solids range up to 10,900 mg/L, higher than the New Mexico and EPA limits of 1,000 and 500 mg/L, respectively. Also high are chloride at 2,800 mg/L compared to regulatory limits of 250 mg/L, fluoride at 1.75 mg/L compared to the New Mexico limit of 1.6 mg/L: nitrate at 25.1 mg/L compared to regulatory limits of 10 mg/L, sulfate at 3,350 mg/L compared to regulatory limits of 250 to 600 mg/L, and total uranium at 0.0629 mg/L compared to regulatory limits of 0.030 mg/L. In addition, groundwater pH measurement of 5.52 exceeded the lower regulatory limits of 6 and 6.5 pH units.

Groundwater analyses listed in Tables 3.4-3 and 3.4-4 represent results from pre-construction and operation site characterization and include inorganics, metals, Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SOCs), pesticides, polychlorinated biphenyls (PCBs), and radionuclides. Chloride, fluoride, nitrate, nitrite, pH, sulfate, and TDS exceeded regulatory limits. Some metals (aluminum, boron, iron, lead, manganese, and selenium) exceeded regulatory standards for drinking water. A very minor level of PCBs was detected in the 2003 MW-2 sample, likely due to field or laboratory contamination. Some organic constituents (acetone, bis[2-ethylhexyl]phthalate, cis-1,3-dichloropropene, ethylbenzene, and iodomethane) were detected at low levels below regulatory limits. Gross alpha activity was detected at a level just slightly above the screening level of 0.6 Bq/L (15 pCi/L). Radium 226 was detected just above the EPA MCL of 0.2 Bq/L (5 pCi/L). Total uranium was detected slightly above the regulatory limit of 0.030 mg/L.

Some of the radionuclide results given in Table 3.4-4 are negative. It is possible to calculate radioanalytical results that are less than zero, although negative radioactivity is physically impossible. This result typically occurs when activity is not present in a sample or is present near background levels. Laboratories sometimes choose not to report negative results or results that are near zero. The EPA does not recommend such censoring of results (EPA, 1980).

The laboratory performing the radioanalytical services for the UUSA site follows the recommendations given by the EPA in the report "Upgrading Environmental Radiation Data; Health Physics Society Committee Report HPSR-1" (EPA, 1980). This report recommends that all results, whether positive, negative, or zero, should be reported as obtained.

3.4.2 Water Consumption

As discussed in Section 3.4.7 of the LES ER, no subsurface or surface water use, such as withdrawals and consumption, is made at the site by UUSA. All water used at the facility is provided through the Eunice Municipal Water Supply System. This system obtains water from groundwater sources in or near the city of Hobbs, approximately 32 km (20 mi) north of the site. Current water consumption is less than the initial anticipated volumes, and the available public water will be sufficient to supply the operation and maintenance of the UUSA facility.

3.4.3 Federal and State Regulations

Supplemental ER Section 1.4 describes all applicable regulatory requirements and permits. Supplemental ER Section 4.4 describes potential site impacts as they relate to environmental permits regarding water use by the facility.

Applicable regulations for water resources include:

- NPDES: In 2009, UUSA submitted a No Exposure Certification to the EPA (March 09, 2009), which exempted the site from National Pollution Discharge Elimination System stormwater permitting, pursuant to the "No Exposure" exclusion for industrial activity of the NPDES storm water Phase II regulations.
- NPDES: Construction General Permit for stormwater discharge is required because ongoing construction of the UUSA site will involve the grubbing, clearing, grading, or excavation of one or more acres of land. This permit is administered by the EPA Region 6 with oversight review by the New Mexico Water Quality Bureau. Various land clearing activities such as offsite borrow pits for fill material were also covered under this general permit. Construction

activities, including permanent plant structures and temporary construction facilities, could potentially disturb or impact the entire 543-acre site. UUSA developed a Storm Water Pollution Prevention Plan (SWPPP) and filed a Notice of Intent (NOI) with the EPA, Washington, D.C., at least two days prior to the commencement of construction activities. If necessary the Construction Stormwater Pollution Prevention Plan will be updated for the ongoing construction and any changes in the regulatory requirements.

- Groundwater Discharge Permit/Plan is required by the New Mexico Water Quality Bureau for facilities that discharge an aggregate waste water volume of more than 7.6 m^3 (2,000 gal) per day to surface impoundments or septic systems. This requirement is based on the assumption that these discharges have the potential of affecting groundwater. UUSA discharges stormwater and cooling tower blowdown water to surface impoundments under Discharge Permit 1481 (DP-1481). Sanitary wastewater is sent to the Eunice Wastewater Treatment plant for processing.

3.4.4 Groundwater Characteristics

Groundwater resources at the UUSA site are comprehensively described in Section 3.4.15 of the LES ER.

3.4.5 Section 3.4 Tables

Table 3.4-1 Summary of Liquid Radiological Waste

Radiological Waste	Projection in lbs (gallons)				
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Liquid Radiological Waste	12,500	23,500	36,200	48,200	64,300
	(1,470)	(2,765)	(4,260)	(5,670)	(7,565)

Phases indicate the proposed schedule for facility expansion through 10 MSWU. Liquid radiological wastes will be containerized and solidified prior to shipment for offsite disposal. Gallon projections based on typical weight of 8.5 lbs/gallon.

Table 3.4-2 Groundwater Chemistry

Constituent	Maximum Result	MCL (EPA)
Arsenic	0.007 mg/L or < Detection Limit	0.05 mg/L
Barium	0.018 mg/L or < Detection Limit	2.0 mg/L
Cadmium	0.005 mg/L or < Detection Limit	0.005 mg/L
Chromium	0.011 mg/L or < Detection Limit	0.1 mg/L
Cobalt	0.0022 mg/L or < Detection Limit	-
Copper	0.02 mg/L or < Detection Limit	1.3 mg/L
Lead	0.054 mg/L or < Detection Limit	0.015 mg/L
Mercury	< Detection Limit	0.002 mg/L
Nickel	0.006 mg/L or < Detection Limit	-
Selenium	0.021 mg/L or < Detection Limit	0.05 mg/L
Silver	0.0026 mg/L or < Detection Limit	0.05 mg/L
Vanadium	0.07 mg/L or < Detection Limit	-
Zinc	0.014 mg/L or < Detection Limit	5 mg/L

Notes:

MCL – Maximum Contaminant Level

Data are derived from four background monitoring wells at the WCS site: MW-3A, MW-3B, MW-4A, and MW-4B. These wells produce samples from the siltstone layer within the Chinle Formation at depths of about 61 to 73 m (200 to 240 ft).

Data are from unfiltered samples (required by the state of Texas) and include some qualified data due to sample sediment and low volume samples.

Results for organic components generally include no detectable analytes except for isolated samples with concentrations of analytes consistent with sampling or laboratory contamination.

Table 3.4-3 Recent Chemical Analyses of UUSA Site Groundwater

PARAMETER	UNITS	Minimum Concentration	UUSA Groundwater in Chinle wells Maximum Concentration	Existing Regulatory Standards NEW MEXICO	EPA MCL
General Properties					
Total Dissolved Solids (TDS)	mg/L	**2180**	**10900**	1000	500 (a)
Specific Conductance, Field	mS/cm	4.852	14.276	NS	NS
Conductivity, Field	umhos/cm	5865	14034	NS	NS
Total Kjeldahl Nitrogen (TKN)	mg/L	<1.0	2.21	NS	NS
pH (lab and field)	pH units	**5.52**	7.78	6 - 9	6.5 – 8.5 (a)
Temperature (lab and field)	Degrees C	17.29	22.26	NS	NS
Inorganic Constituents					
Chloride	mg/L	**514**	**2800**	250	250 (a)
Fluoride	mg/L	0.397	**1.75**	1.6	4
Nitrate (as N)	mg/L	<0.10	**25.1**	10	10
Sulfate	mg/L	**883**	**3350**	600	250 (a)
Radioactive Constituents					
Total Uranium	mg/L	0.00359	**0.0629**	0.030	0.030
U-234	uCi/ml	7.04E-09	2.41 E-08		
U-235	uCi/ml	1.00 E-10	8.45E-09		
U-238	uCi/ml	1.21 E-09	2.15 E-08		

Notes:

Highlighted values exceed a regulatory standard

Results are from samples collected quarterly from MW-4, MW-5, MW-10, and MW-20 from April 2011 through March 2012. Site groundwater background uranium concentration has been previously determined to exceed the existing regulatory standards.

(a): EPA Secondary Drinking Water Standard

NS: No standard or goal has been defined

MCL: Maximum Contaminant Level

Table 3.4-4 Pre-Operational Chemical Analyses of UUSA Site Groundwater

		UUSA Groundwater in Chinle Wells		Existing Regulatory Standards	
PARAMETER	**UNITS**	**Minimum Concentration**	**Maximum Concentration**	**NEW MEXICO**	**EPA MCL**
General Properties					
Alkalinity, Bicarbonate	mg/L	26.6	182	NS	NS
Alkalinity, Carbonate	mg/L	<1	1	NS	NS
Alkalinity, Total (As CaCO3)	mg/L	31	182	NS	NS
Total Dissolved Solids (TDS)	mg/L	341	**9760**	1000	500 (a)
Total Kjeldahl Nitrogen (TKN)	mg/L	<0.5	2.7	NS	NS
Total Suspended Solids	mg/L	6.2	6.2	NS	NS
Specific Conductivity	mS/cm	0.64	15.7	NS	NS
pH (lab)	pH units	7.14	**9.2**	6 - 9	6.5 – 8.5 (a)
Temperature (lab and field)	Degrees C	17.79	22.17	NS	NS
Inorganic Constituents					
Aluminum	mg/L	<0.080	**0.238**	5.0 (i)	0.05 – 0.2 (a)
Antimony	mg/L	<0.0036	<0.0036	NS	0.006
Arsenic	mg/L	<0.001	0.027	0.1	0.05
Barium	mg/L	<0.0005	0.0646	1	2
Beryllium	mg/L	<0.001	0.002	NS	0.004
Boron	mg/L	**1.6**	**1.6**	0.75 (i)	NS
Cadmium	mg/L	<0.0005	0.0041	0.01	0.005
Chloride	mg/L	67.9	**3750**	250	250 (a)
Chromium	mg/L	<0.001	0.018	0.05	0.1
Cobalt	mg/L	<0.0005	0.00136	0.05 (i)	NS
Copper	mg/L	<0.010	0.0841	1.0	1.3 (al)
Cyanide	mg/L	<0.0039	<0.0039	0.2	0.2
Fluoride	mg/L	<0.05	**11.2**	1.6	4
Iron	mg/L	<0.01	**1.81**	1	0.3 (a)
Lead	mg/L	<0.0005	**0.0506**	0.05	0.015 (al)
Manganese	mg/L	<0.0005	**1.65**	0.2	0.05 (a)
Mercury	mg/L	<MDL	<0.00020	0.002	0.002
Molybdenum	mg/L	<0.005	0.536	1.0 (i)	NS
Nickel	mg/L	<0.0005	0.02	0.2 (i)	0.1
Nitrate	mg/L	<0.05	**64**	10	10
Nitrite/Nitrate Nitrogen	mg/L	<0.050	**9.9**	NS	1
Selenium	mg/L	<0.002	**0.21**	0.05	0.05
Silver	mg/L	<MDL	<0.0050	0.05	0.05
Sulfate	mg/L	100	**3650**	600	250 (a)
Thallium	mg/L	<0.0081	<0.0081	NS	0.002
Zinc	mg/L	<0.005	0.14	10	5 (a)

Table 3.4-4 Pre-Operational Chemical Analyses of UUSA Site Groundwater

		UUSA Groundwater in Chinle Wells		Existing Regulatory Standards	
PARAMETER	**UNITS**	**Minimum Concentration**	**Maximum Concentration**	**NEW MEXICO**	**EPA MCL**
Calcium	mg/L	14.8	466	NS	NS
Magnesium	mg/L	<0.05	196	NS	NS
Potassium	mg/L	<0.05	35.9	NS	NS
Sodium	mg/L	93.9	3560	NS	NS
Radioactive Constituents					
Gross Alpha*	Bq/L (pCi/L) (j)	**0.6 (15.1)**	**0.6 (15.1)**	NS	0.6 (15*)
Gross beta	Bq/L (pCi/L) (j)	1.2 (31.4)	1.2 (31.4)	NS	4 (mrem/yr)
Radium 224	Bq/L (pCi/L) (j)	<4.88 (<130)	<4.88 (<130)	NS	NS
Radium 226	Bq/L (pCi/L) (j)	**0.24 (6.5)**	**0.24 (6.5)**	(30****)	0.2** (5****)
Total Uranium	mg/L	0.000358	**0.0301**	0.030	0.030
U-234	mq/L (pCi/L) (j)	0.00695 (4.75)	0.00695 (4.75)	0.030	0.030
U-235	mq/L (pCi/L) (j)	0.000231 (0.158)	0.000231 (0.158)	0.030	0.030
U-238	mq/L (pCi/L) (j)	0.001551 (1.06)	0.001551 (1.06)	0.030	0.030
Ag-108m	Bq/L (pCi/L) (j)	-0.044 (-1.20)	-0.044 (-1.20)	NS	***
Ag-110m	Bq/L (pCi/L) (j)	-0.03 (-0.8)	-0.03 (-0.8)	NS	***
Ba-140	Bq/L (pCi/L) (j)	0.093 (2.5)	0.093 (2.5)	NS	***
Be-7	Bq/L (pCi/L) (j)	0.2 (6)	0.2 (6)	NS	***
Ce-141	Bq/L (pCi/L) (j)	0.12 (3.3)	0.12 (3.3)	NS	***
Ce-144	Bq/L (pCi/L) (j)	-0.12 (-3.3)	-0.12 (-3.3)	NS	***
Co-57	Bq/L (pCi/L) (j)	0.04 (1)	0.04 (1)	NS	***
Co-58	Bq/L (pCi/L) (j)	-0.004 (-0.1)	-0.004 (-0.1)	NS	***
Co-60	Bq/L (pCi/L) (j)	-0.004 (-0.1)	-0.004 (-0.1)	NS	***
Cr-51	Bq/L (pCi/L) (j)	-1.3 (-34)	-1.3 (-34)	NS	***
Cs-134	Bq/L (pCi/L) (j)	0.02 (0.6)	0.02 (0.6)	NS	***
Cs-137	Bq/L (pCi/L) (j)	0.03 (0.8)	0.03 (0.8)	NS	***
Fe-59	Bq/L (pCi/L) (j)	0.041 (1.1)	0.041 (1.1)	NS	***
I-131	Bq/L (pCi/L) (j)	0.063 (1.7)	0.063 (1.7)	NS	***
K-40	Bq/L (pCi/L) (j)	1.6 (44)	1.6 (44)	NS	***
La-140	Bq/L (pCi/L) (j)	0.11 (2.9)	0.11 (2.9)	NS	***
Mn-54	Bq/L (pCi/L) (j)	0.004 (0.1)	0.004 (0.1)	NS	***
Nb-95	Bq/L (pCi/L) (j)	-0.03 (-0.7)	-0.03 (-0.7)	NS	***
Ra-228	Bq/L (pCi/L) (j)	0.22 (5.9)	0.22 (5.9)	NS	***
Ru-103	Bq/L (pCi/L) (j)	-0.044 (-1.2)	-0.044 (-1.2)	NS	***
Ru-106	Bq/L (pCi/L) (j)	0.3 (9)	0.3 (9)	NS	***
Sb-124	Bq/L (pCi/L) (j)	-0.21 (-5.6)	-0.21 (-5.6)	NS	***
Sb-125	Bq/L (pCi/L) (j)	-0.10 (-2.7)	-0.10 (-2.7)	NS	***
Se-75	Bq/L (pCi/L) (j)	-0.0037 (-0.1)	-0.0037 (-0.1)	NS	***
Zn-65	Bq/L (pCi/L) (j)	-0.052 (-1.4)	-0.052 (-1.4)	NS	***

Table 3.4-4 Pre-Operational Chemical Analyses of UUSA Site Groundwater

		UUSA Groundwater in Chinle Wells		Existing Regulatory Standards	
PARAMETER	**UNITS**	**Minimum Concentration**	**Maximum Concentration**	**NEW MEXICO**	**EPA MCL**
Zr-95	Bq/L (pCi/L) (j)	-0.056 (-1.5)	-0.056 (-1.5)	NS	***
Miscellaneous Constituents					
VOCs:					
Acetone	ug/L	<MDL	5.2	NS	NS
bis(2-Ethylhexyl)phthalate	ug/L	<MDL	1.54	NS	6
cis-1,3-Dichloropropene	ug/L	<MDL	1.7	NS	NS
Ethylbenzene	ug/L	<MDL	4.7	750	700
Iodomethane	ug/L	<MDL	2.3	NS	NS
Other VOCs and Pesticides	mg/L	<MDLs	<MDLs	Various	Various
Semi-Volatile Organic Compounds (SOCs)	mg/L	<MDLs	<MDLs	Various	Various
Polychlorinated biphenyls, PCBs	mg/L	<MDLs	<MDLs	0.001	0.0005

Notes:

Highlighted values exceed a regulatory standard

Results are from samples collected from MW-2 in 2003; MW-6 and MW-12 in 2007; MW-20 in 2009; and MW-4, MW-5, and MW-10 during 2007 through 2009.

(a): EPA Secondary Drinking Water Standard

(al): Action Level requiring treatment

(i): Crop irrigation standard

(j): See ER Section 3.4.2, Water Quality Characteristics, for explanation of negative values

* The proposed standard excludes 222Rn, 226Ra, and uranium activity

** This standard excludes 228Ra activity. Units for the existing standard are mrem/yr. U.S.

*** EPA MCL Goal (mg/L, or as noted) 0.04 mSv/yr (4 mrem/yr). EPA has proposed to change the units to mrem Effective Dose Equivalent per year

**** Combined Radium-226 and Radium-228 standard in pCi/L.

NS: No standard or goal has been defined

MCL: Maximum Contaminant Level

MDL: Minimum Detection Limit

Table 3.4-5 Initial Average Plant Water Consumption (3.0 MSWU Facility)

Area/Usage	Average Water Usage Rates		
	Gal/Day	GPM	Gal/Year
Domestic Water	16,531	11.48	6,033,906
Cooling Tower Make Up	23,879	16.58	8,720,000
Deionized Water Make Up	2,304	1.60	840,960
Fire Protection	1,835	1.27	689,775
Totals	44,500	31	16,285,000*

Current total water use for the existing 3.0 million SWU facility is15,800,000 gal/year (or 458,000 gal/year less).

Table 3.4-6 Anticipated Peak Plant Water Consumption (10 MSWU Facility)

Area/Usage	GPM
Domestic Water	290.0
Cooling Tower Make Up	56.2
Deionized Water Make Up	40.0
Fire Protection	375.0

3.4.6 Section 3.4 Figures

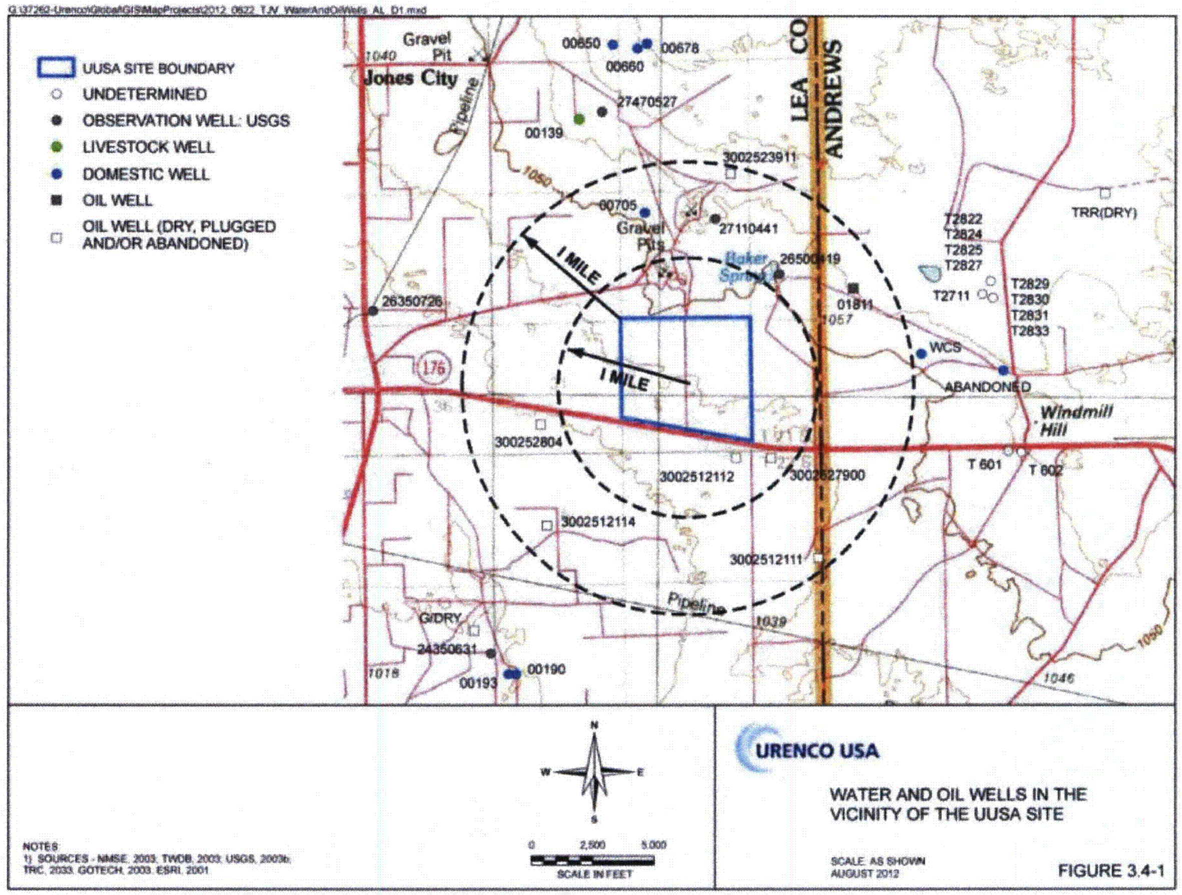

Figure 3.4-1 Water and Oil Wells in the Vicinity of the UUSA Site

3.5 Ecological Resources

Section 3.5 of the LES ER comprehensively describes the terrestrial and aquatic communities of the UUSA site and is incorporated by reference. That evaluation found no communities or habitats defined as rare or unique, or that support threatened and endangered species in the vicinity or on 220-ha (543-acre) UUSA site. Because, as anticipated, site clearing conducted at the time of the initial site construction and current operations have modified the site features, the UUSA site and areas surrounding the current operating facilities were reevaluated for this Supplemental ER to confirm the descriptions of ecological habitats in the LES ER. This reevaluation found no substantive changes to the LES ER discussion of ecological habitats (Haley & Aldrich, Inc., 2010).

3.5.1 Wildlife Management Practices

UUSA currently uses a number of wildlife management practices in association with the facility. These wildlife management practices include:

- Use of BMPs recommended by the State of New Mexico to minimize the construction footprint to the extent possible.
- The use of detention and retention ponds.
- Site stabilization practices to reduce the potential for erosion and sedimentation.
- The use of native, low-water consumption landscaping in and around the stormwater retention/detention basins.
- The management of unused open areas (i.e., leave undisturbed), including areas of native grasses and shrubs for the benefit of wildlife.
- The use of native plant species to revegetate disturbed areas to enhance wildlife habitat.
- The use of animal-friendly fencing around ponds or so that wildlife cannot be injured or entangled.
- Netting pond surface areas or other suitable means to minimize the use of process ponds by birds and waterfowl, based on recommendations from the New Mexico Department of Game and Fish.

In addition to these wildlife management practices, UUSA continues to consider all recommendations of appropriate state and federal agencies including the U.S. Fish and Wildlife Service (USFWS) and the New Mexico Department of Game and Fish.

3.5.2 New RTE Species

Following construction of the UUSA facility, and since the EIS was published in 2005, no relevant species have been added to the federal lists of threatened or endangered species.

However, several species have been identified as New Mexico Department of Fish and Game Rare, Threatened, or Endangered (RTE) species (*see* Table 3.5-1). They include the black footed ferret (*Mustela nigripes),* the bald eagle (*Haliaeetus leucocephalus),* and the northern plomado falcon (*Falco Femoralis septemntrionalis).* These species were not identified as present during the studies of the site. See LES ER Tables 3.5-1 to 3.5-3.

3.5.3 Section 3.5 Tables

Table 3.5-1 Listing of Federal and New Mexico RTE Species

Common Name	Scientific Name	Federal Status$_a$	State Status$_a$
Mammals			
Black-footed ferret	*Mustela nigripes*	E_2	-
Black-tailed prairie dog	*Cynomys ludovicianus*	S_2	-
Swift fox	*Vulpes velox*	S_2	-
Birds			
American peregrine falcon	*Falco peregrinus anatum*	S_2	T_1
Arctic peregrine falcon	*Falco peregrinus tundrius*	S_2	T_1
Baird's sparrow	*Ammodramus bairdii*	S_2	T_1
Bald eagle	*Haliaeetus leucocephalus*	-	T_1
Bell's vireo	*Vireo bellii*	S_2	T_1
Broad Billed Hummingbird	*Cynanthus latirostris magicus (NM)*	-	T_1
Least tern$_b$	*Sterna antillarum athalassos*	-	E_1
Lesser prairie-chicken	*Tympanuchus pallidicinctus*	C_2	-
Northern aplomado falcon	*Falco femoralis septentrionalis*	E_2	E_1
Sprague's pipet	*Anthus spragueii*	C_2	-
Western burrowing owl	*Athene cunicularia hypugaea*	S_2	-
Yellow-billed cuckoo	*Coccyzus americanus*	S_2	-
Amphibians/Reptiles			
Sand dune lizard	*Sceloporus arenicolus*	PE_2	E_1

Sources: 1 NMDGF 2012, 2012; 2 USFWS, 2012

a: C = Candidate, E = Endangered, T = Threatened, S = Species of Concern, PE = Proposed Endangered, " =" = Not listed.

b: The least tern is not listed by the USFWS as occurring in Lea County, however, it is listed by the New Mexico Department of Game and Fish as occurring in Lea County.

3.6 Meteorology, Climatology, and Air Quality

Section 3.6 of the LES ER comprehensively characterizes the meteorology (e.g., winds, precipitation, and temperature) at the location of the UUSA site in Eunice, New Mexico and is incorporated by reference. This discussion supplements the LES ER with more recent meteorological information. No significant changes to meteorology or climatology have occurred at the plant location since the initial evaluation conducted prior to site construction.

3.6.1 Onsite Meteorological Conditions

Official meteorological monitoring began at the UUSA site on September 8, 2009 with an onsite meteorological monitoring station, consisting of a 40-meter tower located on the north side of the UUSA complex. Measurements collected on the solar-powered tower consist of:

- horizontal wind speed and wind direction at 10 and 40 meters;
- temperature at 10 and 40 meters;
- relative humidity at 10 meters;
- solar radiation at 2 meters; and
- precipitation and barometric pressure at 1 meter.

Data are collected and stored by a Campbell Scientific Inc. Model CR3000 data logger. One year of onsite data from the UUSA's onsite tower (January 1 to December 31, 2011) is shown on Figure 3.6.1 and was utilized in air emission modeling for evaluation of impacts to this resource.

3.6.2 Atmospheric Stability

Data collected from the UUSA meteorology station during the year 2011 was used to generate a wind rose (see Figure 3.6-1). The onsite data correlates with the regional data considered during evaluations prior to the site construction, including the five years of data (1987-1991) from the Midland-Odessa NWS (see LES ER Section 3.6.1.5).

3.6.3 Storms

Storms are comprehensively described in Section 3.6.1.7 of the LES ER. This information supplements that discussion with newer data regarding tornados.

Only three significant tornadoes (i.e., F2 or greater) were reported in Lea County, New Mexico, (Tornadohistory.com, 2007) from 1880-2007. Across the state line, two significant tornadoes were reported in Andrews County, Texas, (Tornadohistory.com, 2007) from 1880-2007.

Tornadoes are commonly classified by their intensities. The F-Scale classification of tornados is based on the appearance of the damage that the tornado causes. There are six classifications, F0 to F5, with an F0 tornado having winds of 64 to 116 km/hr (40 to 72 mi/hr) and an F5 tornado having winds of 420 to 512 km/hr (261-318 mi/hr) (AMS, 1996). The three tornadoes reported in Lea County were estimated to be F2 tornadoes (Tornadohistory.com, 2007).

3.6.4 Existing Levels Of Air Pollution And Their Effects On Plant Operations

Both Lea and Andrews counties are in attainment for all of the EPA criteria pollutants and meet New Mexico state standards (Figure 3.6-2, EPA Criteria Pollutant Nonattainment Map; EPA, 2012a). Air quality in the region is very good and should have no impact on plant operations. Air emissions during site preparation and plant construction could include particulate matter and other pollutants; these potential emissions are also addressed in Supplemental ER Section 4.6. Table 3.6-1, National Ambient Air Quality Standards lists the National Ambient Air Quality Standards.

The closest monitoring station operated to the site by the Monitoring Section of the New Mexico Air Quality Bureau is about 32 km (20 mi) north of the site in Hobbs, New Mexico. This station monitors particulate matter, particles 2.5 μm or less in diameter. No instances of the particulate matter National Ambient Air Quality Standards being exceeded have been measured by this monitoring station.

EPA lists 373 sources of criteria pollutants in Lea County, 12 sources in Andrews County, and 14 sources in Gaines County reporting to its Aerometric Information Retrieval System (AIRS) Facility Subsystem, or AFS (EPA, 2012b). None of these sources are located near the existing site or proposed expansion site. Table 3.6- 2 presents a summary of the annual point source emissions for six of the criteria air pollutants for the three counties surrounding the NEF site, based on EPA's 2008 National Emissions Inventory (NEI) data (EPA 2012c). Air pollution levels measured in the vicinity of a particular monitoring site may not be representative of the prevailing air quality of a county or urban area. Pollutants emitted from a particular source may have little impact on the immediate geographic area, and the amount of pollutants emitted does not indicate whether the source is complying with applicable regulations.

3.6.5 Section 3.6 Tables

Table 3.6-1 EPA National Ambient Air Quality Standards and State of New Mexico Air Quality Standards

Pollutant	EPA Standard Value[a]	Standard Type	New Mexico Standard
Carbon Monoxide (CO)			
8-hour Average	9 ppm (10 mg/m^3)	Primary	8.7 ppm
1-hour Average	35 ppm (40 mg/m^3)	Primary	13.1 ppm
Nitrogen Dioxide (NO2)			
Annual Arithmetic Mean	0.053 ppm (100 μg/m^3)	Primary and Secondary	0.05 ppm
1-hour Average	0.100 ppm (188 μg/m^3)	Primary	
24-hour Average			0.10 ppm
Ozone (O3)			
1-hour Average	0.12 ppm (235 μg/m^3)	Primary and Secondary	None
8-hour Average (1997)	0.08 ppm (157 μg/m^3)	Primary and Secondary	None
8-hour Average (2008)	0.075 ppm (147 μg/m^3)	Primary and Secondary	None
Lead (Pb)			
Quarterly Average	1.5 μg/m^3	Primary and Secondary	None
Rolling 3-Month	0.15 μg/m^3	Primary and Secondary	None
Particulate (PM_{10}) *Particles with diameters of 10μm or less*			
24-hour Average	150 μg/m^3	Primary and Secondary	150 μg/m^3
Particulate ($PM_{2.5}$) *Particles with diameters of 2.5 μm or less*			
Annual Arithmetic Mean	15 μg/m^3	Primary and Secondary	None
24-hour Average	35 μg/m^3	Primary and Secondary	None
Sulfur Dioxide (SO_2)			
Annual Arithmetic Mean	0.03 ppm (80 μg/m^3)	Primary	0.02 ppm
24-hour Average	0.14 ppm (365 μg/m^3)	Primary	0.10 ppm

3-hour Average	0.50 ppm (1,300 μg/m^3)	Secondary	None
1-hour Average	0.075 ppm (196 μg/m^3)	Primary	
Hydrogen Sulfide (H_2S)			
1-hour Average (not to be exceeded more than once per year)	Not a NAAQS Pollutant	N/A	0.010 ppm
Total Reduced Sulfur			
½-hour Average	Not a NAAQS Pollutant	N/A	0.003 ppm

[a] Parenthetical value is an approximately equivalent concentration.

NAAQS - National Ambient Air Quality Standards.

ppm - parts per million.

μg/m^3 - micrograms per cubic meter.

mg/m^3 - milligrams per cubic meter.

N/A - not applicable.

Sources: EPA, 2011; NMED, 2002.

Table 3.6-2 Total Annual Emissions (tons per year) of Criteria Air Pollutants at Lea County, New Mexico, and Andrews and Gaines Counties, Texas

County, State	VOC	NOX	CO	SO2	PM2.5	PM10
Lea County, New Mexico	2,215	12,710	5,868	9,075	3,376	28,832
Andrews County, Texas	32,492	6,966	4,635	939	638	3,084
Gaines County, Texas	28,738	3,259	2,956	450	2,819	14,939

A ton is equal to 0.9078 metric ton.

VOC: volatile organic compounds.

NOX: nitrogen oxides.

CO: carbon monoxide.

SO2: sulfur dioxide.

PM25: particulate matter less than 2.5 microns.

PM10: particulate matter less than 10 microns.

Source: Based on 2008 EPA NEI data for point sources in the following "Tier 1" sectors:

Fuel combustion – electric utility, fuel combustion – industrial, fuel combustion – other, chemical and allied products manufacturing, metals processing, petroleum and related industries, solvent utilization and miscellaneous sources.

(http://www.epa.gov/ttn/chief/net/2008inventory.html).

3.6.6 Section 3.6 Figures

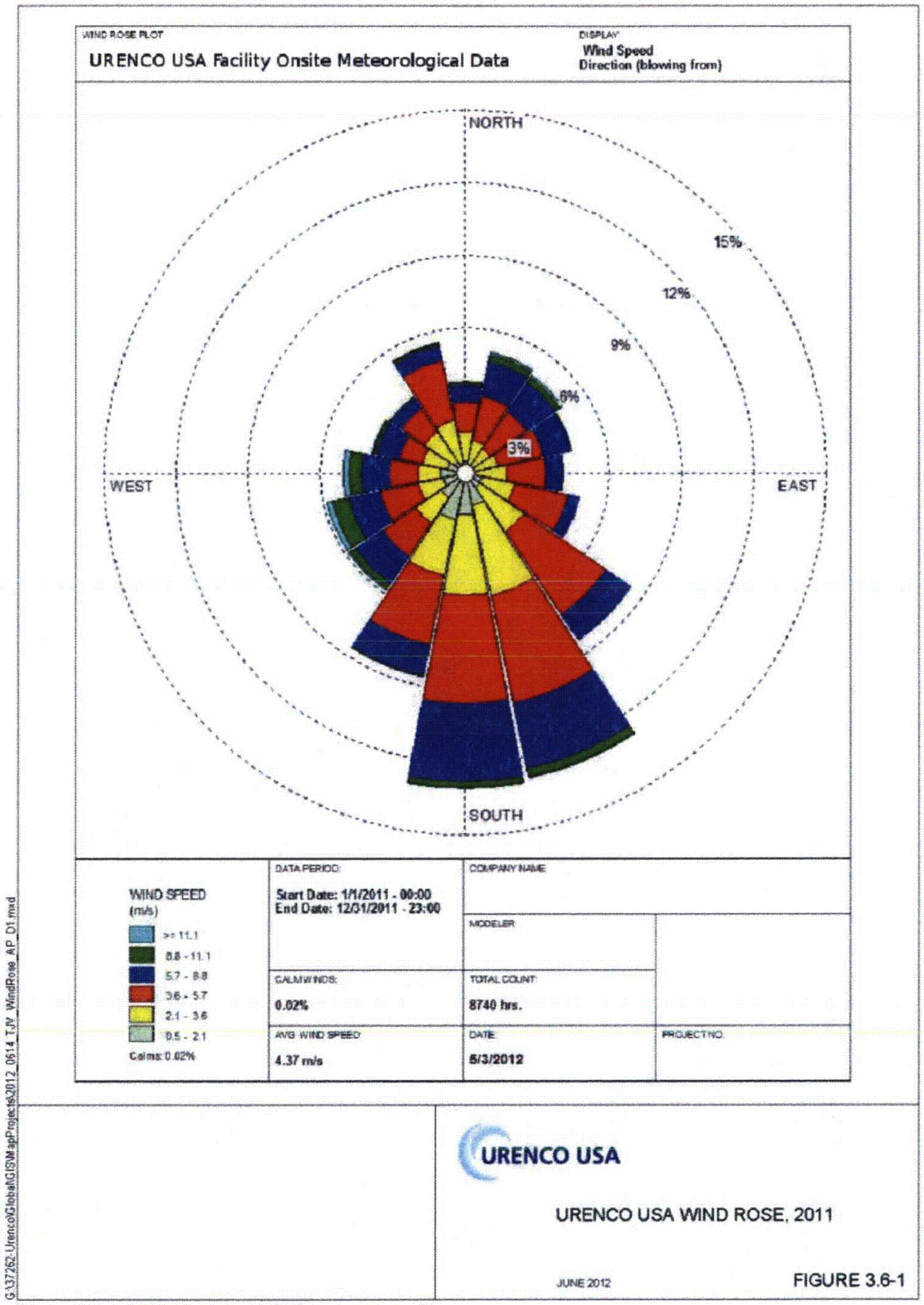

Figure 3.6-1 UUSA Wind Rose, 2011

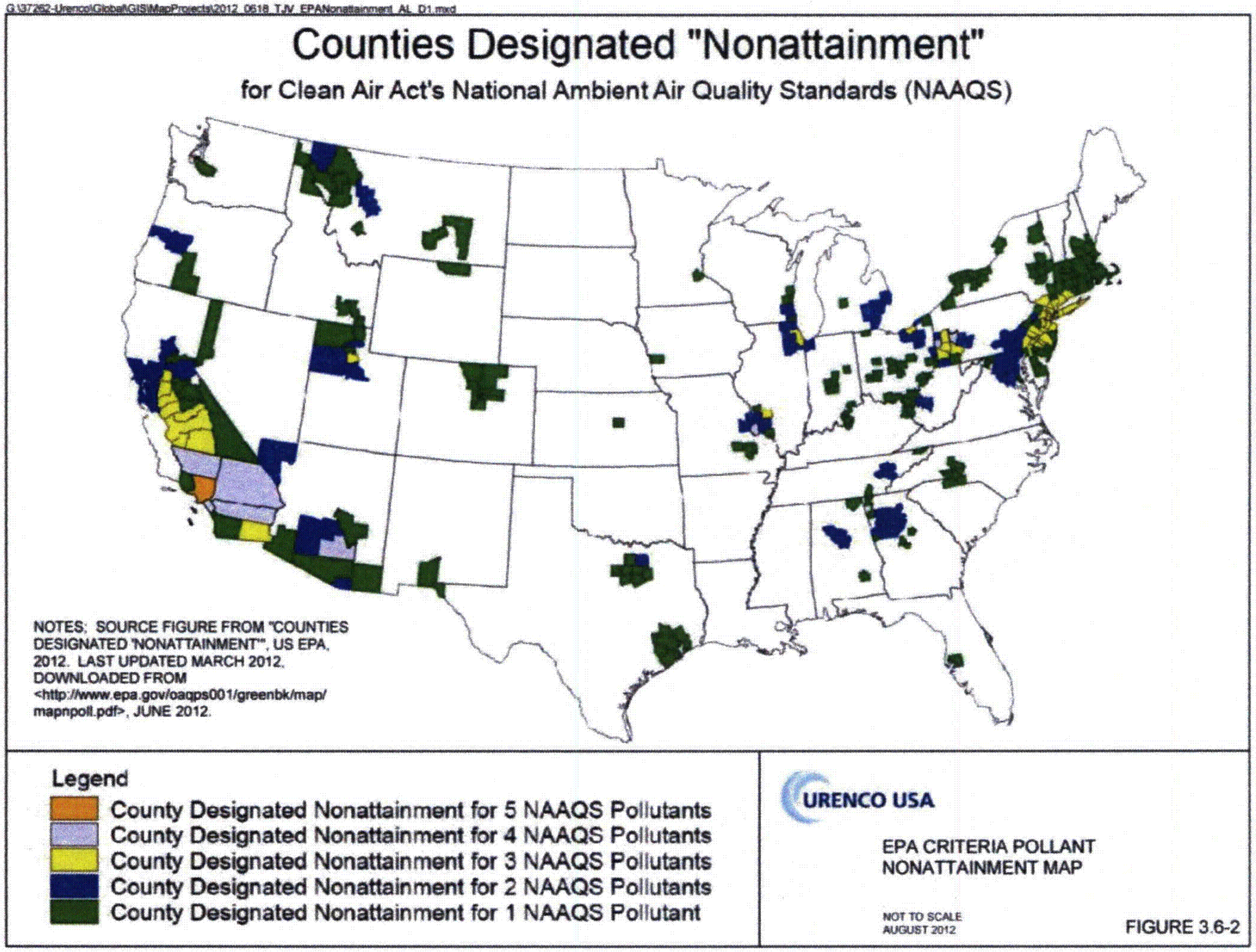

Figure 3.6-2 EPA Criteria Pollutant Nonattainment Map

3.7 Noise

Noise is defined as "unwanted sound." This section describes the current noise levels at the UUSA site.

3.7.1 Background Noise

The background noise sources in the vicinity of the UUSA facility remain consistent with those identified in the initial survey conducted prior to construction and operations at the site. See LES ER Section 3.7. Neighboring industrial sites, local highway traffic including heavy duty tractor trailer trucks, and wind represent the current point and line background noise sources.

3.7.2 Construction Noise

The initial and ongoing construction at UUSA has required the continued use of construction equipment for excavation, such as backhoes, front loaders, bulldozers, and dump trucks; materials-handling equipment, such as cement mixers and cranes; and compressors, generators, and pumps. These are the same types of equipment that were in use for initial construction of the facility. Noise generated from this type of equipment ranges from 87 to 99 dBA at approximately 9.1 m (30 ft) (Cowan, 1994), which would be equivalent of 57 to 69 dBA at approximately 305 m (1,000 ft). It was assumed as part of the initial noise impact evaluation that most of the construction activities would occur during weekday, daylight hours; however, construction could occur during nights and weekends, if necessary. Large trucks would produce noise levels around 89 dBA at approximately 9.1 m (30 ft) (Cowan, 1994), which is equivalent of 77 dBA approximately 37m (120 ft).

As shown on Figures 1.3-4, UUSA Buildings, and 6.1-3, Monitoring Wells, the nearest manmade structure to UUSA boundaries, excluding the two driveways, is the Site Stormwater Detention Basin at the southeast corner of the site. The southern edge of the Site Stormwater Detention Basin is approximately 15.2 meters (50 feet) from the south perimeter fence and approximately 53.3 meters (175 feet) from New Mexico Highway 176. Considering that the sound pressure level from an outdoor noise source decreases 6 decibel units (dB) per doubling of distance, the highest noise levels prior to site construction were predicted to be within the range of 84 to 96 dBA at the south fence line during construction of the Site Stormwater Detention Basin. As shown in LES ER Table 3.7-2, U.S. Department of Housing and Urban Development Land Use Compatibility Guidelines, these predicted noise level ranges fell within unacceptable sound pressure levels as determined by the U.S. Department of Housing and Urban Development. LES ER Section 4.2.3, Traffic Pattern Impacts, states that New Mexico Highway 176 is a main trucking thoroughfare for local industry and LES ER Section 3.1, Land Use, states that a landfill is south/southeast of UUSA across New Mexico Highway 176 and that the adjacent property to the east of UUSA is vacant land. Therefore, there are no sensitive receptors at UUSA south and east boundaries. In addition, noise levels in the predicted ranges at the south and east fence lines are only during construction of the portions of both structures closest to the fences.

The highest noise levels during ongoing construction activities were predicted to be less than 84 to 96 dBA, which was the level estimated at the south fence line during construction of the Site Stormwater Detention Basin. The south fence line is about 38.1 meters (125 feet) from New Mexico Highway 176 and the east fence line is adjacent to vacant land.

During preparation and construction at the UUSA site, noise from earth-moving and construction activities add to the noise environment in the immediate area. Noise sources include the movement of workers and construction equipment, and the use of earth-moving heavy vehicles, compressors, loaders, concrete mixers, and cranes. There is already substantial truck traffic using New Mexico Highway 176 and New Mexico Highway 18.

Due to the temporary and episodic nature of construction, and because of the significant distance to the nearest residence 4.3 km (2.63 mi), actual construction noise at the site has not had a significant effect on nearby residents. Vehicle traffic will be the most noticeable cause of construction noise. Receptors located closest to the intersection of New Mexico Highway 18 and New Mexico Highway 176 will be the most aware of the increase in traffic due to proximity to the source.

3.7.3 Operational Impacts

During operations, point noise sources for the plant have included cascade halls, coolers, rooftop fans, air conditioners, transformers, and traffic from delivery trucks and employee and site vehicles. Ambient background noise sources in the area include vehicular traffic along New Mexico Highway 176, the concrete quarry to the north of the UUSA site, the landfill to the south of the UUSA site, the waste facility to the east of the UUSA site, train traffic along the tracks located on the north border, low-flying aircraft traffic, birds, cattle, and wind gusts.

3.7.4 Sound Level Standards

HUD guidelines, as detailed in Table 3.7-2, set the acceptable Day-Night Average Sound Level (Ldn) for areas of industrial, manufacturing, and utilities at 80 dBA as acceptable. Additionally, under these guidelines, construction and operation of the facility should not cause the Ldn at a nearby residence to exceed 65 dBA (HUD-953-CPD). The EPA has set a goal of 55 dBA for Ldn in outdoor spaces, as detailed in the EPA Levels Document (EPA 550/9). Background measurements and those performed at the Almelo facility were consistent with the guidance in American Society of Testing and Materials (ASTM) Standard Guide E-1686. As indicated in Supplemental ER Section 4.7.1, Predicted Noise Levels, background noise levels, calculated construction noise levels, and operational noise levels should typically be well below both the HUD and EPA guidelines. Both the Eunice City Manager and Lea County Manager have informed UUSA that there are no city, county, or New Mexico state ordinances or regulations governing environmental noise. Thus, the UUSA facility is not subject either to local or state noise regulation.

3.7.5 Potential Impacts to Sensitive Receptors

Potential impacts to local schools, churches, hospitals, and residences from the initial construction are likely to not be significant, as supported by the information presented in LES ER Section 4.7.1. The nearest home is located west of the site at a distance of approximately 4.3 km (2.63 mi) and due to its proximity is not expected to perceive an increase in noise levels due to operational noise levels. The nearest school, hospital, church, and other sensitive noise receptors are beyond this distance, thereby allowing the noise to dissipate and be absorbed, helping decrease the sound levels even further. Homes located near the construction traffic at the intersection of New Mexico Highway 176 and New Mexico Highway 18 will be affected by the vehicle noise, but due to existing heavy tractor trailer vehicle traffic, the change should be minimal. No schools or hospitals are located at this intersection.

3.7.6 Section 3.7 Tables

Table 3.7-2 U.S. Department of Housing and Urban Development Land Use Compatibility Guidelines

	Sound Pressure Level (dBA L_{dn})			
Land Use Category	**Clearly Acceptable**	**Normally Acceptable**	**Normally Unacceptable**	**Clearly Unacceptable**
Residential	<60	60-65	65-75	>75
Livestock farming	<60	60-75	75-80	>80
Office buildings	<65	65-75	75-80	>80
Wholesale, industrial, manufacturing & utilities	<70	70-80	80-85	>85

Source: (HUD-953-CPD)

3.8 Historic and Cultural Resources

Section 3.8 of the LES ER comprehensively describes the site's cultural and historical resources and is incorporated by reference. Seven archeological sites (LA 140701, LA 140702, LA 140703, LA 140704, LA 140705, LA 140706, LA 140707) were identified on the 220-ha (543-acre) parcel of land. Four of these (LA 140704, LA 140705, LA 140706, LA 140707) were eligible for listing on the NRHP based on the presence of charcoal, intact subsurface features and/or cultural deposits, or the potential for subsurface features. Only one of these sites (LA 140705) is within the footprint of the initial construction of the UUSA facility. The results of the survey were submitted to the New Mexico State Historic Preservation Office (SHPO) in March 2004 for a determination of eligibility.

The SHPO review of the survey resulted in the conclusion that all seven sites (LA 140701 through LA 140707) were eligible for listing on the NRHP. Three of these sites (LA 140701, LA 140702 and LA 140705) were within the initial construction footprint for the UUSA site. Based on the terms and conditions of a memorandum of agreement (NRC, 2005), a cultural resource treatment plan was developed and implemented prior to initial construction. This treatment plan was executed for all eligible sites on the UUSA property.

3.9 Visual/Scenic Resources

Section 3.9 of the LES ER comprehensively describes the visual and scenic resources around the UUSA site and is incorporated by reference. This assessment remains accurate. The construction of the UUSA facility, itself, however, has significantly changed the site's visual landscape. The visual characteristics of the facility are described below.

3.9.1 Existing Visual Impacts from the UUSA Site

Figure 4.9-1, Aerial View, is an aerial view of the existing UUSA facility and surrounding area. The quarry and "produced water" lagoons to the north, the existing Waste Control Specialists (WCS) waste facility to the east, the county landfill to the southeast, and New Mexico Highway 176 to the south are shown in relation to the UUSA facility. Land to the west, occupied by a petroleum contaminated soil treatment facility, is undeveloped. Viewing the surrounding area from the UUSA facility, and looking northward, the quarry and "produced water" lagoons are at a higher elevation. To the east, several low-rise buildings associated with the WCS waste facility are apparent at a distance. Earthen mounds at the county landfill are apparent to the southeast, across New Mexico Highway 176. No structures are visible on the adjacent property to the west.

None of the current onsite structures are taller than 40 m (130 ft). Due to the relative flatness of the site and vicinity, however, the structures are observable from New Mexico Highway 176 and from nearby properties. See Figures 3.9-1A to E (pictures of the UUSA site from various directions). However, considering that there are no high-quality viewing areas (see LES ER Section 3.9.7, High Quality View Areas) and the many existing, manmade structures (pump jacks, high power lines, industrial buildings, above-ground tanks) near the UUSA site, the obstruction of existing views due to proposed structures is comparable to nearby conditions.

3.9.2 Section 3.9 Figures

Figure 3.9-1A URENCO USA Facility as Seen From Highway 234/176, Looking North. (Photograph Taken 26 April 2012)

Figure 3.9-1B URENCO USA Facility as Seen From Waste Control Specialists, L.L.C., Looking East. (Photograph Taken 26 April 2012)

Figure 3.9-1C URENCO USA Facility as Seen From the West Looking East. (Photograph Taken 26 April 2012)

Figure 3.9-1D URENCO USA Facility as Seen From the Northern Property Boundary Looking South. (Photograph Taken 26 April 2012)

Figure 3.9-1E URENCO USA Facility as Seen From the East, Looking West. (Photograph Taken 26 April 2012)

3.10 Socioeconomic

Section 3.10 of the LES ER describes the social and economic characteristics of the two-county area around the UUSA site and is incorporated by reference. This Supplemental ER updates that discussion to reflect socioeconomic data from the more recent 2010 U.S. Census. In cases where the 2010 decennial census data had not been published at the time of this document preparation, U.S. Census Bureau American Community Service (ACS) data has been utilized and referenced. Current operational metrics are provided in Section 1.2 Current Operational Information and Status.

Data from the two counties nearest to the UUSA site, Lea County in New Mexico and Andrews County in Texas (Figure 3.10-1), was collected from the U.S. Census databases. Information is provided on population, including minority and low-income areas (i.e., environmental justice as discussed in Supplemental ER Section 4.11), economic trends, housing, and community services in the areas of education, health, public safety, and transportation. The information was updated from publicly available sources, including the U.S. Census, the Economic Development Corporation of Lea County, the City of Eunice, and other data sources.

The site is located in Lea County, New Mexico, near the border of Andrews County, Texas, as shown on Figure 3.10-1, Site Location–Nearby Counties. The figure also shows the city of Eunice, New Mexico, the closest population center to the site, at a distance of about 8 km (5 mi). Other population centers are at distances from the site as follows:

- Hobbs, Lea County, New Mexico: 32 km (20 mi) north
- Jal, Lea County, New Mexico: 37 km (23 mi) south
- Lovington, Lea County, New Mexico: 64 km (39 mi) north-northwest
- Andrews, Andrews County, Texas: 51 km (32 mi) east
- Seminole, Gaines County, Texas: 51 km (32 mi) east-northeast
- Denver City, Gaines County, Texas: 65 km (40 mi) north-northeast

Aside from these communities, the population density around the site region remains low. There have been nominal changes in the area population and population distribution as well as the local area demographics (Table 3.10-1, Populations and Population Projections and Table 3.10-2, General Demographic Profile, 2010) since the time prior to site construction and operation.

The primary labor market for the expansion and continued operation of the facility generally comes from within about 120 km (75 mi) of the site, or generally within Lea County, New Mexico and Andrews County, Texas.

Lea County, New Mexico, was established in March 17, 1917, five years after New Mexico was admitted to the Union as a State. The county seat is located in Lovington, New Mexico, 64 km (39 mi) north-northwest of the UUSA site. The site area is rural and semi-arid, with commerce in petroleum production and related services, cattle ranching, and the dairy industry.

Lea County covers 11,380 km^2 (4,394 mi^2) or approximately 1,138,041 ha (2,812,160 acres). The county population density is 13.6% lower than the New Mexico state average (5.7 versus 6.6 population density per square kilometer) (14.7 versus 17.0 population density per square mile). The population density of Lea County increased approximately 18.75% and the population density of New Mexico increased approximately 13.8% since the facility was initially evaluated in 2003 (2000 Census). The Lea County housing density is 24% lower than the New Mexico state average (2.2 versus 2.9 housing units per square kilometer) (5.7 versus 7.4 housing units per square mile). The housing density of Lea County and New Mexico increased 10% and 16%, respectively since the 2000 Census. Lea County is served by four public libraries, nine financial institutions, and two daily newspapers, the Hobbs News-Sun and Lovington Daily Leader.

Andrews County, Texas was organized in August 1875. The county seat is located in the city of Andrews, about 51 km (32 mi) east-southeast of the UUSA site; there are no population centers in Andrews County closer to the site. The surrounding area is rural and semi-arid, with commerce in livestock production, agriculture (cotton, sorghum, wheat, peanuts, and hay), and significant oil and gas production, which produces most of the county's income.

Andrews County covers 3,887 km^2 (1,500 mi^2). The county population density is 10.2% of the Texas state average (3.8 versus 37.2 per square kilometer) (9.9 versus 96.3 population density per square mile). The county housing density is low, at just over 10.2% of the Texas state average (1.5 versus 14.7 housing units per square kilometer) (3.9 versus 38.2 housing units per square mile). The population density and housing density of Andrews County increased approximately 15% and 13.8% respectively since the 2000 Census. The population and housing densities of Texas increased by approximately 21% since the 2000 Census. The community of Andrews is served by one public library, nine financial institutions, and a biweekly newspaper. The two roughly comparably sized cities of Seminole and Denver City are located in Gaines County Texas, 51 km (32 mi east-northeast) and 65 km (40 mi) north-northeast, respectively.

3.10.1 Population Characteristics

3.10.1.1 Population and Projected Growth

Based on the 2010 U.S. Census (USCB, 2010) the combined population of the two counties within the UUSA vicinity (Lea County, New Mexico and Andrews County, Texas) is 79,513, which represents a 16.05% increase over the 2000 population of 68,515 (Table 3.10-1, Population and Population Projections). Over that 10-year period, Lea County, New Mexico had a growth rate of 16.6%, greater than the 13.2% population growth rate for the state of New Mexico in the same period. Andrews County, Texas had a growth rate of 13.7%, smaller than the 20.6% population growth rate for the state of Texas during that same period. Raw census data was tabulated and used to calculate the above percentage statistics. No other sources of data or information were used.

According to the Economic Development Corporation of Lea County 2011-2012 Annual Report, recent development projects in Lea County include expansion of passenger air travel at Lea County Regional (Hobbs) Airport and development of two small scale alternative fuels producers (Eldorado Bio-Fuels and Joule Unlimited). International Isotopes (INIS) has applied for an NRC license to construct and operate a depleted uranium de-conversion facility approximately 20 miles from the UUSA site. INIS would employ construction workers for the site development and projects employment of up to 150 full-time people for operation of the facility. Intercontinental Potash Corporation (ICP) has filed a Notice of Intent (January 2012) to prepare an Environmental Impact Statement for proposed development of an underground mine to extract polyhalite ore about 20 miles west of Jal, New Mexico (FR, 2012).

Based on projections provided by the 2010 U.S. Census (Table 3.10-1), Lea County, New Mexico and Andrews County, Texas are projected to grow more slowly than their respective state's growth over the next 20 years (the expected construction period of the proposed facility capacity expansion UUSA) (USCB, 2010). However, recent industry expansion projects in the Lea County region may have an impact on regional population growth rates.

3.10.1.2 Minority Population

Based on U.S. Census data, the minority populations of Lea County, New Mexico and Andrews County, Texas as of 2010 were 25% and 20.5%, respectively. These percentages are lower than their respective state averages of 31.6% and 29.6% (see Table 3.10-2, General Demographic Profile, 2010). The raw census data was tabulated and used to calculate the above percentage statistics. No other sources of data or information were used.

Minority population is defined for the purposes of the U. S. Census to include respondents reporting ethnicity and race as something other than non-Hispanic White alone in the decennial census. The minority population, therefore, was calculated to be the total population less the white population. NUREG-1748, Appendix C, defines minority populations to include individuals of Hispanic or Latino origin. The 2010 decennial census data is the source of the minority population data reported above and is the source of the data presented in the Environmental Justice assessment (see Supplemental ER Section 4.11).

Supplemental ER Section 4.11, Environmental Justice demonstrates that no disproportionately high minority or low-income populations exist in proximity to the UUSA site that would warrant further examination of environmental impacts upon such populations.

3.10.2 Economic Characteristics

3.10.2.1 Employment, Jobs, and Occupational Patterns

In 2010, the civilian labor force of Lea County, New Mexico, and Andrews County, Texas, was 27,330 and 6,913, respectively, as shown in Table 3.10-3, Civilian Employment Data, 2010. Of these, 2,126 were unemployed in Lea County, New Mexico, for an unemployment rate of 7.7%. Unemployment in Andrews County, Texas was 390 persons, for an unemployment rate of 5.6%. Based on 2010 Census data, unemployment in the two-county area near the UUSA site increased slightly, by 1.49%; however, the unemployment rates for both counties were both lower by an average of approximately 7% than the rates for New Mexico and Texas (USCB, 2010).

The distribution of jobs by occupation in the two counties is similar to that of their respective states (Table 3.10-3). However, Andrews County generally has fewer managerial and professional positions, and instead has more sales, office, and construction positions (USCB, 2010).

Oil production and related services are the largest part of the site area economy. About 20% of jobs in both Lea County, New Mexico and Andrews County, Texas involve mining (oil production), as compared to approximately 4% and 3% for their respective states. Education, health, and social services account for approximately 20% of jobs in the two-county area, which is generally similar to that for their respective states (23.4% in New Mexico and 20.8% in Texas) (USCB, 2010).

3.10.2.2 Income

The American Community Survey (ACS) is an ongoing survey by the U.S. Census Bureau to generate annual data communities throughout the United States. Based on ACS five-year estimate data for the years 2006-2010 (see Table 3.10-4, Area Income Data, 2006-2010), the per capita income in Lea County, New Mexico was lower than the state average at 85.5%. Per capita income in Andrews County, Texas was higher than the Texas state average. Within the two-county area of the UUSA site, per capita income ranged from $19,637 in Lea County, New Mexico to $29,605 in Andrews County, Texas, as compared to their respective state values of $22,966 and $24,870. The median household income in the two counties was $43,910 and $48,699, respectively, similar to the respective state averages of $43,820 in New Mexico and $49,646 in Texas (USCB, 2010).

The per capita individual poverty level in Lea County, New Mexico decreased from a reported 21% to 17.7% since the facility was initially evaluated. The poverty level in Andrews County, Texas has increased slightly in that same timeframe, from 16.4% to 17.1% (Table 3.10-4 Area Income Data, 2006-2010) (USCB, 2010). The respective state individual poverty levels show a similar trend with New Mexico remaining constant at 15.8% and Texas increasing slightly from 15.4% to 16.8% since the initial LES ER. Household poverty levels have decreased in both counties and both states since the initial site evaluation. Based on ACS five-year estimates (Table 3.10-4, Area Income Data, 2006-2010), the household poverty levels are 15.2% and 12.4% in Lea and Andrews counties, respectively. The household poverty levels in New Mexico and Texas were 13.9% and 13%, respectively.

3.10.2.3 Tax Structure

New Mexico imposes a corporate income tax on the total net income (including New Mexico and non-New Mexico income) of every domestic and foreign corporation doing business in or from the state, or which has income from property or employment within the state. The percentage of New Mexico income is then applied to the gross tax. For corporations with a total net income exceeding $1,000,000 annually, corporate income tax is $56,000 plus 7.6 percent of net income over $1,000,000 (NMTRD, 2010a). New Mexico also levies a corporate franchise tax of $50 per year (NMTRD, 2010a).

3.10.2.3.1 Individual Income Taxes

New Mexico imposes an individual income tax on the net income of every resident and nonresident employed or engaged in business in or from the state or deriving any income from any property or employment within the state. The rates vary depending upon filing status and income. The top tax bracket is 4.9 percent (NMTRD, 2010b).

3.10.2.3.2 Sales Tax/Gross Receipts Tax

New Mexico has a gross receipts tax structure instead of a sales tax structure. Gross receipts are the total amount of money or value of other considerations received from the following:

- Selling property in New Mexico;
- Leasing or licensing property used in New Mexico;
- Granting a right to use a franchise used in New Mexico;
- Performing services in New Mexico;
- Selling research and development services performed outside New Mexico, the product of which is initially used in New Mexico

Although the gross receipts tax is imposed on businesses, it is common for a business to pass the gross receipts tax on to the purchaser either by separately stating it on the invoice or by combining the tax with the selling price (NMTRD, 2012).

The gross receipts tax rate varies throughout the state from 5.125% to 8.6875%, depending on the location of the business. It varies because the total rate combines rates imposed by the state, counties, and, if applicable, municipalities where the businesses are located. The business pays the total gross receipts tax to the state, which then distributes the counties' and municipalities' portions to them (NMTRD, 2012).

Gross receipts tax rates for Lea County range from 5.50% to 6.8750%. The current gross receipts tax rate for Eunice, New Mexico is 6.8125% (EDCLC, 2012).

3.10.2.3.3 Property Taxes

Four governmental entities in New Mexico are authorized to tax: the state, counties, municipalities, and school districts (NRC, 2005). The tax applied to the assessed property value is a combination of state, county, municipal, and school district levies (NRC, 2005). The Lea County tax rate for nonresidential property outside the city limits of Eunice is $28.60 per $1,000 of net taxable value of a property (EDCLC, 2012). Rates for nonresidential properties are higher within the city limits of Eunice. Residential property tax rates are lower for properties outside of Eunice, and higher for those within Eunice.

New Mexico and its local governments offer industrial revenue bonds (IRBs) as a way to encourage company relocations and expansions that provide jobs and economic opportunities for residents and communities. IRBs allow projects to qualify for certain tax incentives, including a property tax exemption on most real and personal property constituting a project's property, and possible exemptions from gross receipts tax and use tax related to the acquisition of equipment and other personal property for use in the business to be conducted at the project. Through the Statewide Economic Development Finance Act the Economic Development Department can recommend projects to the New Mexico Finance Authority for issuance of taxable and tax-exempt IRBs. (Note: IRBs are called IDBs in other jurisdictions.) (EDCLC, 2012).

3.10.3 Community Characteristics

3.10.3.1 Housing

Housing in both Lea County, New Mexico, and Andrews County, Texas, varies from their respective states in general, reflecting the rural nature of the area. Although the number of rooms per housing unit is similar to state averages, the density of housing units and value of housing is considerably different, especially for Andrews County. The densities at 2.2 units per km^2 (5.7 units per mi^2) in Lea County, New Mexico and 1.5 units per km^2 (3.9 units per mi^2) in Andrews County, Texas, are about 77% and 10% of their respective state averages of 2.9 and 14.7 units per km^2 (7.4 and 38.2 units per mi^2). The median cost of a home in Lea County, New Mexico is similar to that of Andrews County, Texas ($87,500 and $86,600, respectively). The cost of a home in Lea County is approximately 45% lower than the respective median value of a home in New Mexico ($158,400). The cost of a home in Andrews County, Texas is approximately 30% lower than the cost of a home in Texas ($123,500) (Table 3.10-5, Housing Information in the Lea County, New Mexico-Andrews County, Texas Vicinity) (USCB, 2010).

The percentage of vacant housing units is 10.8% and 9.5% for Lea County, New Mexico and Andrews County, Texas, respectively. This compares to their state vacancy rates of 12.2% and 10.6%, respectively (USCB, 2010).

3.10.3.2 Education

Education institutions remain as described in the LES ER Section 3.10.3.2.

In general, the population in Lea County, New Mexico, has less advanced education than the general population in their state. On average, the state population with either a bachelor's degree or graduate or professional degree is about double the corresponding percentage in Lea County, New Mexico (USCB, 2010; ACS 5-year Estimates).

3.10.3.3 Health Care, Public Safety, and Transportation Services

Health Care

Health care institutions remain approximately as described in the LES ER Section 3.10.3.3.

Public Safety

Seven fire departments comprising nine fire stations are located in Lea County, New Mexico. One fire station is located in Eunice, New Mexico. Fire support service for the Eunice area is provided by the Eunice Fire and Rescue, located approximately 8 km (5 mi) from the UUSA site. Eunice Fire and Rescue is primarily volunteer, with approximately thirty active volunteer and four active career firefighters on staff (USFA Census, 2012). Backup support for the Eunice Fire and Rescue is as described in the LES ER Section 3.10.3.3.

The Eunice Police Department, which now has eight full-time officers, provides local law enforcement (FBI, 2010).

Transportation

Road, train, and air transportation are described in Supplemental ER Section 3.2.

3.10.4 Section 3.10 Tables

Table 3.10-1 Population and Population Projections[3]

Area (Population/Projected Growth)					
Year(s)	**Lea County, NM**	**Andrews County, TX**	**Lea-Andrews Combined**	**New Mexico**	**Texas**
1970	49,554	10,372	59,926	1,017,055	11,198,657
1980	55,993	13,323	69,316	1,303,303	14,225,512
1990	55,765	14,338	70,103	1,515,069	16,986,335
2000	55,511	13,004	68,515	1,819,046	20,851,820
2010	64,727	14,786	79,513	2,059,179	25,145,561
2020	62,679	16,497	79,176	2,358,278	26,991,548
2030	64,655	17,423	82,078	2099708	33,317,744
2040	66,631	18,348	84,979	2,891,483	33,349,013
Percent Change(%)					
Year(s)	**Lea County, NM**	**Andrews County, TX**	**Lea-Andrews Combined**	**New Mexico**	**Texas**
1970-1980	13.0%	28.5%	15.7%	28.1%	27.0%
1980-1990	-0.4%	7.6%	1.1%	16.2%	19.4%
1990-2000	-0.5%	-9.3%	-2.3%	20.1%	22.8%
2000-2010	16.6%	13.7%	16.05%	13.2%	20.6%
2010-2020	3.3%	5.9%	3.8%	12.7%	13.3%
2020-2030	3.2%	5.6%	3.7%	11.3%	11.8%
2030-2040	3.1%	5.3%	3.5%	10.2%	10.5%

Source: U.S. Census Bureau

[3] http://www.census.gov/population/www/projections/projectionsagesex.html

Table 3.10-2 General Demographic Profile, 2010

Profile	Areas							
	Lea County, NM		Andrews County, TX		New Mexico		Texas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Population	64,727	100.0	14,786	100.0	2,059,179	100.0	25,145,561	100.0
Minority Population*	16,188	25	3,037	20.5	651,303	31.6	7,444,009	29.6
Race								
One race	63,076	97.4	14,494	98	1,982,169	96.3	24,466,560	97.3
White	48,539	75	11,749	79.5	1,407,876	68.4	17,701,552	70.4
Black or African American	2,641	4.1	222	1.5	42,550	2.1	2,979,598	11.8
American Indian and Alaska Native	770	1.2	142	1.0	193,222	9.4	170,972	0.7
Asian	326	0.5	91	0.6	28,208	1.4	964,596	3.8
Native Hawaiian and Other Pacific Islander	36	0.1	1	0.0	1,810	0.1	21,656	0.1
Some other race	10,764	16.6	2289	15.5	38,503	15.0	2,628,186	10.5
Two or more races	1,651	2.6	292	2.0	77,010	3.7	679,001	2.7

*Calculated as total population less white population

Source: U.S. Census Bureau

Table 3.10-3 Civilian Employment Data, 2006-2010[4]

Topic	Area							
	Lea County, NM		Andrews County, TX		New Mexico		Texas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Employment Status								
In labor force	27,330	100.0	6,913	100.0	957,903	100.0	11,962,847	100.0
Employed	25,204	92.2	6,523	94.4	888,761	92.8	11,125,616	93.0
Unemployed	2,126	7.7	390	5.6	69,142	13.9	837,231	13.3
Occupation (population 16 years and over)								
Management, professional, and related occupations	6,135	24.3	1,322	20.3	305,845	34.4	3,751,544	33.7
Service occupations	4,355	17.3	1,080	16.6	169,033	19.0	1,877,988	16.9
Sales and office occupations	5,862	23.3	1,596	24.5	215,717	24.3	2,854,195	25.7
Farming, fishing, and forestry occupations (2000 data)	331	1.5	64	1.2	7,594	0.9	61,486	0.6
Construction, extraction, and maintenance occupations	4,941	19.6	1,368	21.0	112,591	12.7	1,291,496	11.6
Production, transportation, and material moving occupations	3,911	15.5	1,157	17.7	85,575	9.6	1,350,393	12.1
Industry								
Agriculture, forestry, fishing and hunting, and mining	4,903	19.5	1,518	23.3	36,726	4.1	325,101	2.9

[4] AFF – SELECTED ECONOMIC CHARACTERISTICS 2006-2010 ACS 5-Year Estimates

Table 3.10-3 Civilian Employment Data, 2006-2010[4]

Topic	Area							
	Lea County, NM		Andrews County, TX		New Mexico		Texas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Construction	2,079	8.2	395	6.1	75,349	8.5	960,632	8.6
Manufacturing	1,116	4.4	567	8.7	47,079	5.3	1,081,154	9.7
Wholesale trade	602	2.4	192	2.9	19,887	2.2	368,938	3.3
Retail trade	2,522	10.0	583	8.9	103,278	11.6	1,282,840	11.5
Transportation and warehousing, and utilities	1,745	6.9	313	4.8	40,748	4.6	630,728	5.7
Information	257	1.0	109	1.7	16,994	1.9	241,266	2.2
Finance, insurance, real estate, and rental and leasing	1,049	4.2	202	3.1	45,111	5.1	768,942	6.9
Professional, scientific, management, administrative, and waste management services	1,383	5.5	394	6.0	95,697	10.8	1,170,818	10.5
Education, health and social services	5,219	20.7	1,360	20.8	207,969	23.4	2,312,346	20.8
Arts, entertainment, recreation, accommodation and food services	1,778	7.1	619	9.5	91,649	10.3	815,429	8,2
Other services (except public administration)	1,244	4.9	184	2.8	41,988	4.7	578,173	5.2
Public administration	1,307	5.2	87	1.3	66,286	7.5	489,069	4.4

Source: U.S. Census Bureau

Table 3.10-4 Area Income Data, 2006-2010[5],[6]

Topic	Lea County, NM	Andrews County, TX	New Mexico	Texas
Individual				
Per Capita Income (dollars)	19,637	29,605	22,966	24,870
Percent of State (%)	85.5	119.0	100.0	100.0
% Below Poverty Level (2009)	17.7	17.1	18.4	16.8
Household				
Medial Income (dollars)	43,910	48,699	43,820	49,646
Percent of State	100.2	98.1	100.0	100.0
% Below Poverty Level (2009)	15.2	12.4	13.9	13.0

Source: U.S. Census Bureau

[5] AFF – SELECTED ECONOMIC CHARACTERISTICS 2006-2010 ACS 5-Year Estimates

[6] AFF – INCOME IN THE PAST 12 MONTHS (IN 2010 INFLATION-ADJUSTED DOLLARS); 2006-2010 ACS –Year Estimates

[5] AFF – SELECTED ECONOMIC CHARACTERISTICS 2006-2010 ACS 5-Year Estimates

[6] AFF – INCOME IN THE PAST 12 MONTHS (IN 2010 INFLATION-ADJUSTED DOLLARS); 2006-2010 ACS –Year Estimates

Table 3.10-4 Area Income Data, 2006-2010[5],[6]

Table 3.10-5 Housing Information in the Lea New Mexico Andrews Texas County Vicinity

Topic	Area			
	Lea County, NM	Andrews County, TX	New Mexico	Texas
Total Housing Units	23,405	5,400	780,579	8,157,575
Occupied housing units (percent)	84.2	85.2	86.9	90.6
Vacant housing units (percent)	15.8	14.8	13.1	9.4
Density -- Housing units (per square mile)	5.3	3.6	6.4	31.2
Number of rooms (median)	5.1	5.2	5.0	5.1
Median value (2000 dollars)	50,100	42,500	108,100	82,500

Source: U.S. Census Bureau (DOC, 2002)

Table 3.10-6 Educational Facilities Near the UUSA

School	Grades	Distance km (miles)	Direction	Population	Student-Teacher Ratio
Lea County, New Mexico					
Eunice High School	9-12	8.6 (5.3)	W	177	13:1
Caton Middle School	6-8	8.6 (5.3)	W	143	14:1
Mettie Jordan Elementary School	DD, K-5	8.6 (5.3)	W	275	14:1
Eunice Holiness Academy	1-12	8.2 (5.1)	W	18	8:1

Note : DD – Development Delayed Class
Source: Eunice School District
National Center for Educational Statistics
Source: U.S. Census Bureau (DOC, 2002)
Population for 2009-2010 School Year http://nces.ed.gov/ccd/elsi/quickFacts.aspx

Table 3.10-7 Educational Information in the Lea County, New Mexico-Andrews County, Texas Vicinity[7]

	Area									
	Eunice, NM		Lea County, NM		Andrews County, TX		New Mexico		Texas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
School Enrollment (≥3 years of age)	720	100.0	16,539	100.0	3,716	100.0	547,061	100.0	6,836,694	100.0
Nursery School, pre-school	19	2.6	852	5.2	363	9.8	28,423	5.2	434,630	6.4
Kindergarten	51	7.1	1,239	7.5	210	5.7	27,785	5.1	391,643	5.7
Elementary school	429	59.6	7,610	46.0	1,750	47.1	222,167	40.6	2,935,688	42.9
High school	106	14.7	3,959	23.9	1,044	28.1	121,945	22.3	1,478,743	21.6
College or graduate school	115	16.0	2,879	17.4	349	9.4	146,741	26.8	1,595,990	23.3
School Attainment (≥25 years of age)	1,786	100.0	37,689	100.0	8,552	100.0	1,296,627	100.0	15,116,371	100.0
Less than 9th grade	341	19.1	4,769	12.7	1,353	15.8	101,101	7.8	1,505,662	10.0
9th to 12th grade, no diploma	229	12.8	5,530	14.7	982	11.5	123,052	9.5	1,515,336	10.0
High School graduate (includes equivalency)	605	33.9	11,221	29.8	2,625	30.7	349,895	27.0	3,928,438	26.0
Some college, no degree	378	21.2	8,573	22.7	2,196	25.7	299,157	23.1	3,318,190	22.0
Associate's degree	30	1.7	2,737	7.3	337	3.9	93,389	7.2	954,622	6.3
Bachelor's degree	111	6.2	3,134	8.3	774	9.1	189,601	14.6	2,609,718	17.3
Graduate or professional degree	92	5.2	1,725	4.6	285	3.3	140,432	10.8	1,284,405	8.5

Sources: U.S. Census Bureau, Eunice School District

[7] AFF – SELECTED SOCIAL CHARACTERISTICS 2006-2010 ACS 5-Year Estimates

3.10.5 Section 3.10 Figures

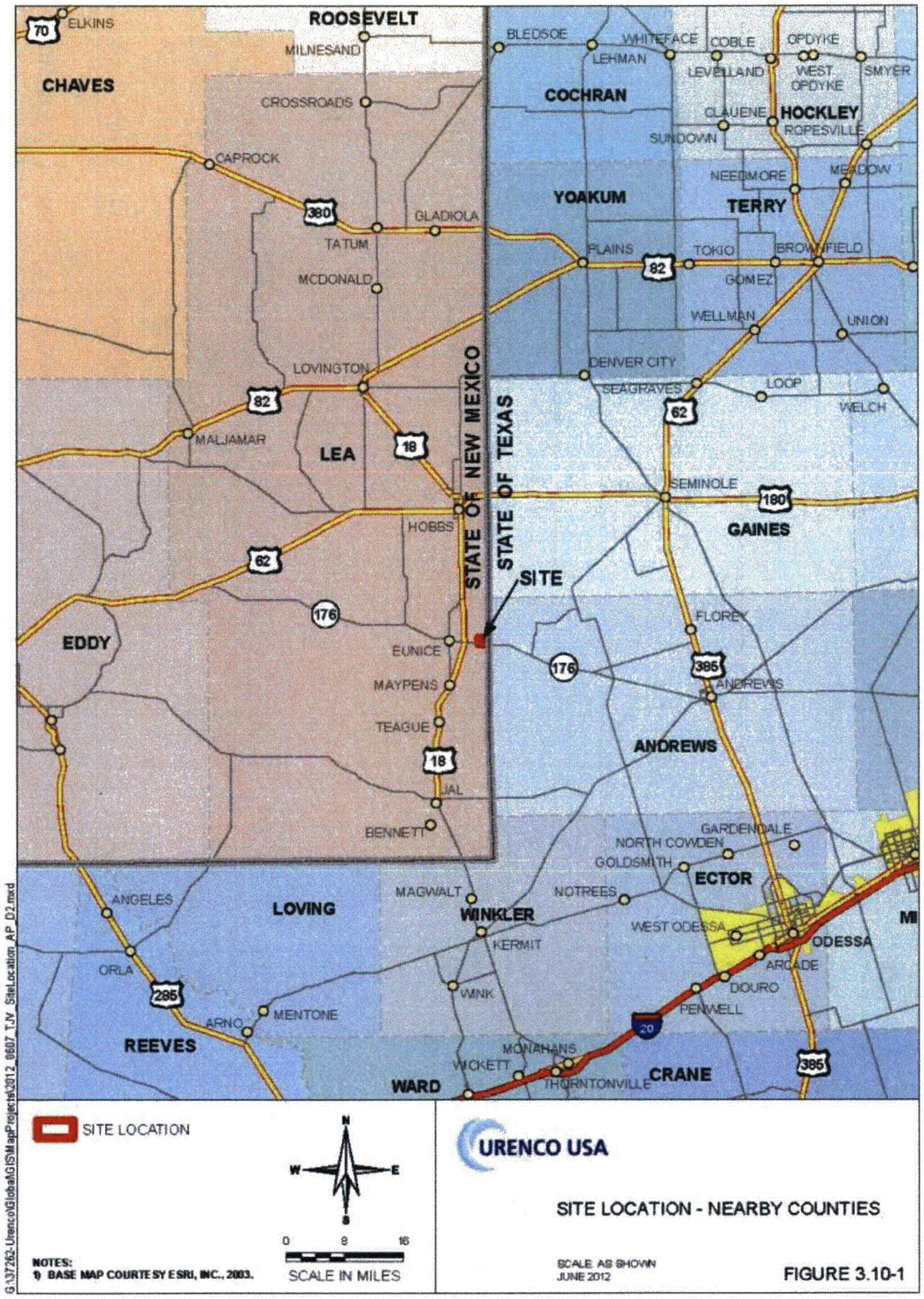

Figure 3.10-1 Site Location–Nearby Counties

3.11 Public and Occupational Health

Section 3.11 of the LES ER describes public and occupational health environment for the UUSA site prior to construction, including background radiation, prior radiation, and chemicals at the site, and likelihood of occupational injury. This discussion remains accurate. However, this Supplemental ER adds a general baseline description of the public and occupation health now that the UUSA facility has begun operating. These impacts are discussed in more detail in LES ER Section 4.11 and that Section is incorporated by reference. Current operational metrics are provided in Section 1.2 Current Operational Information and Status.

3.11.1 Nonradiological Impacts

Nonradiological effluents at the UUSA site have been evaluated and do not exceed criteria in 40 CFR 50, 59, 60, 61, 122, 129, or 141. Radionuclides and HF are governed as a National Emission Standards Hazardous Air Pollutants (NESHAP) (EPA, 2003b). Details of radiological gaseous and liquid effluent impacts and controls are listed in ER Section 4.12.2, Radiological Impacts. A detailed list of the chemicals that are used at UUSA, by building, is contained in LES ER Tables 2.1-2 through 2.1-4. LES ER Figure 2.1-4 indicates where these buildings are located on the UUSA site.

3.11.2 Routine Gaseous Effluent

Routine gaseous effluents from the plant are listed in LES ER Table 3.12-3, Estimated Annual Gaseous Effluent. The primary material in use at the facility is uranium hexafluoride (UF_6). UF_6 is hygroscopic (moisture absorbing) and, in contact with water, will chemically break down into uranyl fluoride (UO_2F_2) and HF. Inhalation of UF_6 typically results in internal exposure to UO_2F_2 and HF. Of these, HF is the most significant hazard, being toxic to humans. In addition to a potential radiation dose, a worker would be subjected to two other primary toxic effects: (1) the uranium in the uranyl complex acts as a heavy metal poison that can affect the kidneys; and (2) the HF can cause severe irritation to the skin and lungs at high concentrations. Refer to LES ER Section 3.11.2.2, Public and Occupational Exposure Limits, for public and occupational exposure limits.

It should be noted that the public exposure limits proposed by the State of California (30 $\mu g/m^3$) and the Occupational Safety and Health Administration (OSHA) Permissible Exposure Level (PEL) (2.0 mg/m^3) vastly differ, with the California (CA) value being significantly more conservative. The proposed CA limit is by far the most stringent of all state or federal agencies, yet both are based on allowable exposure for an 8-hr workday. UUSA is not obligated to follow California proposed standards; however, for comparative reasons, UUSA points out that the annual average gaseous effluent release concentration from a 10 MSWU URENCO Centrifuge Enrichment Plant is less than the California standard including dispersion effects. This comparison demonstrates the HF emissions from the plant do not exceed the strictest of regulatory limits at the point of discharge. If standard dispersion modeling techniques are used to estimate the exposure to the nearest residents under normal operating conditions, the concentration at the nearest fence boundary is calculated to be 9.3E-3 $\mu g/m^3$, which is significantly less than the State of New Mexico Occupational Exposure Levels (OEL). The location of the nearest resident to the site is shown in Figure 4.12-1, Nearest Resident. Other sensitive receptors (e.g., schools and hospitals), as well as the nearest drinking water source, are located further away.

Worker exposure to in-plant gaseous effluents listed in Table 3.12-3, Estimated Annual Gaseous Effluent, are minimal. No exposures exceeding 29 CFR 1910 are anticipated. Leaks in UF_6 components and piping would cause air to leak into the system and would not release effluent. Work activities are routinely evaluated for potential airborne hazards and containments, ventilation controls, or respiratory protection measures are employed as needed. All maintenance activities utilize mitigative features including local flexible exhaust hoses connected to the Gaseous Emissions Ventilation System (GEVS). Laboratory and maintenance operations activities involving hazardous gaseous or respirable effluents are conducted with ventilation control (i.e., fume hoods, local exhaust or similar) and/or with the use of respiratory protection as required.

3.11.3 Routine Liquid Effluent

Routine liquid effluents are listed in LES ER Table 3.12-4, Estimated Annual Liquid Effluent. As discussed in Section 3.12.9.1, the UUSA facility generates much less routine liquid effluent than was anticipated in the LES ER, due to the elimination of the laundry and the consolidation of washing facilities. All effluents are managed at UUSA except sanitary waste. Sanitary wastewater is sent to the City of Eunice Wastewater Treatment Plant via a system of lift stations and 8 inch sewage lines. See LES ER Section 3.12.1.3 for further discussion of the Liquid Effluent Collection and Treatment System. There is no water intake for surface water systems in the region. Water supplies in the region are from distant groundwater sources and are thus protected from any immediate impact due to potential releases. Supplemental ER Section 3.4 provides further information about water wells in the site area. No public impact is expected from routine liquid effluent discharge.

The effluents listed in LES ER Table 3.12-4, Estimated Annual Liquid Effluent, will have no significant impact on the public since they are used in de minimis levels or are nonhazardous by nature. All regulated gaseous effluents are below regulatory limits as specified by the New Mexico Air Quality Bureau. Additionally, handling of all chemicals and wastes is conducted in accordance with the site Environment, Health, and Safety Program, which conforms to 29 CFR 1910 and specifies the use of appropriate engineered controls, as well as personnel protective equipment, to minimize potential chemical exposures.

3.11.4 Radiological Impacts

Sources of radiation exposure incurred by the public generally fall into one of two major groupings, naturally-occurring radioactivity and man-made radioactivity. These sources were described in LES ER Section 3.11.2.

Workers at UUSA are subject to higher potential exposures than members of the public and these hazards are described in LES ER Section 3.11.

The potential radiological impacts to the public from operations at UUSA are those associated with chronic exposure to low levels of radiation, not the immediate health effects associated with acute radiation exposure. The major sources of potential radiation exposure are the effluent from the Separations Building Modules (SBMs) and Cylinder Receipt and Dispatch Buildings (CRDB) and direct radiation from the UBC Storage Pad. The Centrifuge Assembly Building is a potential minor source of radiation exposure. The total amount of uranium released to the environment via air effluent discharges from UUSA is less than 10 g (0.35 ounces) per year (URENCO, 2000; URENCO, 2001, URENCO, 2002a). Due to the anticipated low volume of contaminated liquid waste and containment for offsite disposal, liquid effluent discharges are not expected to have a significant radiological impact to the public or the environment. In addition, the radiological impacts associated with direct radiation from indoor operations are not a significant contributor because the low-energy gamma-rays associated with the uranium will be absorbed almost completely by the process lines, equipment, cylinders, and building structures at UUSA. It is anticipated the UBC Storage Pad will present the highest potential for direct radiation impact to the public at or beyond the plant fence line. The combined potential radiological impacts associated with the small quantity of uranium in effluent discharges and direct radiation exposure due to stored UBCs are expected to be a small fraction of the general public dose limits established in 10 CFR 20 and within the uranium fuel cycle standards established in 40 CFR 190. Figure 4.12-1, Nearest Resident and Figure 4.12-2, Site Layout for UUSA, show the site layout for UUSA and its relation to the nearest residence.

The principle isotopes of uranium, ^{238}U, ^{235}U, and ^{234}U, are the primary nuclides of concern in both gaseous effluent and liquid waste discharged from the plant. However, their concentrations in gaseous and liquid effluents are expected to be very low because of engineered controls prior to discharge. In addition, a combination of the effluent monitoring and environmental monitoring/sampling programs will provide data to identify and assess plant's contribution to environmental uranium at UUSA. Both monitoring programs have been designed to provide comprehensive data to demonstrate that plant operations have no adverse impact on the environment. ER Section 6.1 provides detailed descriptions of the two monitoring programs.

The enrichment process system operates sub-atmospherically such that any air leaks are into the equipment and not into the building environment. In addition to building HVAC systems, the plant design includes GEVS for treatment of potentially contaminated gas streams. The enrichment process in each of the Separation Building Modules (SBMs) includes a Pumped Extract GEVS and Local Extract GEVS system of exhaust filters (pre-filters, HEPA filters, and impregnated activated carbon filters) before gaseous effluent is discharged to the environment. The CRDB also has Local Extract and Fume Hood GEVS to treat gaseous effluent from laboratories containing process materials and from other rooms within the CRDB where decontamination and maintenance work is performed. In addition, gaseous effluent from the GEVS is monitored continuously (refer to ER Section 6.1, Radiological Monitoring, for details regarding the effluent monitoring system).

The Centrifuge Test and Post Mortem Facilities Exhaust Filtration System, similar to the CRDB GEVS, performs a similar function except it exhausts on the roof of the CAB. Discharges of gaseous effluent from both GEVS and the Centrifuge Test and Post Mortem Facilities Exhaust Filtration System result in ground-level plumes because the release points are at roof top level of the SBMs, CRDB, or CAB, as applicable. Consequently, airborne concentrations of uranium present in gaseous effluent continually decrease with distance from the release point. Therefore, the greatest offsite radiological impact is expected at or near the site boundary locations in each sector. Site boundary distances have been determined for each sector (refer to ER Section 4.6 for details). The nearest resident has been identified at a distance of about 4.3 km (2.63 miles) in the west sector. Other important receptor locations, such as schools, have also been identified within an 8-km (5-mi) radius of UUSA (refer to Supplemental ER Tables 3.10-6 and 3.10-7). With respect to ingestion pathways, there is little in the way of food crops grown within an 8-km (5-mi) radius due to semi-arid nature and minimal development of the local area for agriculture. Cattle grazing across the open range has been observed in the vicinity of the site (refer to LES ER Section 3.1). The radiological impacts on members of the public and the environment at these potential receptor locations are expected to be only small fractions of the radiological impacts that have been estimated for the site boundary locations because of the low initial concentrations in gaseous effluent and the high degree of dispersion that takes place as the gaseous effluent is transported.

The potential offsite radiological impacts to members of the general public from routine operations at UUSA have been assessed through calculations designed to estimate the annual committed effective dose equivalent (CEDE) and annual committed dose equivalent to organs from effluent releases. The calculations also assessed impacts from direct radiation from stored uranium in feed, product and byproduct cylinders. The term "dose equivalent" as described throughout this section refers to a 50-year committed dose equivalent. The addition of the effluent related doses and direct dose equivalent from fixed sources provides an estimate of the total effective dose equivalent (TEDE) associated with plant operations. The calculated annual dose equivalents were then compared to regulatory (NRC and EPA) radiation exposure standards as a way of illustrating the magnitude of potential impacts.

3.11.4.1 Pathway Assessment

There are three primary exposure pathways associated with plant effluent: (1) direct radiation due to deposited radioactivity on the ground surface (ground plane exposure), (2) inhalation of airborne radioactivity in a passing effluent plume, and (3) ingestion of food that was contaminated by plant effluent radioactivity. These pathways and the predicted exposures at the UUSA site are described in LES ER Section 4.12.2.1, remain similar, and are incorporated by reference.

3.11.4.1.1 Routine Gaseous Effluent

Most of the airborne uranium is removed through filtration prior to the discharge of gaseous effluent to the atmosphere. However, the release of uranium in extremely low concentrations is expected and raises the potential for radiological impacts to the general public and the environment. The total annual discharge of uranium in routine gaseous effluent from a similar designed 1.5 MSWU uranium enrichment facility was estimated to be less than 30 g (1.1 oz.) (NRC,1994a). The uranium source term applied in the assessment of radiological impacts for routine gaseous effluent from that plant was 4.4×10^6 Bq (120 µCi) per year. It was noted that actual uranium discharges in gaseous effluent for European facilities with similar design and throughput are significantly lower (i.e., $< 1 \times 10^6$ Bq (28 µCi) per year) (NRC, 1994a). In contrast, the UUSA was initially evaluated to be a 3.0 MSWU facility and is proposed to have a final facility capacity of 10 MSWU. The annual discharge of uranium in routine gaseous effluent discharged from the UUSA was originally predicted to be less than 10 g (0.35 ounces) (URENCO, 2000; URENCO, 2001, URENCO, 2002a). As a conservative assumption for assessment of potential radiological impacts to the general public, the uranium source term used in the assessment of radiological impacts for routine gaseous effluent releases from the UUSA was taken as 8.9 MBq (240 µCi) per year, which is equal to twice the source term applied to the 1.5 MSWU plant described in NUREG-1484 (NRC, 1994a). In comparison, the operating history of gaseous emissions from the URENCO Capenhurst facility in the United Kingdom averaged over a four-year period (1999 to 2002) indicates an average annual release to the atmosphere of uranium of about only 0.1 MBq (2.8 µCi) (URENCO, 2001; URENCO, 2002a). Since the Capenhurst facility is less than half the size of the initially evaluated UUSA, scaling their annual release by a conservative factor of 3 suggests that the expected annual releases could be about 0.31 MBq (8.4 µCi) of uranium, or about 28 times smaller than the 8.9 MBq (240 µCi) bounding condition that is used in this assessment.

3.11.4.1.2 Routine Liquid Effluent

The operation of UUSA includes liquid waste processing and off-site disposal for uranic materials that are collected from various process streams. LES ER Section 2.1.2, Proposed Action, provides an overview of the liquid waste treatment systems. From an effluent standpoint, the main feature of the liquid waste treatment is that there are no direct liquid effluents discharged offsite. The primary liquid waste effluents that could contain residual uranic waste include (1) decontamination, laboratory and miscellaneous waste streams and (2) hand wash and shower effluents. Liquids discharged from these paths are collected and sent for offsite disposal. As with the gaseous waste effluents, the major radionuclides in the liquid waste stream are the three isotopes of uranium, ^{238}U, ^{235}U and ^{234}U. Of these, ^{238}U and ^{234}U account for about 97% of the total uranic radioactivity and dominate the dose contribution resulting from offsite releases. Similar to the liquid waste stream, water from other sources, such as site area rain runoff, are also collected onsite in separate collection basins, which allow for evaporation instead of liquid discharges across the site boundary. LES ER Section 3.4.1, Surface Hydrology, also describes the site's groundwater investigation, which indicates the depth to the nearest groundwater aquifer (Santa Rosa) is approximately 340 m (1,115 ft), which is separated from the surface by a thick Chinle clay unit. This aquifer is considered not potable. These site features negate any significant potential that the drinking water exposure pathway could be impacted by routine liquid waste releases.

With normal operations there is not a release pathway related to the routine liquid effluents.

3.11.4.1.3 Direct Radiation Impacts

Storage of feed, product and UBCs at UUSA may have an impact due to direct and scatter (sky shine) radiation to the site boundary, and to lesser extents, offsite locations. The UBC storage on an outdoors pad is the most significant portion of the total direct dose equivalent. Updated estimates of the total direct equivalent are discussed in Section 4.12.6.

3.11.4.1.4 Population Dose Equivalents

The local area population distribution was previously derived from U.S. Census Bureau 2000 data for counties in New Mexico and Texas (DOC, 2000a; DOC, 2000b; DOC, 2000c; DOC, 2000d) that fall all or in part of a 80-km (50-mi) radius of the UUSA site. Shifts in population revealed in the 2010 census are discussed in Supplemental ER Section 3.10, Socioeconomics. Population dose equivalents have not been calculated for the revised numbers in the 2010 census because there remains no change in the location of nearest residents to the site, and because the site total equivalent dose has not increased at the property line due to the proposed facility capacity expansion, see Section 4.12.

3.11.4.2 Mitigation Measures

Although routine operations at UUSA create the potential for radiological and nonradiological impacts on the environment and members of the public, plant design has and will continue to incorporate features to minimize gaseous and liquid effluent releases and to keep them well below regulatory limits. These features include:

- Process systems that handle UF_6 operate at sub-atmospheric pressure, which minimizes outward leakage of UF_6.
- UF_6 cylinders are moved only when cool and when UF_6 is in solid form, which minimizes the risk of inadvertent release due to mishandling.
- Process off-gas from UF_6 purification and other operations passes through desublimers to solidify and reclaim as much UF_6 as possible. Remaining gases pass through high-efficiency filters and chemical absorbers, which remove HF and uranium compounds.

- Waste generated by decontamination of equipment and systems are subjected to processes that segregate uranium compounds and various other heavy metals in the waste material.
- Liquid and solid waste handling systems and techniques are used to control wastes and effluent concentrations.
- Gaseous effluent passes through prefilters, HEPA filters, and activated carbon filters, all of which greatly reduce the radioactivity in the final discharged effluent to very low concentrations.
- Liquid waste is routed to collection tanks, and treated through a combination of treatments and is containerized for solidification and offsite disposal
- Effluent paths are monitored and sampled to assure compliance with regulatory discharge limits.

Under routine operations, the potential that radioactivity from the UBC Storage Pad may impact the public is low because the UBCs are surveyed for external contamination before they are placed on the storage pad. Therefore, rainfall runoff from the pad is not expected to be a significant exposure pathway. Runoff water from the UBC Storage Pad is directed from the UBC Storage Pad to an onsite retention basin for evaporation of the collected water. Periodic sampling of the soil from the basin is performed to identify accumulation or buildup of any residual UBC surface contamination washed off by rainwater to the basin (see Supplemental ER Section 6.1, Radiological Monitoring). No liquids from the retention basin are discharged directly offsite. In addition, direct radiation from the UBC Storage Pad is monitored on a quarterly basis using thermo-luminescent dosimeters (TLDs) and pressurized ion chamber measurements.

3.11.4.3 Public and Occupational Exposure Impacts

The assessment of the dose impacts resulting from the annual liquid and gaseous effluents for the UUSA site indicate that the principal radionuclides with respect to the dose equivalent contribution to individuals are ^{234}U and ^{238}U. Each of these nuclides contributes about the same level of committed dose. The critical organ for all receptor locations was found to be the lung as a result of the pathway. This committed dose equivalent dominated all other exposure pathways by a few orders of magnitude.

Based on initial evaluations of gaseous effluents, the location of highest calculated offsite dose is the South site boundary with an annual effective dose equivalent of $1.7x10^{-4}$ mSv ($1.7x10^{-2}$ mrem), with a maximum annual organ (lung) committed dose of $1.4x10^{-3}$ mSv ($1.4x10^{-1}$ mrem). The nearest resident location had maximum annual effective dose equivalents of (teenager) $1.7x10^{-5}$ mSv ($1.7x10^{-3}$ mrem), or about a factor of 10 lower than the site boundary. The maximum annual organ (lung) at the nearest resident was estimated to be $1.2x10^{-4}$ mSv ($1.2x10^{-2}$ mrem) and was to the teenager age group. The nearest business, which exhibited the highest calculated annual effective dose equivalent, was at a location southeast, approximately 925 m (0.57 mi) from the SBMs and CRDB release points. The annual effective dose equivalent for this location from liquid releases is $2.8x10^{-5}$ mSv ($2.8x10^{-3}$ mrem). The maximum organ (lung) committed dose for this receptor was estimated at $2.3x10^{-4}$ mSv ($2.3x10^{-2}$ mrem) from one year's exposure and intake. Tables 4.12-5 through 4.12-7 provide a breakdown of organ and effective doses by exposure pathway for gaseous effluents.

Although not part of the current operation and not considered as part of the future design, liquid effluents would have resulted in resuspended airborne particles from the dry out of the Treated Effluent Evaporative Basin, and the location of highest calculated offsite dose was the south site

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boundary with an annual effective dose equivalent of $1.7x10^{-5}$ mSv ($1.7x10^{-3}$ mrem) and maximum annual organ (lung) committed dose of $1.5x10^{-4}$ mSv ($1.5x10^{-2}$ mrem). The previous evaluation of the contribution from the Treated Effluent Evaporative Basin is found at LES ER Section 3.11.2.2.

LES ER Table 4.12-12 provides the previously evaluated impact from liquid, gases, and fixed radiation sources. The previous evaluation illustrated that the annual total effective dose equivalent (TEDE) at the maximum exposure point is estimated to be 0.19 mSv (19 mrem) assuming storage associated with a facility capacity of 3.0 MSWU. The calculated dose equivalents are all below the 1 mSv (100 mrem/yr) TEDE requirement per 10 CFR 20.1301, and also within the 0.25 mSv (25 mrem/yr) dose equivalent to the whole body and any organ as indicated in 40 CFR 190. Previous impact assessments utilized assumptions have been refined for the assessment of impacts due to the proposed facility capacity expansion and are described in Section 4.12 of the Supplemental ER.

Supplemental ER Table 4.12-3, Collective Dose Equivalents to All Ages Population (Person-Sieverts) and Supplemental ER Table 4.12-4, Collective Dose Equivalents to All Ages Population (Person-rem) provide the previously estimated collective effective dose equivalent to the 80-km (50-mi) population (all age and exposure pathways). The estimated dose is $5.2x10^{-5}$ Person-Sv ($5.2x10^{-3}$ Person-rem). This is a small fraction of the collective dose from natural background for the same population.

In addition to members of the public along the site boundary and beyond, estimates of annual facility area radiation dose rates were made along with projections of occupational (UUSA worker) personnel exposures during normal operations. LES ER Table 4.12-13, Estimated UUSA Occupational Dose Equivalent Rates and LES ER Table 4.12-14, Estimated UUSA Occupational (Individual) Exposures summarize the annual dose equivalent rates and projected dose impact for different areas and compounds (i.e., cylinders) of the plant, and for different work functions for employees. Section 4.1 of the UUSA Safety Analysis Report (SAR) provides a detailed description of the UUSA radiation protection program for controlling and limiting occupational exposures for plant workers.

3.12 Waste Management

Section 3.12 of the LES ER describes the site's waste management. This discussion is intended to supplement the LES ER with a discussion of more recent waste management activities. It incorporates the Section 3.12 of the LES ER by reference. Current operational metrics are provided in Section 1.2 Current Operational Information and Status.

For the proposed action of the facility capacity expansion to 10 MSWU, waste management at the current operating facilities have been reevaluated and the changes to the systems and volumes are discussed in this section and Section 4.13. Specifically, this section describes the proposed changes in management of liquid radioactive wastes (shipment to offsite disposal as either liquid or solidified waste versus onsite treatment by evaporation).

Waste Management for UUSA is divided into gaseous and liquid effluents, and solid wastes.

3.12.1 Effluent Systems

The following paragraphs provide a comprehensive description of UUSA systems that handle gaseous and liquid effluent.

3.12.1.1 *(See SAR § 12.2.1.8 and 12.5.1.5)* Gaseous Effluent Vent Systems (GEVS)

The function and design criteria for the Gaseous Effluent Vent System (GEVS) is discussed in LES ER Section 3.12.1.1.

3.12.1.2 Pumped Extract and Local Extract GEVS

The Pumped Extract GEVS, a Safe-By-Design[8] system, provides exhaust of potentially hazardous contaminants for the SBMs from all permanently connected vacuum pump and trap sets as well as temporary connections used by maintenance and sampling rigs. The Pumped Extract GEVS is located in the UF_6 Handling Area.

The Local Extract GEVS services the SBM and CRDB functions primarily associated with point-of-use vacuum hoses. Some of the activities carried out in the SBM and CRDB give rise to potentially contaminated gaseous streams that require treatment before being discharged to the atmosphere. The stream carried by the Local Extract GEVS consists of air with trace quantities of HF and uranics, which are mainly uranyl fluoride (UO_2F_2). The Local Extract GEVS is a sub-atmospheric ductwork and pipe system that transports the trace amounts of potentially contaminated gases expected to be released into the system to a set of filters and fans and ultimately to the atmosphere.

3.12.1.3 CRDB GEVS

The CRDB GEVS provides exhaust of potentially hazardous contaminants from rooms and services within the CRDB Bunkered Area. The system is located in the CRDB's GEVS Room and is monitored from the Control Room. The existing CRDB will also service a portion of the proposed facility capacity expansion (through the operation of SBM-1005) and therefore this

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[8] Safe-by-design components are those components that by their physical size or arrangement have been shown to have a $k_{eff} < 0.95$.

system as currently operating will not be modified under the proposed action. The function and design of this system is included in LES ER, Section 3.12.1.1.4.1.

3.12.2 Design and Safety Features for all GEVS

The Pumped Extract GEVS, Local Extract GEVS and CRDB GEVS will continue to be designed and operated to protect plant personnel, the public, and the environment against uranium and HF exposure.

These system features will be expanded with the additional GEVS constructed for the proposed action.

3.12.3 Effluent Releases

The annual discharge of uranium in routine gaseous effluent discharged from UUSA is expected to be less than 10 grams (0.35 ounces). The environmental impacts of gaseous releases and associated doses to the public are described in detail in ER Section 3.11.3, Routine Gaseous Effluent.

3.12.4 Centrifuge Test and Post Mortem Facilities Exhaust Filtration System

The Centrifuge Test and Post Mortem Facilities Exhaust Filtration System provides exhaust of potentially hazardous contaminants from the Centrifuge Test and Post Mortem Facilities. The system also ensures the Centrifuge Test and Post Mortem Facility is maintained at a negative pressure with respect to adjacent areas during contaminated or potentially contaminated processes. The Centrifuge Test and Post Mortem Facilities Exhaust Filtration System is located in the Centrifuge Assembly Building and is monitored from the Control Room. This system will remain unchanged through the proposed facility capacity expansion and is described in the LES ER, Section 3.12.2.

3.12.5 (See SAR § 12.6.1.1 and 12.7.2.2) Liquid Effluent Collection and Treatment System (LECTS)

Quantities of radiologically contaminated, potentially radiologically contaminated, and nonradiologically contaminated aqueous liquid effluents are generated in a variety of operations and processes in the CRDB and in the SBMs. The majority of potentially radiologically contaminated aqueous liquid effluents are generated in the CRDB. All aqueous liquid effluents are collected in tanks that are located in the Liquid Effluent Collection and Treatment Room in the CRDB. The processes generating these waste streams are described in LES ER, Section 3.12.1.3.

Liquid effluent found to have radiological contamination will be stored in the LECTS room Bulk Storage Tank array and then disposed of off-site via the following mechanisms in compliance with the Department of Transportation (DOT) shipping requirements:

- Aqueous waste batches with a ^{235}U DOT exempt level of 15 grams or less will be containerized and transported to a properly permitted off-site facility for solidification and disposal. These totes or drums will likely be transported to the Clive, Utah disposal facility for solidification.

- Aqueous waste batches with a ^{235}U content of greater than 15 grams will be solidified by the disposal vendor onsite at a campaign based facility and then transported to the contracted radiological disposal site for final disposal. Solidification will be by addition of grout, which will increase both the volume and weight of the waste stream. It is anticipated up to 90% of the liquid radiological effluents will be managed in this manner.

This waste management process will continue through the proposed facility capacity expansion.

Under the proposed action the Cooling Tower Blowdown Effluent will continue to discharge to a separate onsite basin, the UBC Storage Pad Stormwater Retention Basin. The single-lined retention basin is used for the collection and monitoring of rainwater runoff from the UBC Storage Pad and to collect cooling tower blowdown. The proposed action does not increase the number of cooling towers onsite and therefore does not increase the cooling water blowdown effluent volumes from the current levels. A second unlined basin is used for the collection and monitoring of general site stormwater runoff. Sanitary wastewater will continue to be sent to the City of Eunice Wastewater Treatment Plant for processing.

3.12.6 Solid Waste Management

Solid waste that will continue to be generated at UUSA can be grouped into industrial landfill, universal, medical (infectious), radioactive, mixed, nonhazardous, and hazardous waste categories. Solid radioactive and mixed wastes are further segregated according to the quantity of liquid that is not readily separable from the solid material. The solid waste management systems are a set of facilities, administrative procedures, and practices that will continue through the proposed facility capacity expansion to provide for the collection, temporary storage, and offsite disposal of categorized solid waste in accordance with regulatory requirements. All solid radioactive wastes generated are Class A low-level wastes (LLW) as defined in 10 CFR 61. The nature of the anticipated waste generation is described in LES ER Section 3.12.2.

3.12.7 Depleted UF_6

The enrichment process yields depleted UF_6 streams with assays ranging from 0.1 to 0.5 $^{w}/_{o}$ ^{235}U. UUSA does not consider this material a "waste" but rather a process byproduct with continued value for reprocessing. No reprocessing is currently being proposed for the UUSA Site, but it is anticipated the depleted UF_6 will be stored onsite for a period approaching 25 years as allowed under New Mexico agreements. The amount and rate of depleted UF_6 generation evaluated in the initial EIS was 8,600 tons.

The UBC Storage Pad consists of an outdoor storage area with cradles on which the cylinders rest. A mobile transporter transfers cylinders from the Cylinder Receipt and Dispatch Building (CRDB) to the UBC Storage Pad. UBC cylinder transport between each SBM and the storage area is discussed in the Safety Analysis Report Section 3.4.11.2, Cylinder Transport Within the Facility. Refer to ER Section 4.13.5.2, Radioactive and Mixed Waste Disposal Plan, for information regarding UUSA's depleted UF_6 management practices and UBC disposition.

Storage of UBC will be for a temporary period until shipped offsite for use or deconversion. Refer to ER Section 4.13.8 for the range of options for UBC disposition.

3.12.8 Construction Wastes

Efforts are made to minimize the environmental impact of ongoing construction. Erosion, sedimentation, dust, smoke, noise, unsightly landscape, and waste disposal are controlled to practical levels and permissible limits, where such limits are specified by regulatory authorities. In the absence of such regulations, UUSA will ensure that ongoing construction proceeds in an efficient and expeditious manner, remaining mindful of the need to minimize environmental impacts. Construction wastes generated during the course of ongoing construction have been previously described in LES ER Section 3.12.2.2.

3.12.9 Effluent and Solid Waste Quantities

3.12.9.1 Non-Radioactive Waste Water and the Treated Effluent Evaporative Basin

The LES ER and 2005 EIS projected that the currently licensed UUSA 3.0 MSWU facility would generate approximately 662,033 gallons of non-radioactive waste water, entirely from laundry and hand wash/showers (NUREG-1790 at Figure 2-10). This non-radioactive waste water was to have been captured and evaporated in the Treated Effluent Evaporative Basin.

However, as the UUSA production and support facility design evolved, the UUSA facility no longer needed to generate this waste water. The laundry was eliminated and the hand wash/shower functions were consolidated in the Technical Service Building. These bathroom and locker facilities are not in a radiological area and the effluent from these facilities is disposed of via the UUSA sanitary sewer line to the treatment plant in Eunice, NM.

Due to the elimination of the Treated Effluent Evaporative Basin (TEEB) and some of the support systems that fed the TEEB, a fraction of the effluent intended for the TEEB was re-routed to Eunice Waste Water Treatment Plant (WWTP). An evaluation was performed by Molzen-Corbin & Associates of the Eunice WWTP and established that "based on a review of the WWTP design, it is in [their] professional opinion that the city of Eunice's WWTP will be able to adequately handle the LES sewer discharge of 20,000 gallons per day," (See Molzen-Corbin & Associates letter to NMED Ground Water Quality Bureau dated November 14, 2008 - (IN-08-00194-OTHER)). The re-routing of this fraction of effluent does not challenge the estimated 20,000 gallons per day established for the entire UUSA facility. Therefore, a formal environmental impact assessment was not performed.

These two non-radioactive waste-water streams accounted for 662,033 gallons of the 670,000 gallons proposed for evaporation in the Treated Effluent Evaporative Basin in the 2005 EIS (NUREG-1790 at Figure 2-10). With the elimination of the hand wash, shower and laundry waste water streams (99% of the projected flows) the Treated Effluent Evaporative Basin was and is no longer viable.

3.12.9.2 Radioactive Liquid Waste

The LES ER projected that approximately 7,851 gallons of radioactive liquid waste would be generated and subsequently captured and evaporated in the Treated Effluent Evaporative Basin. However, as described above, without the 662,033 gallons of non-radioactive waste-water, the Treated Effluent Evaporation Basin system was no longer viable. Instead, UUSA has determined that it would utilize solidification as its treatment mechanism for radioactive liquid waste. The license amendment process to remove the Treated Effluent Evaporative Basin from the licensing design basis is included as part of the current license amendment application, as is utilizing solidification as our treatment mechanism instead.

Without the Treated Effluent Evaporative Basin, the quantity of liquid radiological wastes expected to be produced annually through the full construction and operation of SBM-1001 and 1003 has increased from 7,851 to approximately 28,000 gallons. See Supplemental ER Table 3.12-2. This increase is also due to the following:

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- Emergency shower flows were added from the CRDB (7,560 gallons)

- Spent degreaser and spent citric acid waste stream projections were increased by approximately 12,000 gallons following analysis of the most recent pump decontamination waste water flows from the Almelo, NL site

This predicted amount (28,000 gallons) has not yet been generated because the decontamination train and chemistry laboratories in the CRDB are not yet operational.

This increase in projected liquid waste quantities for the currently licensed facility will not have significant environmental impacts. Sections 3.2, 3.12, and 4.13 demonstrate that the total of these revised liquid waste quantities and the quantities expected with the expansion, will not have significant transportation, public and occupational health, or waste impacts. In addition, not building the Treated Effluent Evaporative Basin eliminates a source of radiation at the UUSA site. See Supplemental ER Section 3.12.9.

The following tables have been included in this section to address radiological wastes: Table 3.12-1, June 2010 (Plant Startup) to December 31, 2012 Solid Radiological Waste and Table 3.12-2, Projected Annual Radiological Waste Generation through Nominal 3.0 MSWU Capacity.

3.12.9.3 Solid Wastes

The annual amounts of office, packaging and cafeteria waste and hazardous wastes generated due to current operations are as described in the LES ER Section 3.12.3.

3.12.9.4 Resources and Materials Used, Consumed or Stored During Construction and Operation

Construction commodities will continue to be used, consumed, or stored at the site to support ongoing construction. Resources, materials and construction commodities were described in LES ER Section 3.12.4. Usage and storage is anticipated to be proportional to previous construction activities.

3.12.10 Section 3.12 Tables

Table 3.12-1 June 2010 (Plant Startup) to December 31, 2012 Solid Radiological Waste

Solid Radiological Waste	2010 Startup to 2012 Present			
Assorted paper, rubber & cloth materials [1]	1,417	kg	3,124	lbs
Ventilation filters [1& 3]	57	kg	125	lbs
Totals	**1,148**	**kg**	**2,525**	**lbs**

[1] Does not include three 55-gal drums of material that were unconditionally released as clean in August 2010

[2] May be possible to have filters unconditionally released as clean

[3] The facility capacity as of January 2013 had not yet reached the 3.0 MSWU capacity, therefore the ventilation filter production has been below projected values. The projected numbers are conservative estimates based on operational experience from our sister facility. Until recently (February 2013 for the Chemistry Laboratory), the Cylinder Receipt and Dispatch Building (CRDB) was not approved for use and the Decontamination System within the CRDB is still unapproved for use. The CRDB and more specifically, the Decontamination System is anticipated to be a significant contributor to ventilation filter production.

Table 3.12-2 Projected Annual Radiological Waste Generation through Nominal 3.0 MSWU Capacity

Radiological Waste	Annual Projection			
Activated carbon	300	kg	662	lbs
Activated alumina	2,160	kg	4,763	lbs
Assorted paper, rubber & cloth materials	2,100	kg	4,631	lbs
Ventilation filters **	30,735	kg	67,753	lbs
Liquid Radiological Waste	10,660	kg	23,500	lbs
Solidified Waste Water	312,528	kg	689,000	lbs
Totals	**358,483**	**Kg**	**790,309**	**lbs**

** May be possible to have filters unconditionally released as clean

Basis of estimated quantities is operational experience of URENCO's Almelo facility in the Netherlands

Quantity of solidified waste water includes a significant weight increase factor (i.e.: 3-4 times) due to solidification process

Table 3.12-3 Estimated Annual Gaseous Effluent (10 MWSU facility)

Area	Quantity (yr^{-1})	Discharge Rate m^3/yr (SCF/yr) (STP)
GEVS (Note 1)	NA	3.96×10^8 (1.40×10^{10})
HVAC Systems	NA	NA
Radiological Areas	NA	1.5×10^9 (max) (5.17×10^{10})
Non-Radiological Areas	NA	1.0×10^9 (max) (3.54×10^{10})
Total Gaseous HVAC Discharge	NA	2.5×10^9 (max) (8.71×10^{10})
Constituents:		
Helium	440 m^3 (STP) (15,540 ft^3)	NA
Nitrogen	52 m^3 (STP) (1,836 ft^3)	NA
Ethanol	40 L (10.6 gal)	NA
Laboratory Compounds	Traces (HF)	NA
Argon	190 m^3 (STP) (6,709 ft^3)	NA
Hydrogen Fluoride	<1.0 kg (<2.2 lb)	NA
Uranium	<10 g (<0.0221 lb)	NA
Methylene Chloride	610 L (161 gal)	NA

NA – Not Applicable

Note 1. This includes the monitored gaseous discharges from PXGEVS, LXGEVS, CRDB GEVS, and the Centrifuge Test and Post Mortem Facilities Exhaust Filtration System.