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LES-13-00082-NRC

ATTN: Document Control Desk
Director, Division of Security Operations
Office of Nuclear Security and Incident Response
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Louisiana Energy Services, LLC
NRC Docket Number: 70-3103

Subject: Response to NRC Request for Additional Information on License Amendment Request (LAR) 12-10 Capacity Expansion of UUSA Facility (TAC L34193)

Reference:

1. IN-13-00061-NRC, First Request for Additional Information for License Amendment Request 12-10 Related to the Environmental Assessment for Capacity Expansion of URNCEO USA Facility, dated June 7, 2012
2. LES-12-00162-NRC, License Amendment Request for Capacity Expansion of URENCO USA Facility (LAR-12-10), dated November 9, 2012

Pursuant to the Ref. 1 Request for Additional Information (RAI) regarding the Ref. 2 License Amendment Request (LAR), Louisiana Energy Services, LLC (dba URENCO USA "UUSA") herewith provides the enclosed response.

UUSA appreciates the efforts of the NRC staff in supporting the review and approval of this License Amendment Request in a timely manner. Should there be any questions, please contact Timothy Knowles, UUSA Licensing and Performance Assessment Manager, at 575.394.6212.

Respectfully,

Jay Laughlin
Chief Nuclear Officer and Head of Operations

Enclosures:

1) Response to Request for Additional Information
2) Potential Doses Due to Effluent Discharges from the NEF, New Mexico Site" Areva 2003
3) National Enrichment Facility REMP 2008 (ML090970289, 2006 – 2008)
4) 2009 NEF REMP Report (ML100900468, 2009)
5) REMP Report 1-1-2010 to 12-31-2010 (ML110940408, 2010)

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6) NRC Annual Radiological Environmental Monitoring Program (REMP) Report (ML12086A310, 2011)
7) Power Consumption Forecast 2012
8) Monthly Electric Bill
9) Xcel Energy Interconnection Study

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Enclosure 1

Response to Request for Additional Information

<u>RAI 1</u>: Provide clarification and additional information regarding radioactive material shipment.

a. Provide additional information on the shipment of product cylinders. Section 3.2.2.2 of the Environmental Report (ER), Rev. 21 (UUSA, 2012), states that approximately 220 product shipments/year would occur based on four cylinders per shipment (880 cylinders/year, consistent with Section 4.2.7.2 of ER, Rev. 21 (UUSA, 2012)). However, Section 3.2.4 of the Supplemental ER, Rev. 4b (UUSA, 2013), states that a typical shipment contains only two cylinders per truck. Which of the two statements is more consistent with current and future operations? Clarify what the expected average annual number of product shipments, and number of product cylinders per shipment, will be for the 10 million separative work units (MSWU) facility.

b. Provide the number of shipments associated with each set of impact calculations presented in Tables 4.2-2 through 4.2-4 of ER Rev. 21 (UUSA, 2012), and clarify that these are annual impacts.

c. Provide the RADTRAN computer code assumptions and calculations performed in support of incident-free and accident risk analyses for radioactive material transportation, including the RADTRAN input and output files with an explanation for the package or shipment-specific input parameters used (i.e., radionuclide inventory, package size, and external dose rates).

This information is needed to properly assess the potential impacts of transportation of radioactive material to and from the URENCO USA (UUSA) site during operations.

<u>UUSA response to (1)</u>

a) Section 3.2.4 of the Supplemental Environmental Report states: "typically two per truck although up to six product cylinders could be transported on the same truck."

However correct as written that up to six cylinders could be transported, normal shipments occur in two types. Four cylinders will be shipped in a single shipment if it is intended to travel via ocean cargo vessel. Six cylinders will be shipped in a single shipment if travel is solely by road. The average number of product cylinders is correct as discussed. To clarify, approximately 880 cylinders per year will be transported. UUSA used the more conservative shipping estimate of only 4 cylinders per shipment. Therefore increasing the total number of shipments, leading to a conservative estimate of total shipments when calculating cumulative shipments.

b) Impact calculations are described in Table 4.2-2 are based upon total number of cylinders per shipment. This is footnoted as #5 which states: "Type and number of containers shipped per year given parenthetically." Footnote 1 associated with table 4.2.3 discusses that only two cylinders are shipped per product shipments. Table 4.2-2 therefore uses 350 cylinders per year. This is correlated in table 4.2-3 using the conservative higher estimate of 175 total shipments.

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Table 4.2-2 of ER Rev. 21 (UUSA, 2012) is discussed in Section 4.2.7.6, Incident-Free Scenario Dose. All calculation in this section are performed on a per year basis and therefore this information is transcribed in to the table on an annual basis.

Table 4.2-3 of ER Rev. 21 (UUSA, 2012) is discussed in Section 4.2.3 Traffic Pattern Impacts. Section 4.2.3 discusses that shipments are calculated on an annual or per year basis.

Table 4.2-4 does not exist in ER Rev. 21 (UUSA, 2012).

c) During an initial visit this topic was discussed with NRC contractors performing the Environmental Assessment expansion License Amendment Request. As such UUSA contractors are currently performing calculations to provide a response. Response is expected no later than 15 August 2013.

RAI 2: Provide additional information on cumulative radiological transportation impacts.

Section 4.2.8 of the Supplemental ER, Rev. 4b (UUSA, 2013), discusses the potential cumulative impacts from transportation associated with the proposed UUSA facility capacity expansion (i.e., UUSA, U.S. Department of Energy Waste Isolation Pilot Plant, and International Isotopes Fluorine Products Plant shipment impacts). However, no discussion is included on any radiological impacts associated with radioactive waste shipments going to the Waste Control Specialists (WCS) disposal facility that is located adjacent to the UUSA site. Provide a discussion on the radioactive waste shipments going to the WCS disposal facility and the related cumulative radiological transportation risks associated with the proposed UUSA facility capacity expansion.

This information is needed to properly assess the potential cumulative impacts of transportation of radioactive material to and from the UUSA site during operations.

UUSA response to (2)

Section 4.2.8 states:

4.2.8 Cumulative Impacts

The ongoing construction, operation, and decommissioning of the UUSA through the proposed facility capacity expansion would result in a small to moderate impact due to traffic from commuting construction workers and operational personnel. There will be increased shipments of radiological materials to and from the UUSA facility due to the proposed facility capacity expansion. Cumulative impacts associated with transportation of radiological materials will occur with the recent licensing of the WCS facility as a disposal location, which is nearly adjacent to the UUSA facility. It is anticipated the cumulative impact to the state highway systems that service the facilities (NM176 and TX 176) will be minimal as there is sufficient capacity on these major roadways. No cumulative impact is anticipated due to other energy projects in the vicinity due to existing development in the nearby areas or due to the WIIP project, which is a significant distance from the UUSA site. There are potential cumulative impacts from the proposed construction and operation of the IIFP facility in Hobbs, New Mexico as this facility is anticipated to receive depleted materials from UUSA for deconversion processes. The proposed IIFP site will be located approximately 20 miles from the UUSA site. It is anticipated the IIFP site will also receive depleted materials from other sources along the same or similar transportation routes. The EIS for the IIFP site concluded that the radiological impacts associated with combined Phase 1 and Phase 2 operations at IIFP would result in a total population dose of 1.7 person-Sv (170 person-rem) annually. Statistically, this dose could result in 0.10 LCFs annually. When combined with the radiological transportation impacts from operation of the UUSA facility (0.1 LCFs over the facility life) and radiological transportation impacts from the WIPP (less than 1 LCF annually), the NRC staff found that the cumulative radiological impacts from transportation would be SMALL (less than 1 LCF annually) (IIFP, 2009a). The radiological transportation impacts evaluated for the UUSA proposed facility capacity expansion remain less than 1 LCF annually, and the evaluation of the cumulative impacts from these projects will remain small as evaluated recently by NRC on the IIFP evaluation.

With the implementation of all current and planned or proposed future actions within the vicinity of the existing UUSA facility traffic volumes would contribute to cumulative impacts. However, no changes are anticipated in the small to moderate cumulative effects for nonradiological or radiological transportation.

Section 4.2.8 describes cumulative radiological transportation impacts due to the neighboring facilities. Latent Cancer Fatalities (LCF) are correlated to each corresponding site. Waste Control Specialist is considered in this calculation though a number is not directly associated with this facility. The International Isotopes Fluorine Products (IIFP) NUREG-2113, "Safety Evaluation Report for the International Isotopes Fluorine Products, Inc. Fluorine Extraction Process and Depleted Uranium Deconversion Plant in Lea County, New Mexico", considers the LCF of WCS and is therefore considered in section 4.2.8.

NUREG-2113 Section 4.2.2.9 Traffic and Transportation discuss Latent Cancer Fatalities of the combined use of all facilities including Waste Control Specialist. The number of Shipments to WCS is discussed in table 4-36 and Annual Accident Dose-Risk and LCF-Risk from Radiological Transportation is discussed in table 4-37. Appendix E of NUREG 2113 provides more discussion on the results of table 4-37.

RAI 3: Provide additional information on radiological impacts to construction workers during the construction of the facility expansion.

Section 4.12.6 of the Supplemental ER (UUSA 2013) discusses the potential external radiation hazard at the site fence line from the Uranium Byproduct Cylinder (UBC) Storage Pad. However, the estimated radiation dose to the onsite construction worker would be greater than the estimated dose at the facility fence line because the construction worker would be much closer to the UBC Storage Pad and the Cylinder Receipt and Dispatch Building (CRDB) than the fence line. At different phases of construction, the estimated number of cylinders stored at the UBC Storage Pad and CRDB may be different and construction workers may be exposed to gaseous effluent releases from the additional Separation Building Modules (SBM) as they are brought online (according to Sections 4.10.1 and 4.13.1.1 of the Supplemental ER, the initial construction of the site is anticipated to be completed in 2013 and the construction period for the proposed facility capacity expansion would continue approximately 8 years beyond the initial construction period).

a. Provide the locations and average numbers of construction workers with respect to existing radiological hazards from facility operations during the different phases of construction.

b. Provide the estimated doses to construction workers from all applicable exposure pathways during the different phases of construction for the facility capacity expansion. Include the exposure to gaseous effluent releases and direct external exposure from the UBC Storage Pad and cylinders stored in the CRDB.

This information is needed to properly assess the radiological human health impacts to construction workers from operations at the UUSA facility.

<u>UUSA response to (3) (a) & (b)</u>

Previous NRC request, NRC Correspondence, dated April 25, First Request for Additional Information for License Amendment Request 12-10 Related to the Safety Analysis Report for Capacity Expansion of URENCO USA Facility (TAC L34193) posed a similar question. This question is being answered in LES-13-00068-NRC Response to RAI on LAR 12-10 Expansion of UUSA Facility. The direct/external dose exposure to the construction workers will be addressed by these calculations. Calculations will have to be modified by UUSA contractors to ensure that the question is being adequately addressed. Response is expected to be completed no later than 15 August 2013.

b). the calculation does not include contributions from gaseous effluent releases. Contribution from gaseous effluent releases has been and is expected to remain non-appreciable.

UUSA Semi-Annual Radiological Effluent Release Reports (SARERR) previously submitted to the NRC for facility operational periods of January 2009 through December 2013 document that the facility gaseous effluent discharges are historically below Minimum Detectable Activity (MDA) and/or Lower Level of Detection (LLD). The historical discharge values, partnered with the effluent ventilation system design to cease discharges when filter saturation is suspected, indicate that the gaseous effluent exposures to site personnel are not appreciable.

<u>The SARERRs reviewed include:</u>
NEF-09-00164-NRC (AUG 26 2009)
NEF-10-00042-NRC (FEB 26 2010)
LES-10-00202-NRC (SEP 24 2010)
LES-11-00014-NRC (FEB 23 2011)
LES-11-00121-NRC (AUG 24 2011)
LES-12-00031-NRC (MAR 01 2012)
LES-12-00130-NRC (AUG 20 2012)
LES-13-00033-NRC (FEB 28 2013)

<u>RAI 4</u>: Provide additional information on expected external dose rate estimates from the UBC Storage Pad.

The estimated direct exposure from the UBC Storage Pad (capacity of 25,000 UBCs, plus a quantity of empty feed and empty clean product cylinders – total 28,500 cylinders) and the CRDB provided in Table 4.12-1 for the 10 MSWU facility in the Supplemental ER, Rev. 4b (UUSA, 2013), is much lower than the estimated direct exposure in Table 4.12-1 of the National Enrichment Facility (NEF) ER Report, Rev. 5 (Louisiana Energy Service, 2005). The lower estimated dose from the UBC Storage Pad with more cylinders for the proposed expansion is the result of removing some excessive conservatism associated with the dose estimation method. Provide the updated estimated direct exposure from the storage pad and CDRB in the NEF ER, Rev. 5, Table 4.12-1 using the new dose estimation method. Provide a copy of the reference document (UUSA, 2012, Radiation Dose Rate Calculation of the Site Boundary due to UBC Storage Pad Expansion, CALC-S-00141, Rev.1, URENCO USA, August 2012) with the response.

This information is needed to properly assess radiological human health impacts from the storage of uranium hexafluoride cylinders at the UUSA facility during facility capacity expansion and during current and future operations. The information will also be used to better compare the radiological human health impacts from an updated Table 4.12-1 from the NEF ER Report, Rev. 5 (LES, 2005), to the impact during facility capacity expansion and during current and future operations.

<u>UUSA response to (4)</u>

Previous NRC request, NRC Correspondence, NRC Correspondence, dated April 25, First Request for Additional Information for License Amendment Request 12-10 Related to the Safety Analysis Report for Capacity Expansion of URENCO USA Facility (TAC L34193) posed the same question. This question was answered in LES-13-00068-NRC Response to RAI on LAR 12-10 Expansion of UUSA Facility. See below for reference:

<u>NRC Request (C)</u>

1. Table 4.1-2 lists a dose rate of < 0.01 mrem/hr for the plant general area excluding the separations building modules. Provide estimated dose rates in occupied areas close to the expanded uranium byproduct storage pad and describe the considerations given to these dose rates in the assessment of expanded facility operations.

<u>UUSA Response to (C) 1</u>

UUSA is currently awaiting revised analytical data to support calculations to support this response. UUSA received verbal acknowledgement from the NRC Project Manager that the response is expected to be completed no later than July 31, 2013.

RAI 5: Provide additional information on radiological air emissions during operation of the expanded UUSA facility and associated dose estimations.

Annual air emission values of 800 microcuries/year (µCi/yr) and 240 µCi/yr were used in the ER (UUSA, 2012) and Supplemental ER (UUSA, 2013) to estimate the bounding and average potential doses, respectively, to members of the public associated with the routine operation of the proposed 10 MSWU facility. Provide the expected isotopic release mix in the gaseous effluent releases for each of the two annual air emission values. Also provide the input and output files for the dose estimations for the proposed 10 MSWU facility.

This information is needed to properly assess radiological human health impacts to members of the public from routine air emissions during operation of the proposed expanded UUSA facility.

UUSA response to (5)

Our average source term releases to the atmosphere were estimated to be 29.7 MBq (800 µCi) per year for the purposes of bounding routine operational impacts and based on URENCO's experience in Europe.

See Enclosure #2 "Potential Doses Due to Effluent Discharges from the NEF, New Mexico Site" Areva 2003. This was the basis of our assumptions and documents our input/output data and the assumed isotopic release mix.

RAI 6: Provide additional information on the UUSA radiological environmental monitoring.

Environmental monitoring was started in 2006 at the UUSA site. The facility has been operational for the last 3 years, and the site is submitting part of the annual Radiological Monitoring Program (REMP) report to the U.S. Nuclear Regulatory Commission (NRC). The parts submitted include, the cover letter, Table of Contents, and the Executive Summary for the monitoring events on and in the immediate area of the facility. Provide complete copies of all of the REMP reports. The reports include those summarized in ADAMS documents with the following ADAMS Accession Numbers: ML090970289 (2006 – 2008), ML100900468 (2009), ML110940408 (2010), and ML12086A310 (2011). Also include the report for 2012 is now available.

This information is needed to properly document the REMP in the Environmental Assessment (EA) and to assess any changes at the site after the start of operations.

UUSA response to (6)

- Enclosure 3, National Enrichment Facility REMP 2008 (ML090970289, 2006 – 2008)
- Enclosure 4, 2009 NEF REMP Report (ML100900468, 2009)
- Enclosure 5, REMP Report 1-1-2010 to 12-31-2010 (ML110940408, 2010)

- Enclosure 6, LES-12-00041-NRC Annual Radiological Environmental Monitoring Program (REMP) Report (ML12086A310, 2011)

Changes made to the Environmental Report in CC-EN-2012-0001, replace Section 6.1 with the correct regulatory requirement for a Semi- Annual Radiological Release Report per 10 CFR 70.59. Thusly, there is no report available for 2012.

RAI 7: Provide additional information on the electric power requirements for the proposed expanded UUSA facility.

The electric power requirement to operate the proposed 10 MSWU facility is expected to be approximately 62 MVA, which is 42 MVA above that for the 3 MSWU facility. Provide documentation that:

a. The 3 MSWU facility is anticipated to require about 20 MVA Section 2.1.12.2.6 of the Supplemental ER (UUSA, 2013) and the proposed 10 MSWU facility is expected to require about 67 MVA Section 2.1.12.2.6 of the Supplemental ER (UUSA, 2013);

b. Shows the current power consumption of the existing facility and the maximum amount of power that Xcel (the power provider) can provide to UUSA on the existing transmission lines;

c. The current transmission lines providing power to the UUSA facility are capable of handling the increased power load for the proposed 10 MSWU facility; and

d. Xcel does not have to add extra generating capacity to support the expansion.

This information is needed to verify that no additional actions such as transmission line upgrades/replacement or additional construction and operation of power generation facilities is necessary for expansion of the UUSA facility. Otherwise, it would be necessary to address the environmental impacts of such additional actions in the EA.

UUSA response to (7)

a) It was projected that the 10MSWU facility will require roughly 52MVA of load. See Enclosure 7, "Power Consumption Forecast 2012" for documentation. This forecast is based upon field data taken by Plant Engineering. The final results show the Phase 2 (3MSWU) facility load at approximately 18.263 MVA and the Phase 4 (10MSWU) facility load at approximately 52.478 MVA.

b) See Enclosure 8, Monthly Electric Bill, this bill provides documentation of the latest power usage numbers (demand and consumption). A formal request has been sent to Xcel Energy for an estimate of the maximum capacity of the existing lines. Xcel will provide UUSA this data upon completion of their process. Also See Enclosure 9 "Xcel Energy Interconnection Study" requested to ensure adequate capacity for the complete of Phase 3 construction.

c) A formal request has been sent to Xcel Energy for an estimate of the maximum capacity of the existing lines. Xcel will provide UUSA this data upon completion of their process.

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d) A formal request has been sent to Xcel Energy for an estimate of the maximum capacity of the existing lines. Xcel will provide UUSA this data upon completion of their process.

<u>RAI 8</u>: Provide an updated rationale for the purpose and need for the capacity expansion of the UUSA facility.

a. In the ER (UUSA, 2012) and Supplemental ER, Rev. 4b, Section 1.1.4 (UUSA, 2013), the basis document for the annual demand for enrichment services in the United States, Energy Information Administration (EIA), DOE, "U.S. Nuclear Fuel Cycle Projections 2000-2025," 2003 (EIA, 2003), is 10 years old. During the General Electric (GE)-Hitachi Global Laser Enrichment LLC (GLE) mandatory hearing in 2012, the Atomic Safety and Licensing Board (ASLB) questioned why the forecasts for annual demand for enrichment services are based on 2003 projections. Given the economic turmoil in the past few years, the ASLB asked if these forecasts are accurate. Also the ASLB questioned if the domestic and international demand for low enriched uranium may be affected by the Fukushima Daiichi accident and international economic downturn (ASLB, 2012). Provide an updated purpose and need analysis using updated projections that reflect current conditions and potential future needs for enriched uranium.

b. In addition, the license granted to AREVA Enrichment Services LLC for the Eagle Rock Enrichment Facility (EREF) on October 12, 2011, is for a capacity of 6.6 MSWU, not 3.0 MSWU as considered in the ER (UUSA, 2012) and Supplemental ER (UUSA, 2013). Use the correct license capacity for EREF in the updated purpose and need analysis requested in the RAI8a above

This information is needed to justify the need to expand the capacity of the UUSA facility.

<u>UUSA response to (8)</u>

Email communication between Mr. Timothy Knowles and Mr. Mike Raddatz provided further clarification. Thusly, the NRC has provided the following question on July 1 2013. URENCO USA will provide a response no later than 31 July 2013.

RAI 8 requests for UUSA to provide an independent assessment of the purpose and need using updated projections that reflect current conditions and potential future needs for enriched uranium. The NRC staff provided a response to this request to the Atomic Safety and Licensing Board (ASLB) in the licensing proceedings for the proposed GE-Hitachi Global Laser Enrichment facility. As was explained to the ASLB the staff relied on those projections because they were the best publicly available information at the time of the development of the final environmental impact statement of the proposed GE-Hitachi Global Laser Enrichment facility. Thus the reason for RAI 8 is because of the following:

1. The ASLB hearing mentioned above occurred in 2012. Information the staff provided to ASLB was based on documents that refer to 2010 data. Three years have elapsed since then.

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2. The EIA report used for the GE-Hitachi hearing used data from before the Fukushima accident which happened in April 2011. Conditions and fluctuations in the uranium enrichment market might have changed due to the Fukushima accident and other developments.

3. More important, UUSA is directly involved on the purpose and market dynamics of supply and demand for enriched uranium. UUSA by being in the uranium enrichment business is affected directly by the impact of relevant past and present developments and events on the need for enriched uranium and is in a good position to make future predictions. Thus, it is important for the staff to receive the UUSA's input, perspective, relevant assessments/studies on current estimates and future projections. UUSA needs to update the purpose and need for the capacity expansion of the UUSA facility.

   With regards to Part b of RAI 8, the information UUSA provided in the Supplemental ER concerning AREVA is incorrect. Update the purpose and need analysis, as requested above, using the best available information regarding AREVA

SUPPLEMENTAL ENVIRONMENTAL REPORT FOR FACILITY EXPANSION REQUEST

-JULY 2013

Revision 4c

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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 3 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 Section 4.6 Tables 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 to 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, 2.3 No-Action Scenario C, 2.3 No-Action Scenario D, 2.1.1 No-Action Alternative, 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, 4.6.7No-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, and Section 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 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 4.6.21 and 4.12.4
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.

Summary of Changes to Initial Submittal (Revision 4)		
Revision - RAI#	**Date**	**Change**
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	As noted in the annotations for Tables 3.12-1 and 3.12-2 the ventilation filters can be unconditionally released as clean (universal waste) if supported by survey data. No revision required.
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 Construction Worker Population 4.10.3 Facility Operation - Jobs, Income, and Population Table 4.10-1 Annual Construction Worker 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.
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

Summary of Changes to Initial Submittal (Revision 4)		
Revision - RAI#	**Date**	**Change**
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
Rev 4c – RAI8(a) Provide an updated purpose and need analysis using updated projections that reflect current conditions and potential future needs for enriched uranium.	6/10/2013	The following Sections were revised significantly: 1.32 Current Demand for Enriched Uranium 1.3.3 Current Supply of Enriched Uranium 1.3.5 Market Analysis and Commercial Considerations of Proposed Action and Six No-Action Scenarios 2.3 Comparison of the Predicted Environmental Impacts of the No-Action Scenarios Table 2.3-1 Table 2.3-2 The following table was added: Table 1.3.1 The new references used are reflected in the List of References.
Rev 4c – The license granted to AREVA Enrichment Services LLC for the Eagle Rock Enrichment Facility (EREF) on October 12, 2011, is for a capacity of 6.6 MSWU, not 3.0 MSWU as considered in the ER (UUSA, 2012) and Supplemental ER (UUSA, 2013). Use the correct license capacity for EREF in the updated purpose and need analysis requested in the RAI8a above.	6/10/2013	The capacity for the AREVA Eagle Rock facility was changed in the following Sections and Tables: 1.3.4 Role of Proposed Action In Meeting Demand for More Reliable and Economical Domestic Enriched Uranium 1.3.5 Market Analysis and Commercial Considerations of Proposed Action and Six No-Action Scenarios 2.3 Comparison of the Predicted Environmental Impacts of the No-Action Scenarios Table 2.3-1 Table 2.3-2 2.1 Detailed Descriptions of the Alternatives 4.1 Land Use Impacts

Summary of Changes to Initial Submittal (Revision 4)		
Revision - RAI#	**Date**	**Change**
		4.2 Transportation Impacts 4.3 Geology Impacts 4.4 Water Resource Impacts 4.5 Ecological Resources Impacts 4.6 Air Quality Impacts 4/7 Noise Impacts 4.8 Historical and Cultural Resources 4.9 Visual/Scenic Resources 4.10 Socioeconomics Impacts 4.11 Environmental Justice 4.12 Public and Occupational Health 4.13 Waste Management Impacts

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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 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.

<u>The UUSA Organizational Structure</u>

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.

1.2 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 Million Separative Work Units (MSWU). A total of 1.3 MSWU was produced in 2012.

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

Tax revenue generated: Tax Revenue thru 2012 is $93.9 million.

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: beginning with 1st quarter 2009 Due to the Cylinder Receipt and Dispatch Building (CRDB) not being online, waste hasn't been generated by decontamination activities and chemistry laboratory. Additionally, the ventilation filters have been able to be screened and determined to constitute universal waste (see response to question 4 part d).

1.3 Purpose and Need for the Proposed Action

1.3.1 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.

1.3.2 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 2012, 16 MSWU of enrichment services were purchased under enrichment services contracts in the United States (EIA, 2013a at 2). This is an increase from 15 MSWU in 2011 (EIA, 2012 at 2).

The demand for uranium enrichment services is expected to continue to grow in the United States and worldwide, despite the 2011 Fukushima Daiichi accident in Japan. Energy Resources International (ERI) forecast in 2012 that the annual demand for enrichment services in the United States by 2030 is likely to be 18.1 MSWU (ERI, 2012). Worldwide, demand for uranium enrichment services is predicted to grow from 40.9 MSWU in 2011 to between 49.7 and 90.7 MSWU by 2030 (ERI, 2012).

The increased demand for uranium enrichment services is consistent with the continued increased growth of nuclear energy worldwide. Despite the shutdown of some facilities after the Fukushima Daiichi accident, in August 2012, a year and a half after the Fukushima Daiichi accident, the International Atomic Energy Agency provided low and high projections for installed nuclear power capacity that both showed continued, intensive growth (IEAE, 2012). Under the low projection, the world's installed nuclear power capacity would grow from 368.8 GW(e) in 2011 to 421 GW(e) in 2020, 456 GW(e) in 2030, and 469 GW(e) in 2050, a 27% increase (IEAE, 2012). In the high projection, the world's installed nuclear power capacity would grow to 508 GW(e) in 2020, 740 GW(e) in 2030, and 1,137 GW(e) in 2050, a 300% increase (IEAE, 2012). ERI made similar projections in 2012 just from new units, predicting that world installed nuclear power capacity will rise 32% to 485 GWe by 2025, and an additional 19% to 580 GWe by 2035 (ERI, 2012). Supplemental ER Table 1.3-1, Summary of World Nuclear Power Installed Generating Capacity Forecasts (GWe) shows the ERI forecasts by region of nuclear power generation through 2030. Construction of new facilities worldwide also continues: in 2012, seven units, totaling 6.9 gigawatts (GW(e)), were scheduled to enter commercial operation; two units, totaling 1.5 GWe, were expected to return to service; and a total of 74 units (74 GWe) were engaged in active construction activities (ERI, 2012). Another 79 units (99 GWe) are planned in 14 countries (ERI, 2012).

In the United States, the Energy Information Administration (EIA) has forecasted that nuclear capacity will increase from 101.1 GWe in 2011 to 114.1 GWe by 2025 (EIA, 2013b). This increase in nuclear generating capacity includes 11 GWe from new reactors and 8 GWe from uprates at existing plants (EIA, 2013b).

The projections showing continued growth of nuclear power capacity are consistent with NRC's own analysis of the continued growth of nuclear power worldwide after the Fukushima Daiichi accident. In the September 2012 mandatory hearing for the GE-Hitachi Global Laser Enrichment Facility (GLE), the NRC Staff testified that "the Fukushima Daiichi accident slowed nuclear power growth worldwide, but current information suggests that nuclear power growth will continue globally." GE-Hitachi Global Laser Enrichment LLC, LBP-12-21 at 123 (Sept. 19, 2012). The Board agreed with the Staff's analysis and "concluded that the Staff has adequately supported its evaluation that the project has a legitimate need" in light of the Fukushima Daiichi accident." Id. at 204.

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.

1.3.3 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). With the closure of the Paducah gaseous diffusion plant (GDP) in May 2013, domestic uranium enrichment will fall further. At present, the UUSA facility is the only domestic uranium enrichment facility in operation.

U.S. enrichment requirements have been met principally through enriched uranium produced at USEC's 50-year-old Paducah GDP; the existing UUSA facility; and foreign enrichment facilities. The Paducah GDP produced approximately 5 MSWU in 2011 (USEC, 2012 at 13). However, USEC announced on May 24, 2013 that it would cease uranium enrichment at the end of May 2013 (USEC, 2013). DOE solicited 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 July 2013, capacity at the UUSA facility stood at approximately 2.8 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).

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).

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

As discussed below, U.S. demand for enrichment services, currently at approximately 16 MSWU, will not be met in the long term by continued reliance on the now-shuttered 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

[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.

could be supplied by foreign sources. (IEAE, 2012, ERI, 2012). 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.

1.3.5 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 the LES ER to reflect current market conditions, including the 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.

1.3.5.1 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 7 MSWU.

This scenario effectively replaces the 5 MSWU per year of enrichment services from the Paducah GDP, with the additional capacity of 7 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.

1.3.5.2 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 7 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 beginning to enrich uranium again 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 begin uranium enrichment at the Paducah plant (USEC, 2013, DOE, 2012a).

Even if the Paducah plant had not closed in May 2013 and continued to produce at a 5 MSWU level, there would have been 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 or practical long-term solution.

1.3.5.3 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 6.6 MSWU), and GLE in Wilmington, North Carolina (proposed capacity 6 MSWU)

Under this scenario, the 7 MSWU supply deficit from not expanding the UUSA facility and the 5 MSWU deficit from Paducah closing is made up by a total of 12.6 MSWU from GLE and the AREVA Enrichment Services, L.L.C. Eagle Rock facility.

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). NRC issued GLE a license on September 25, 2012 (NRC, 2013).

It is highly uncertain whether the AREVA Eagle Rock facility will be built in the near future. While the 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, after two years of postponement while AREVA looked for a financial partner, the company announced in May 2013 that it no longer projects a date at all for building the facility (AP, 2013).

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, including one that has announced it will not set a date to begin such construction. Should the construction not be completed – or never started – 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.

1.3.5.4 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 6.6 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 7 MSWU supply deficit from not expanding the UUSA facility and the 5 MSWU deficit from Paducah closing is made up by 16.3 MSWU from a combination of Eagle Rock in Idaho Falls, Idaho (proposed capacity 6.6 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.

1.3.5.5 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 7 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.

1.3.5.6 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 7 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 7 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).

1.3.5.7 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 7 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 (IAEA, 2012, ERI, 2012). 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

1.3.5.8 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 12.6 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 beginning uranium enrichment again at 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 6.6 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.

Section 1.3 Tables

Table 1.3-1 Summary of World Nuclear Power Installed Generating Capacity Forecast (GWe)

Year	Forecast	U.S.	Western Europe	CIS & E. Europe	East Asia	Other
2011	Actual	101.8	116.1	47.2	78.1	24.1
2015	Low	99.4	114.6	48.3	86.5	29.1
	Reference	104.4	117.2	51.9	96.1	30.1
	High	105.0	118.5	53.8	114.7	33.3
2020	Low	101.8	100.7	50.9	111.5	24.6
	Reference	107.7	115.8	57.8	132.3	32.8
	High	109.4	125.8	66.5	165.9	50.6
2025	Low	99.6	85.8	49.4	130.9	25.6
	Reference	107.2	102.6	64.2	167.8	43.4
	High	116.5	143.5	78.4	223.9	87.8
2030	Low	95.5	72.7	38.9	151.5	31.0
	Reference	109.1	102.7	70.2	203.2	60.8
	High	125.7	147.5	95.3	282.5	133.3

(ERI, 2012)

1.4 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.

1.4.1 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.

1.4.2 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.

1.4.3 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.

1.4.4 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.

1.4.5 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.

1.4.6 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.

1.4.7 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.

1.4.8 Section 1.3 Figures

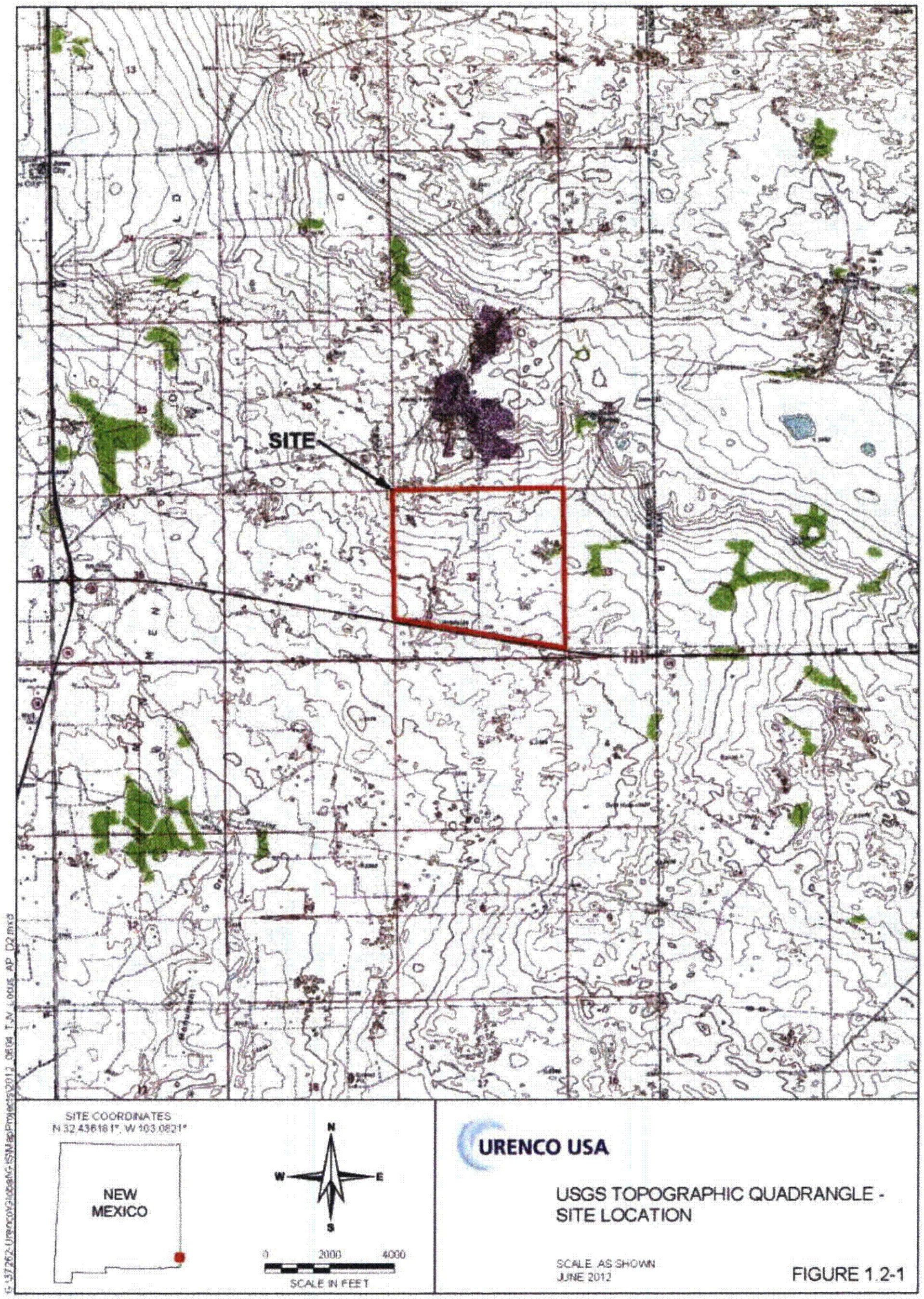

Figure 1.3-1 Site Location

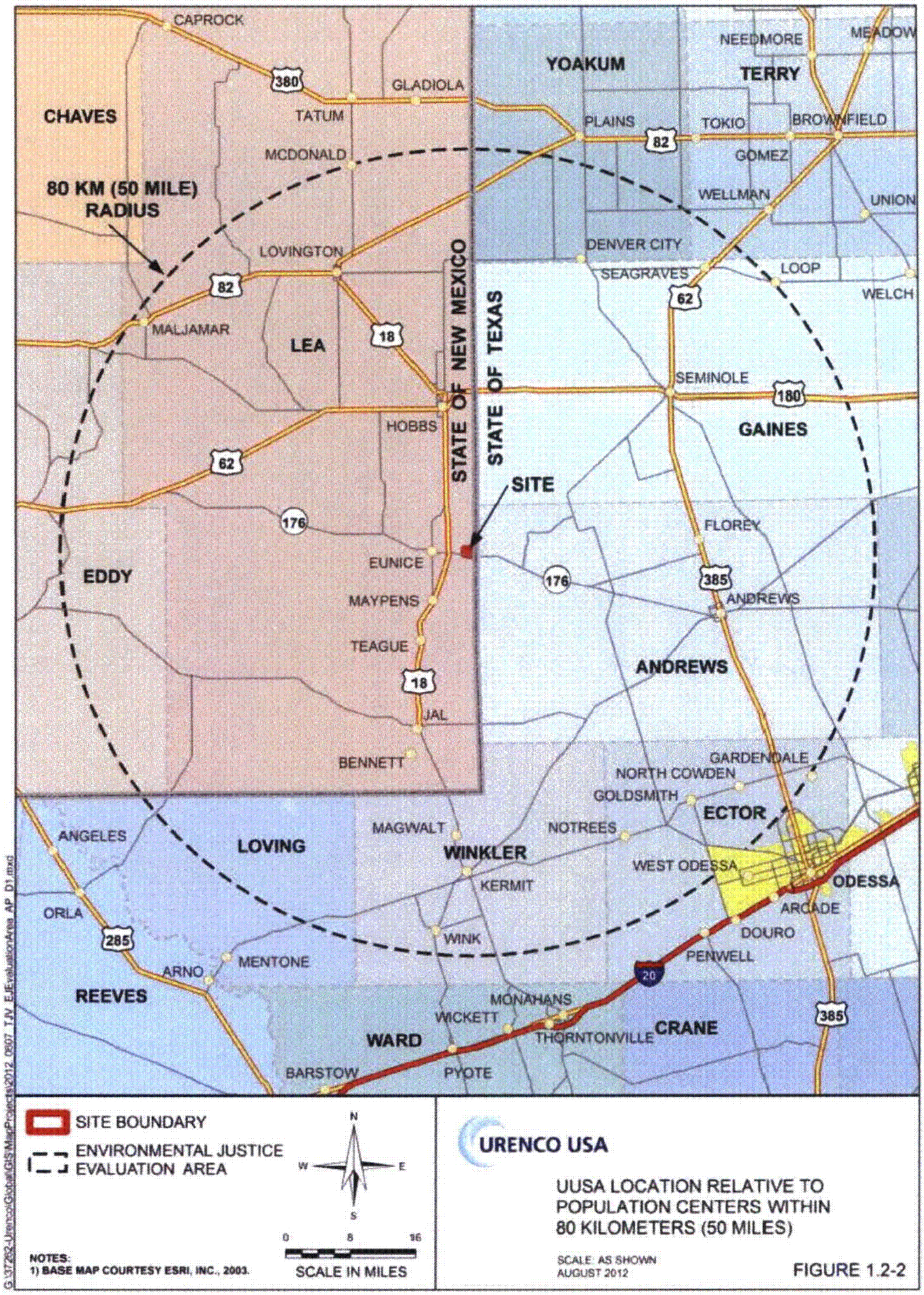

Figure 1.3-2 UUSA Location Relative to Population Centers Within 80-Kilometers (50-Miles)

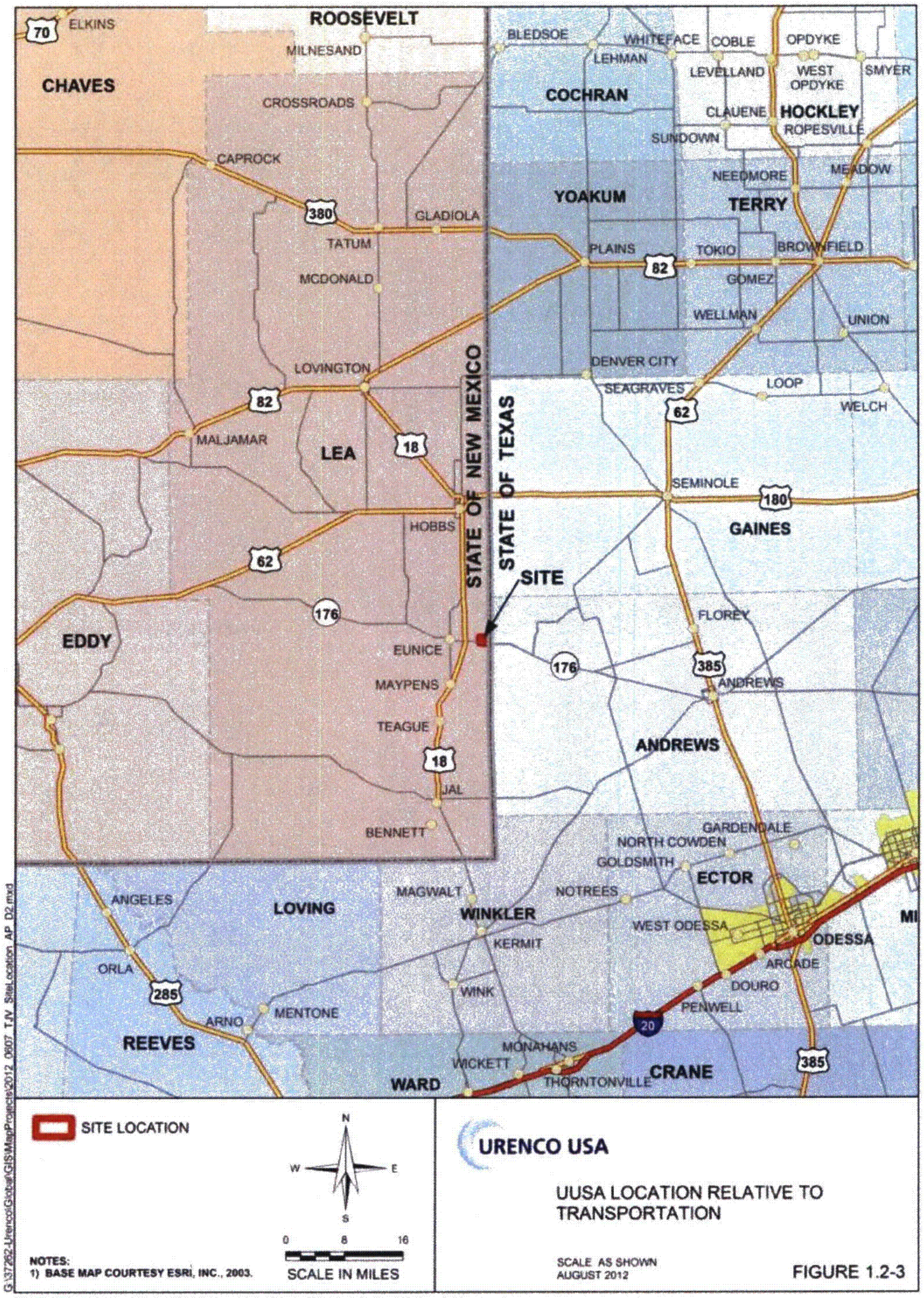

Figure 1.3-3 UUSA Location Relative to Transportation Routes

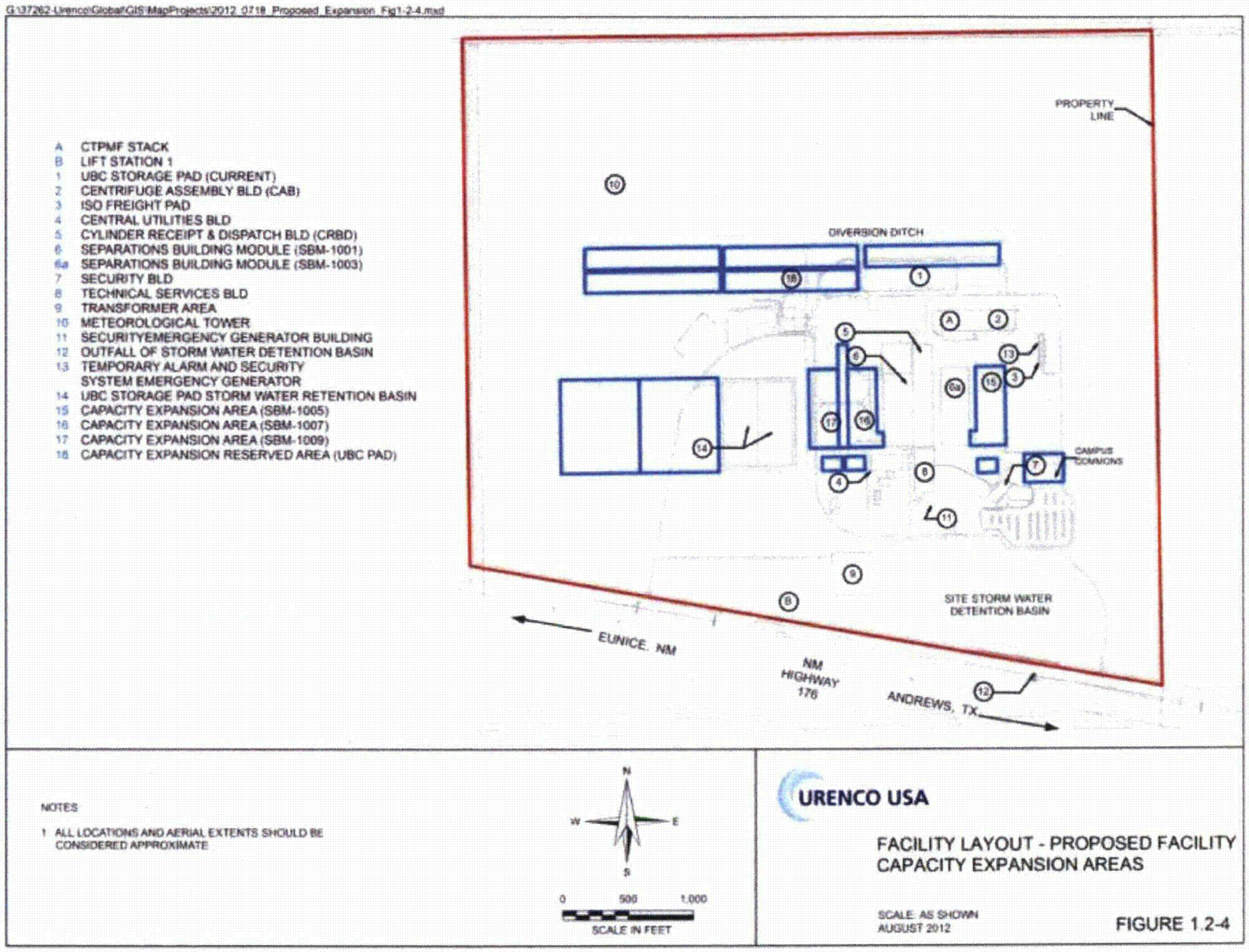

Figure 1.3-4 Facility Layout – Proposed Facility Capacity Expansion Areas

1.5 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.

1.5.1 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.

1.5.2 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.

1.5.3 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.

1.5.4 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.

1.5.5 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 3MSWU 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) operational employment at the UUSA facility is approximately 250 employees (excluding construction staff). 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 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 9.3×10^{-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 closed in 2013 (USEC, 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 construction workers 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 is the most likely because they have 1) successfully demonstrated a prototype facility over the last 2 years; 2) are owned by very solvent partners GE, Hitachi, and Cameco; and 3) obtained their license (WNA, 2012, NRC, 2013).

It is uncertain when or whether the AREVA Eagle Rock or the ACP facilities will be built. While the AREVA 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, after two years of postponement while AREVA looked for additional financial partners, the company announced in May 2013 that it no longer projects a date at all for building the facility (AP, 2013). The development of ACP is also uncertain. While the ACP plant does have a license, and has 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, the Paducah GDP ceased uranium enrichment in May 2013 and it is very unlikely that the plant will begin such enrichment activities again, particularly at previous production levels (USEC, 2013).

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 7 MSWU per year supply deficit, with the Paducah GDP beginning enrichment operations again to produce 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 ceased uranium enrichment at the end of May 2013 (USEC, 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 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU).

Under this scenario, there is a 7 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). 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 6.6 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.
- Restarted 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 re-starts enrichment 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 6.6 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 6.6 MSWU), GLE (proposed capacity 6 MSWU), and ACP (planned capacity 3.7 MSWU)**
Domestic Capacity	Provides 10 MSWU/yr supply (UUSA only)	7 MSWU/yr deficit; possibly made up from re-starting enrichment at the Paducah GDP at 5 MSWU/yr	7 MSWU/yr deficit from UUSA and 5 MSWU deficit from closure of Paducah; made up by construction of both Eagle Rock and GLE	7 MSWU/yr deficit from UUSA and 5 MSWU deficit from closure of Paducah; made up 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. Paducah GDP has ceased enriching uranium.	Uncertainty because neither facility is built yet, and construction of Eagle Rock has been indefinitely postponed.	Fair amount of uncertainty because neither the GLE nor Eagle Rock facility is built yet, construction of Eagle Rock has been indefinitely 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 re-starts enrichment 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 6.6 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 6.6 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 re-starts enrichment 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 6.6 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 6.6 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 re-starts enrichment 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 6.6 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 6.6 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 re-starts enrichment 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 6.6 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 6.6 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

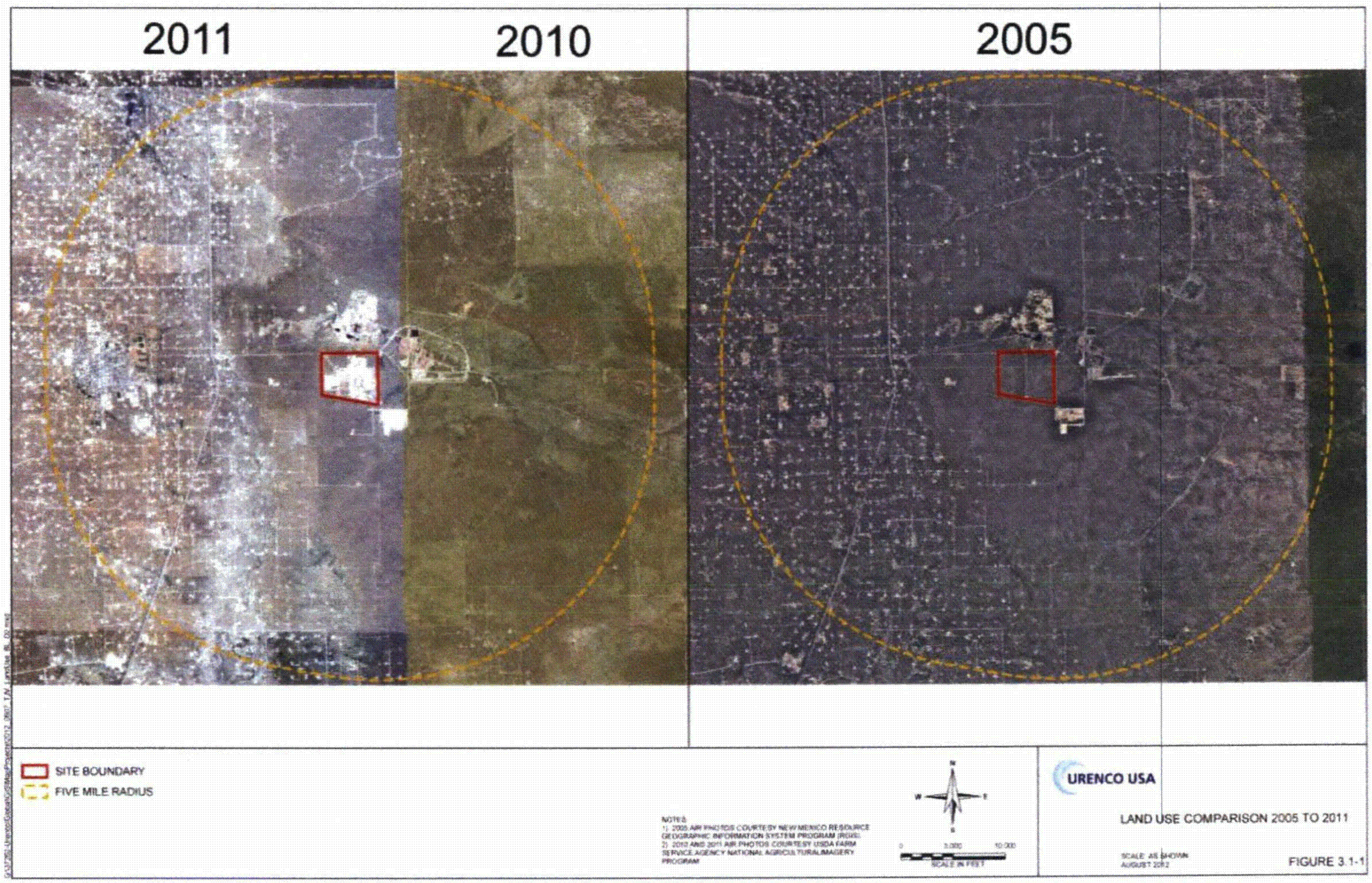


Figure 3.1-1 Land Use Comparison 2005 to 2011

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 operational workers 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 construction workers at the site. *See* LES ER Section 4.2.3. The maximum potential increase to traffic due to construction workers 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	5.58	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	9380	< 2.00 U	3.74	0.66	1.75	3,150
OnSite-SO-East	01/20/2011	Primary	Soil	1990 J	1.1 J	27.4	0.131 J	0.489 U	3380	3.3	3.1	0.773	2.14	2720
Onsite-SO-East	07/12/2011	Primary	Soil	3300 J	1.25 J	61.1 J	.143 J	0.458 U	11900 J	12.7	4.44	1.23	2.81	3680 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	.858	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	4030
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	73.8	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	4.56	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	1290 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	.598	2.14	2320 J
OnSite-SO-Northwest	04/11/2012	Primary	Soil	1250 J	.672 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	9.41	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	2.58	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	1.45 J	26.4	.153 J	0.497 U	4220	1.75 J	3.53	.709	1.36	3050

3.3.6 Section 3.3 Figures

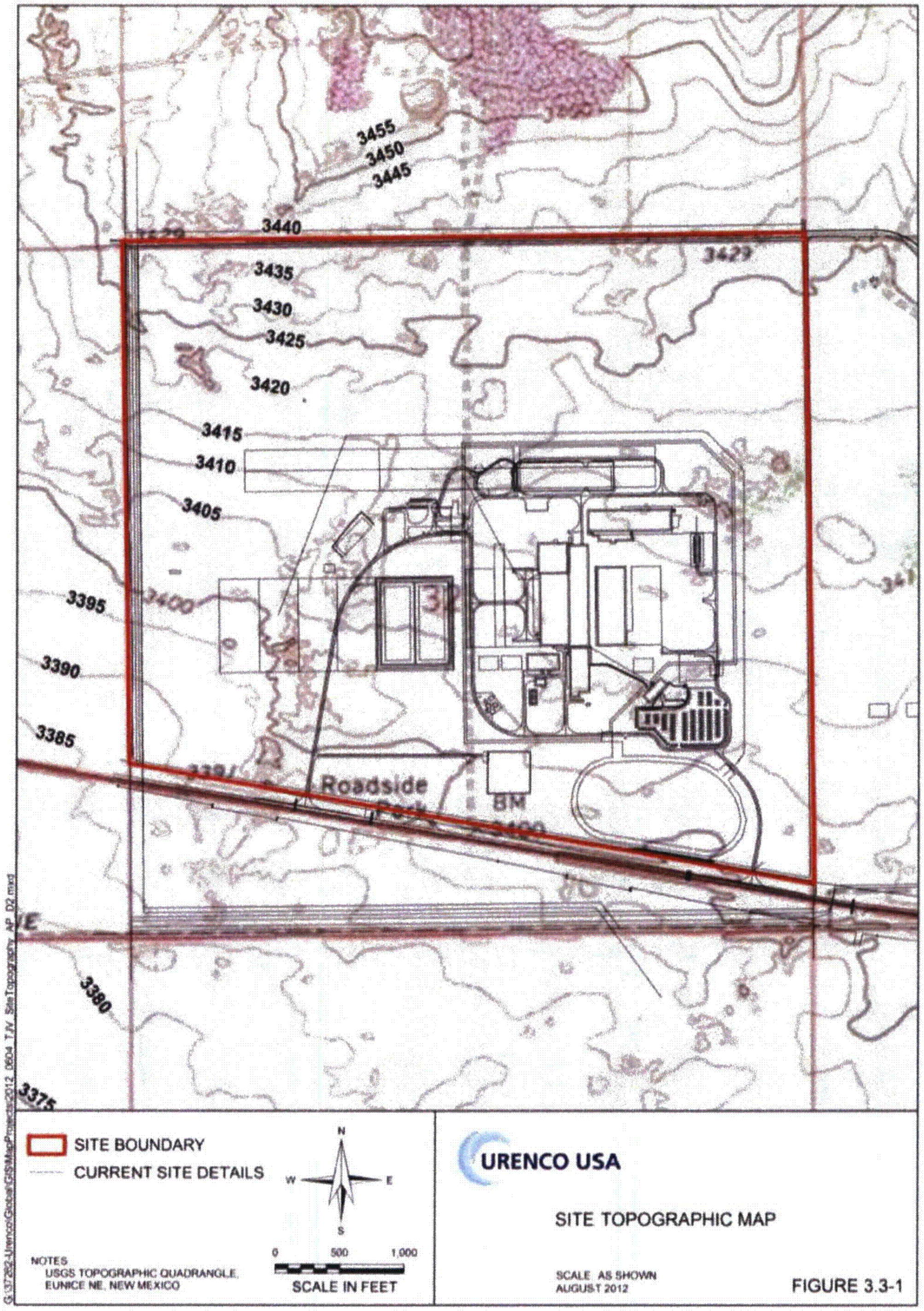


Figure 3.3-1 Site Topographic Map

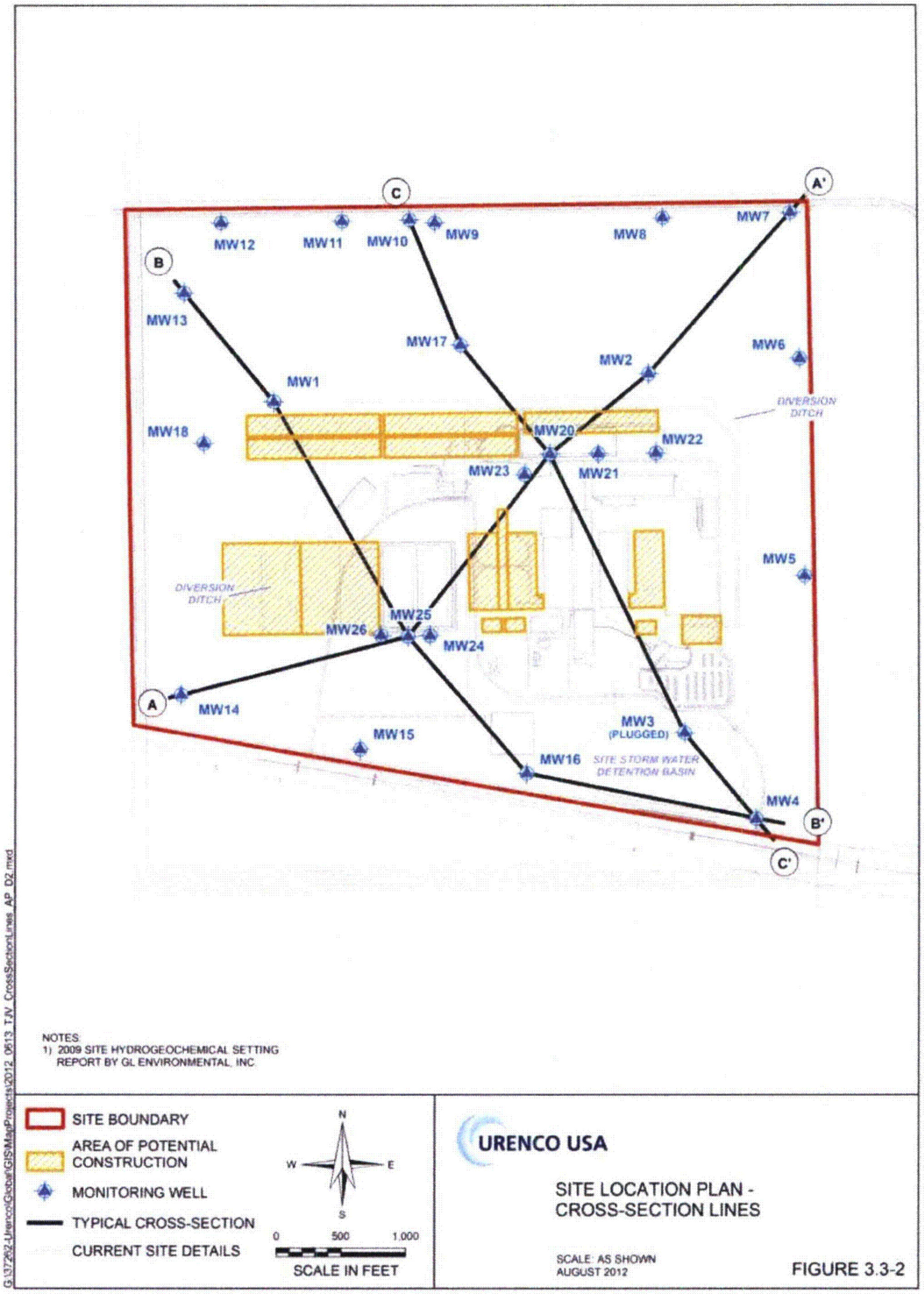


Figure 3.3-2 Site Location Plan – Cross-Section Lines

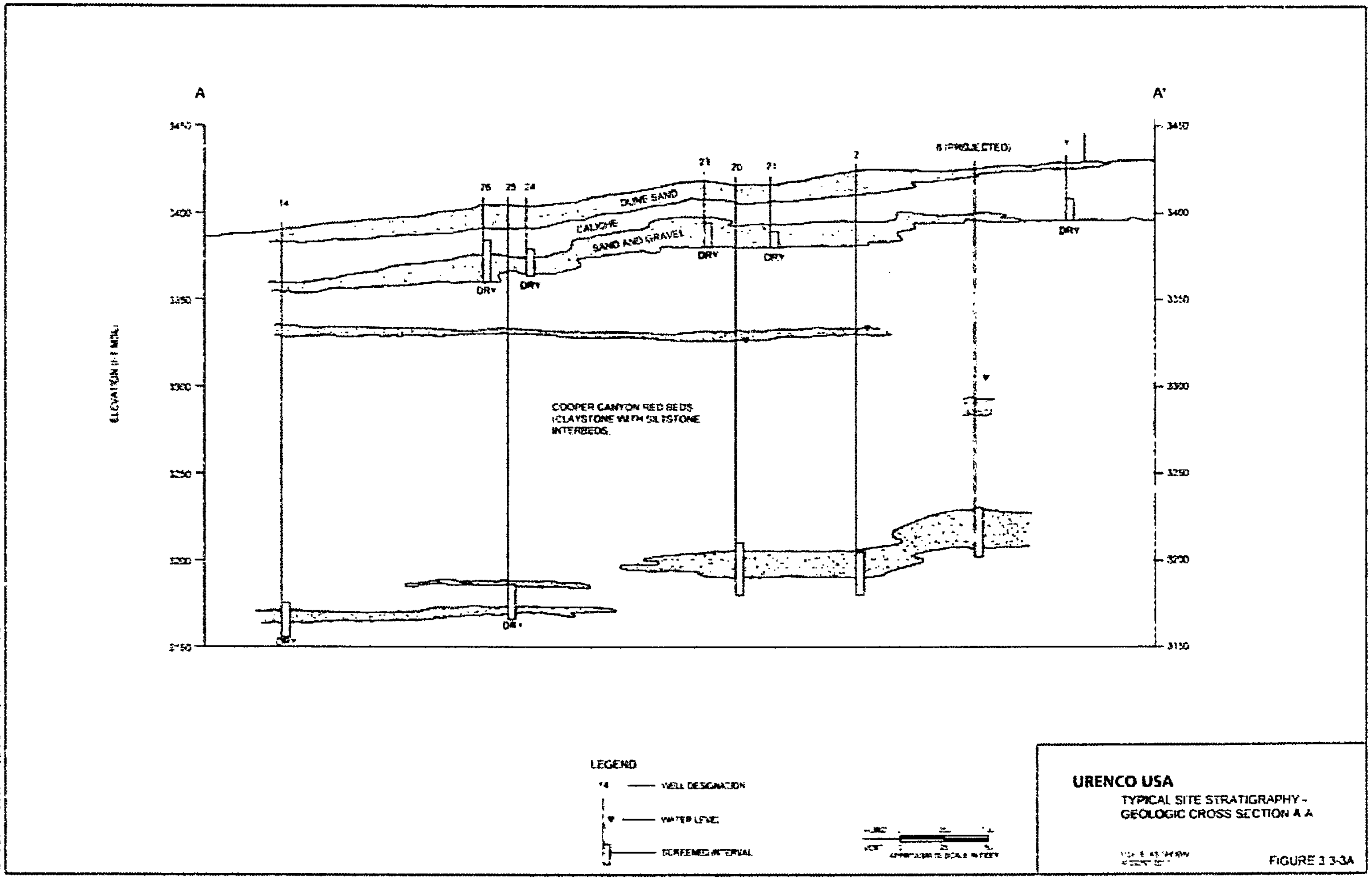


Figure 3.3-3ATypical Site Stratigraphy – Geologic Cross Section A-A'

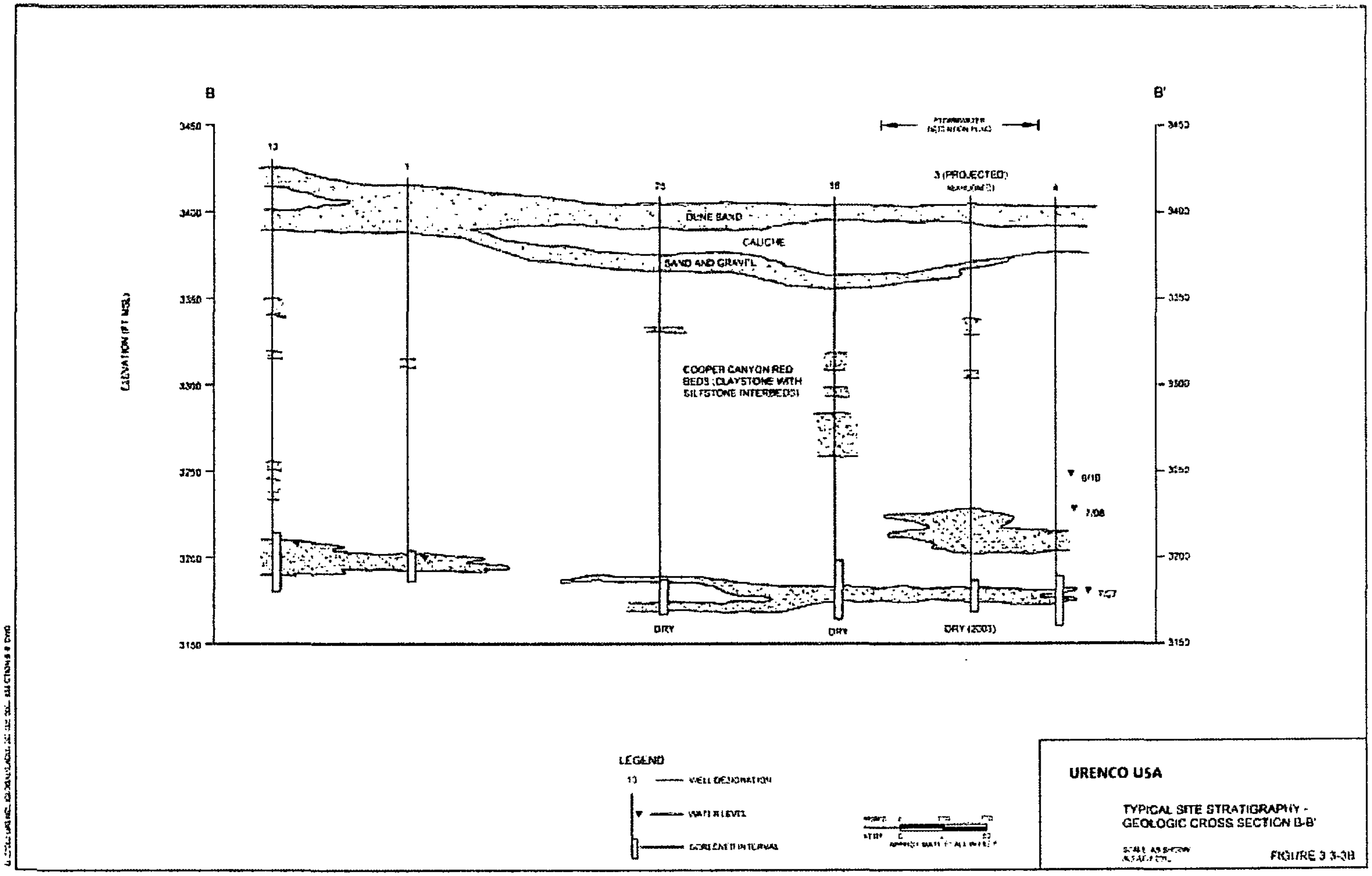


Figure 3.3-3B Typical Site Stratigraphy – Geologic Cross Section B-B'

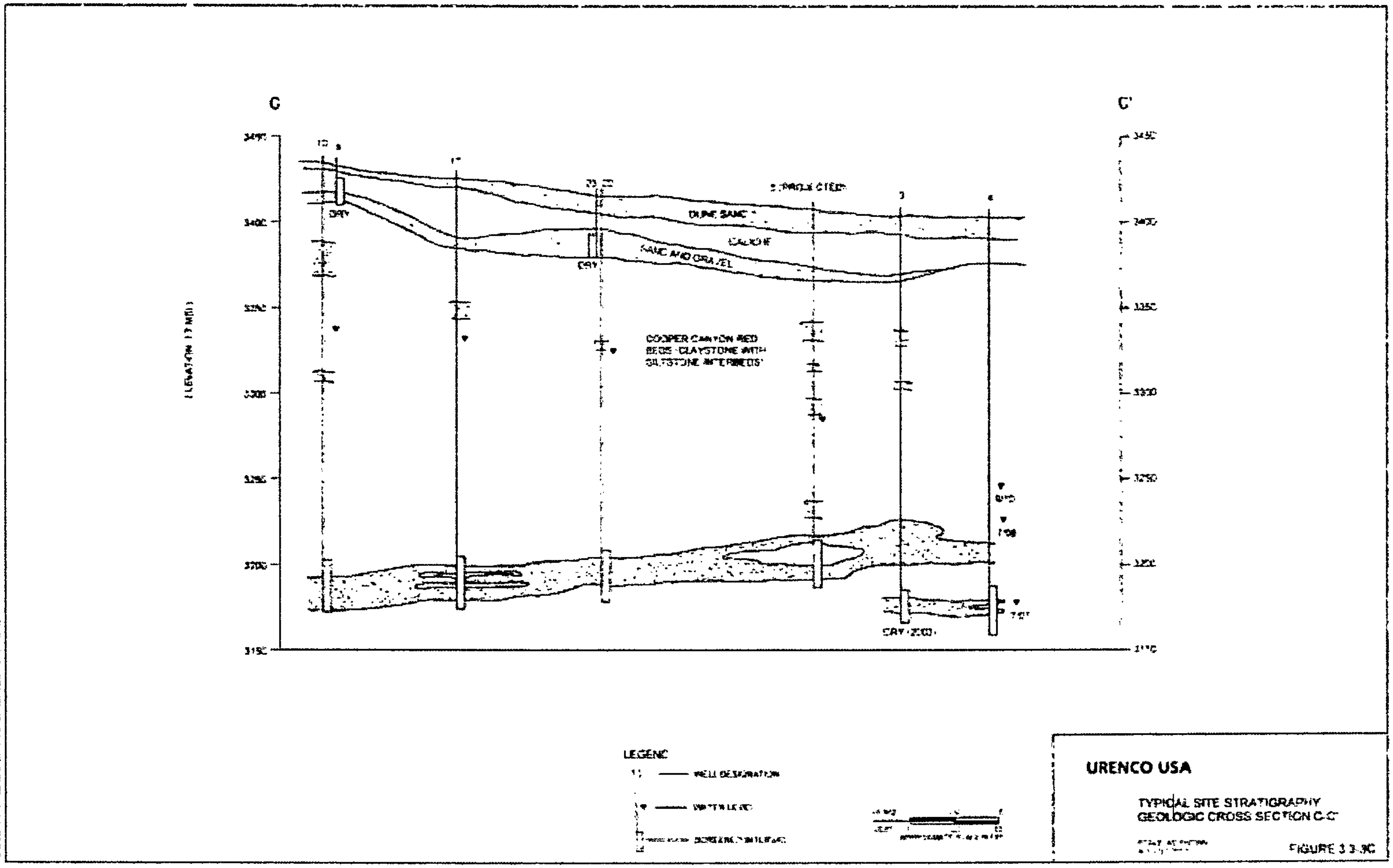
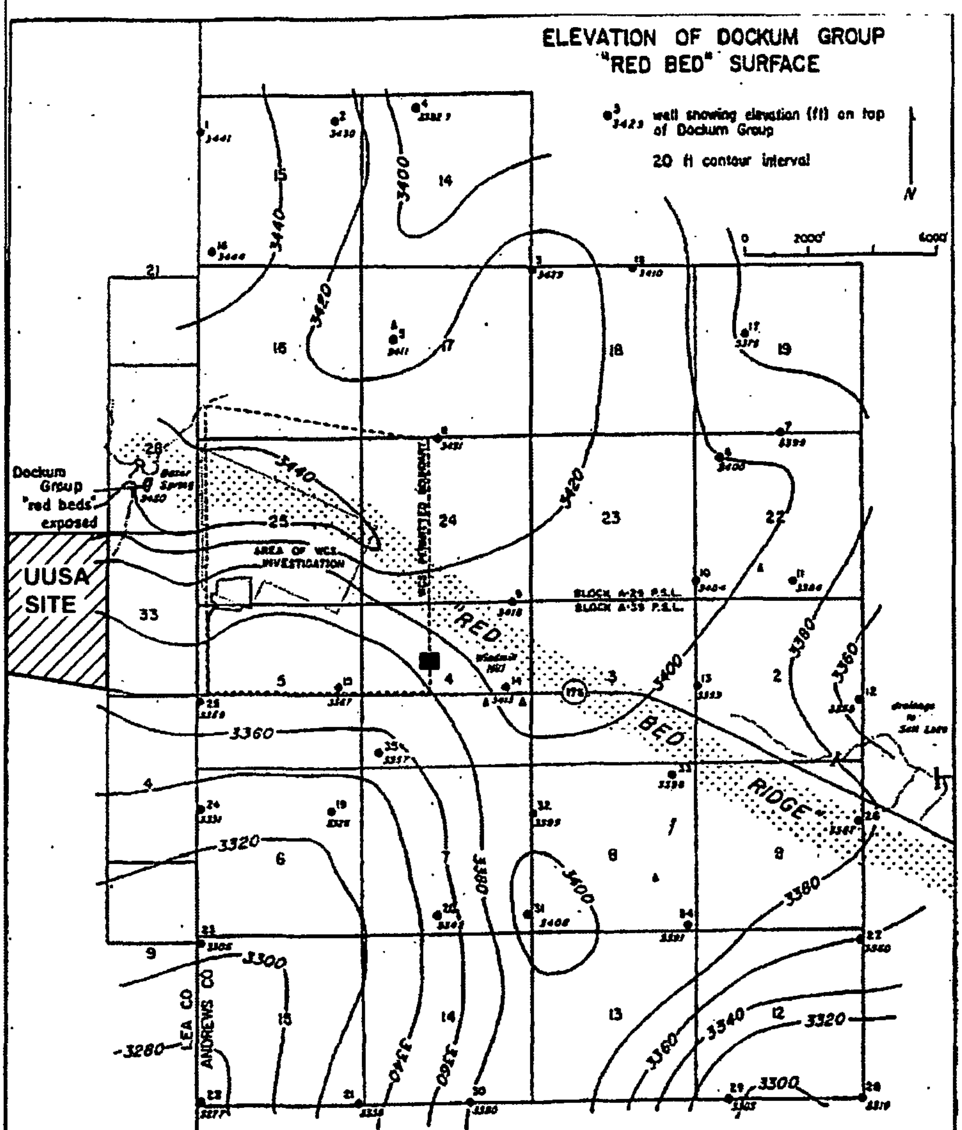


Figure 3.3-3C Typical Site Stratigraphy – Geologic Cross Section C-C



SOURCE: GEOLOGY OF WCS - FLYING "W" RANCH, ANDREWS COUNTY, TEXAS. NOVEMBER 2000

URENCO USA

CONTOUR MAP - TOP OF DOCKUM GROUP RED BEDS

SCALE: AS SHOWN
AUGUST 2012

FIGURE 3.3-4

G:\37262.URENCO\GLOBAL\CAD\37262-005-0002-FIG4.DWG

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

AB, AMARILLO-ARVANA LOAMY FINE SANDS ASSOCIATION
AA, ACTIVE DUNE LAND
BO, BROWNFIELD-SPRINGER ASSOCIATION
BS, BROWNFIELD-SPRINGER ASSOCIATION, HUMMOCKY
GM, GOMEZ LOAMY FINE SAND
KM, KERMIT SOILS AND DUNE LAND, 0 TO 12 PERCENT SLOPES
KO, KIMBROUGH GRAVELLY LOAM, 0 TO 3 PERCENT SLOPES
MU, MIXED ALLUVIAL LAND
PG, PORTALES AND GOMEZ FINE SANDY LOAMS
SE, SIMONA FINE SANDY LOAM, 0 TO 3 PERCENT SLOPES
SR, SIMONA-UPTON ASSOCIATION

SITE BOUNDARY

N W E S

0 500 1,000
SCALE IN FEET

NOTES:
SOIL SURVEY COURTESY OF U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE, "SOIL SURVEY GEOGRAPHIC (SSURGO) DATABASE FOR LEA COUNTY, NEW MEXICO" 2008

URENCO USA

SITE SOIL SURVEY

SCALE: AS SHOWN
AUGUST 2012

FIGURE 3.3-5

G:\37262-Urenco\Global\GIS\Map\Projects\2012_0605_TJV_SiteSoilSurvey_AP_D2.mxd

Figure 3.3-5 Site Soil Survey

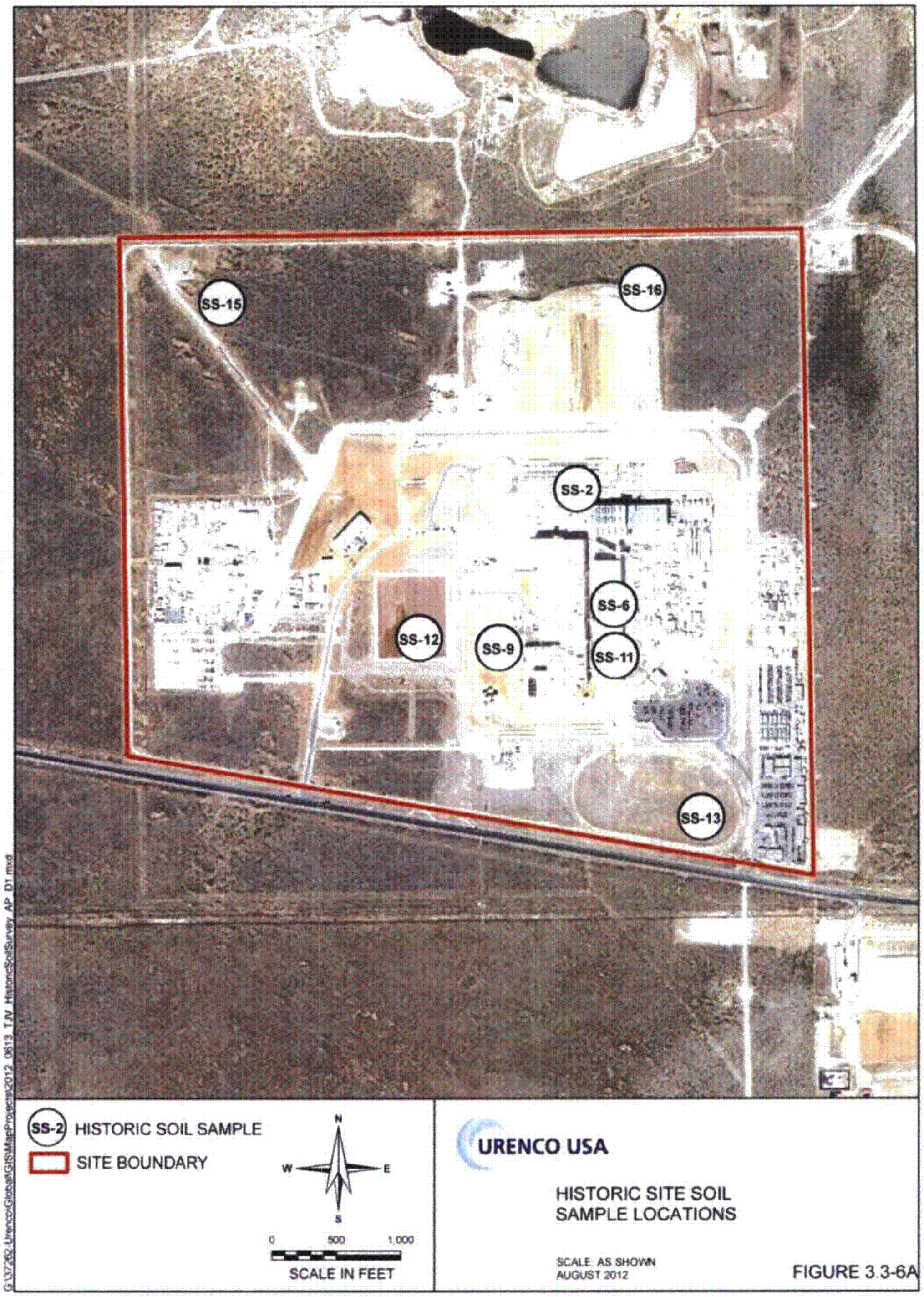


Figure 3.3-6A Historic Site Soil Sample Locations

Figure 3.3-6B Site Soil Sample Locations

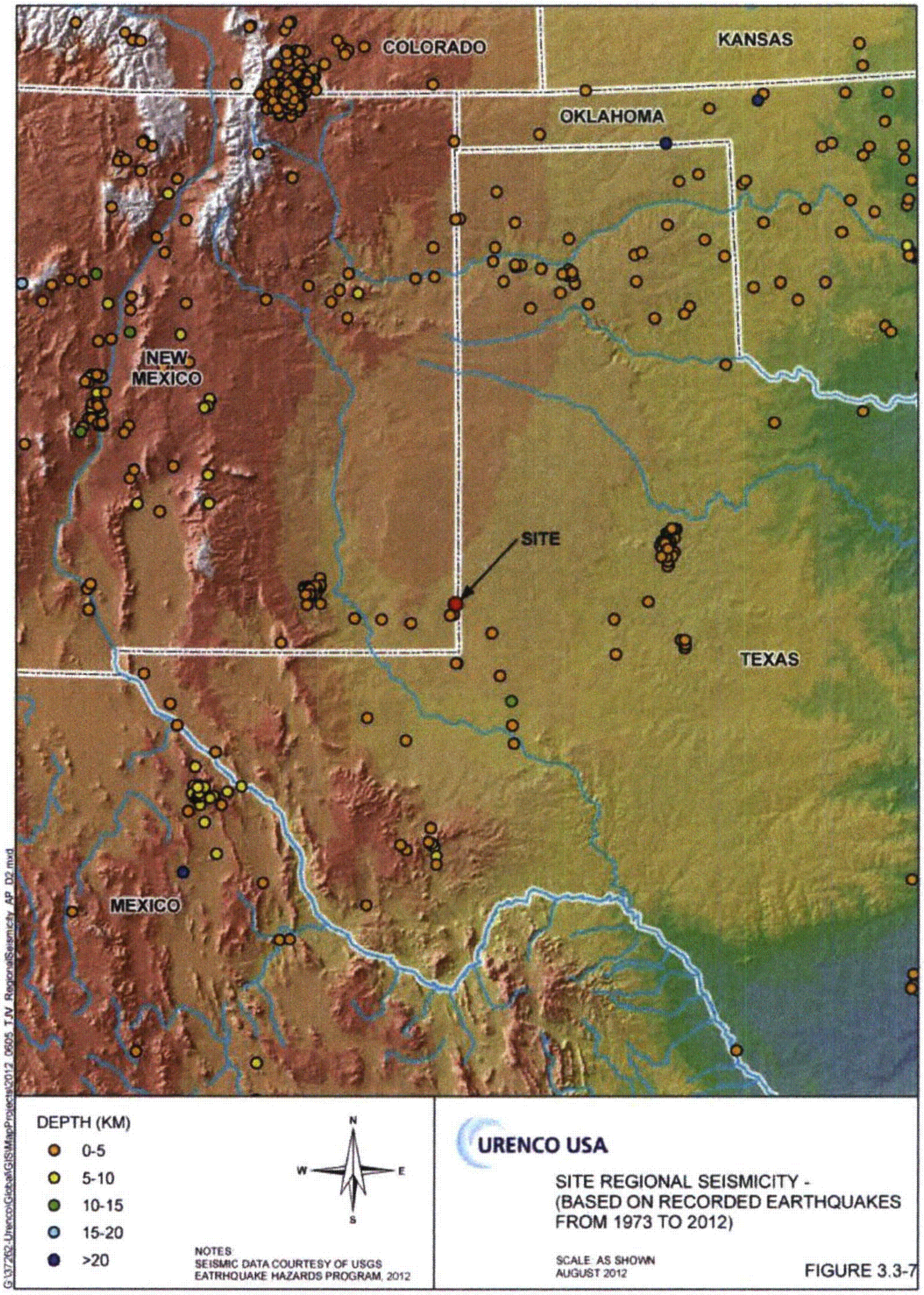


Figure 3.3-7 Site Regional Seismicity – (Based on Recorded Earthquakes from 1973 to 2012)

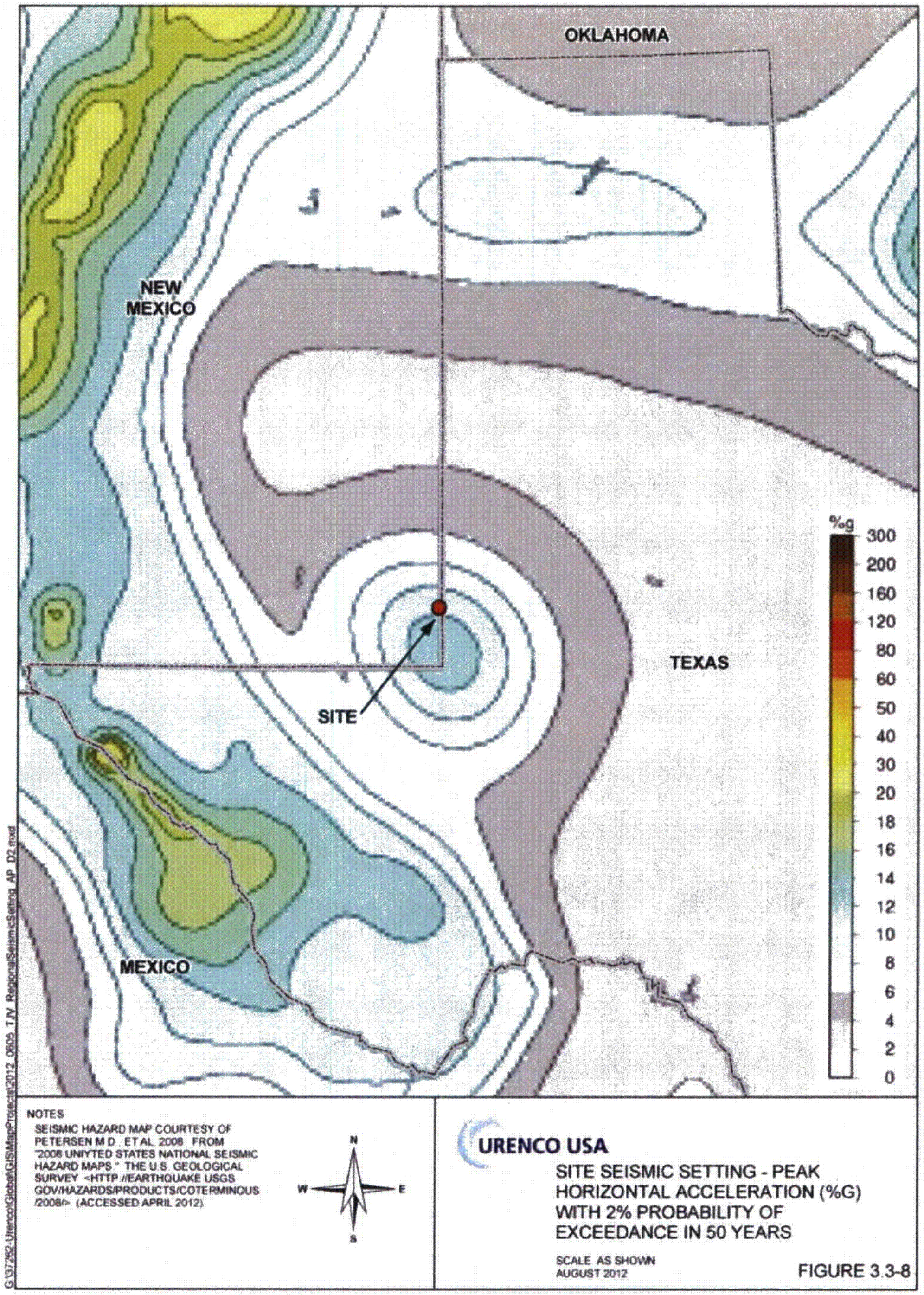


Figure 3.3-8 Site Seismic Setting – Peak Horizontal Acceleration (%G) with 2% Probability of Exceedance in 50 Years

3.4 Water Resources

Section 3.4 of the LES ER describes the site's surface water and groundwater resources for the 3 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 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*

* 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

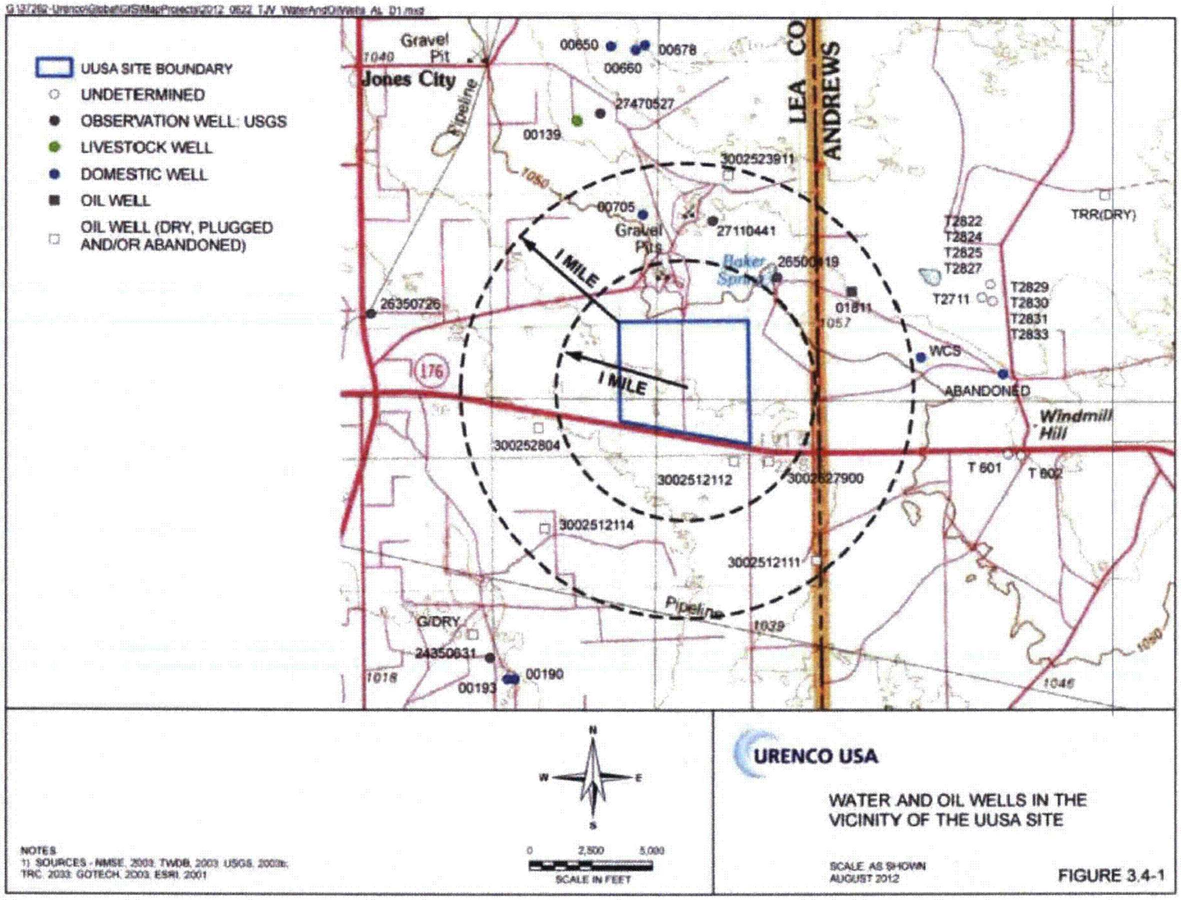


Figure 3.4-1 Water and Oil Wells in the Vicinity of the UUSA Site

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

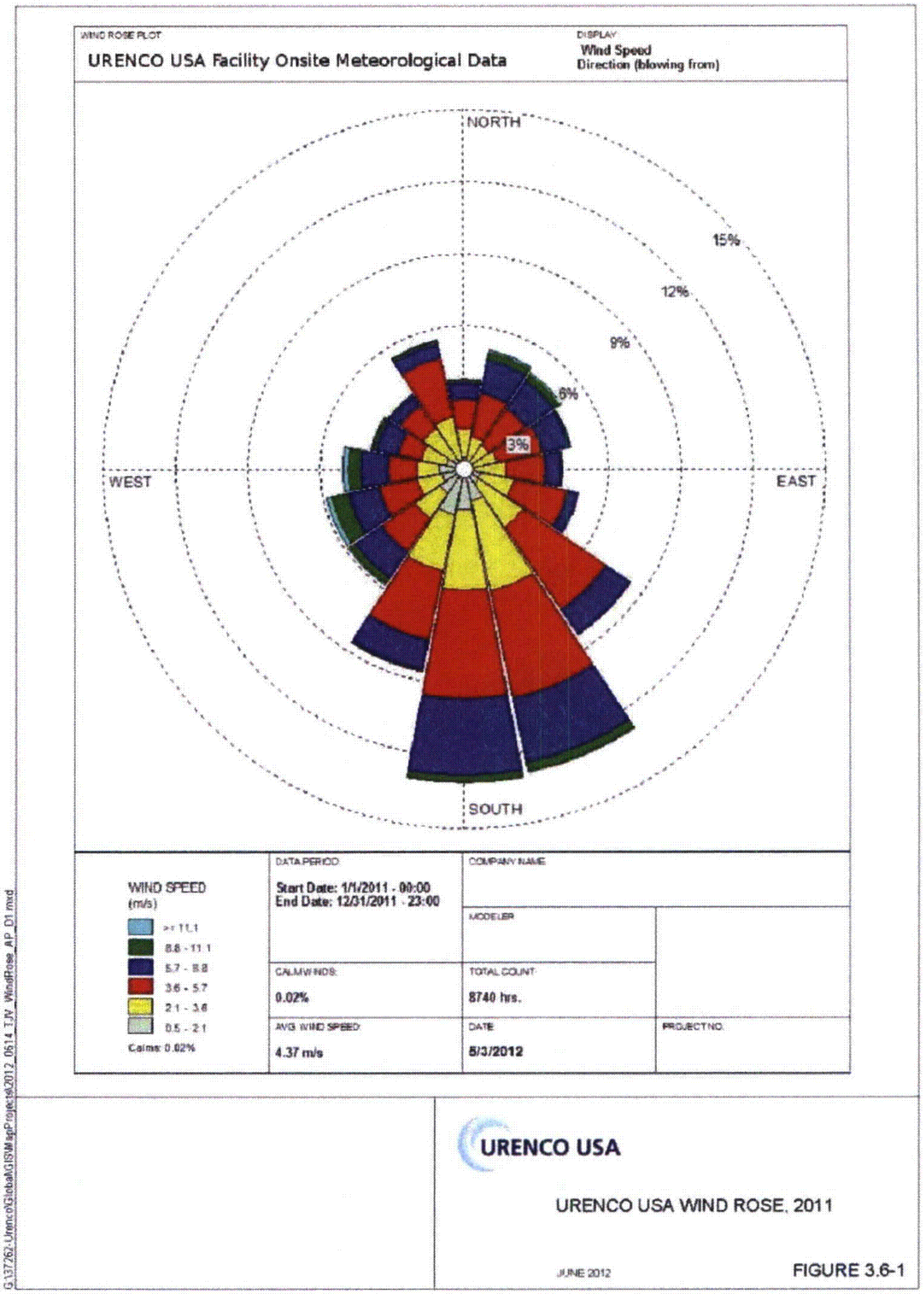


Figure 3.6-1 UUSA Wind Rose, 2011

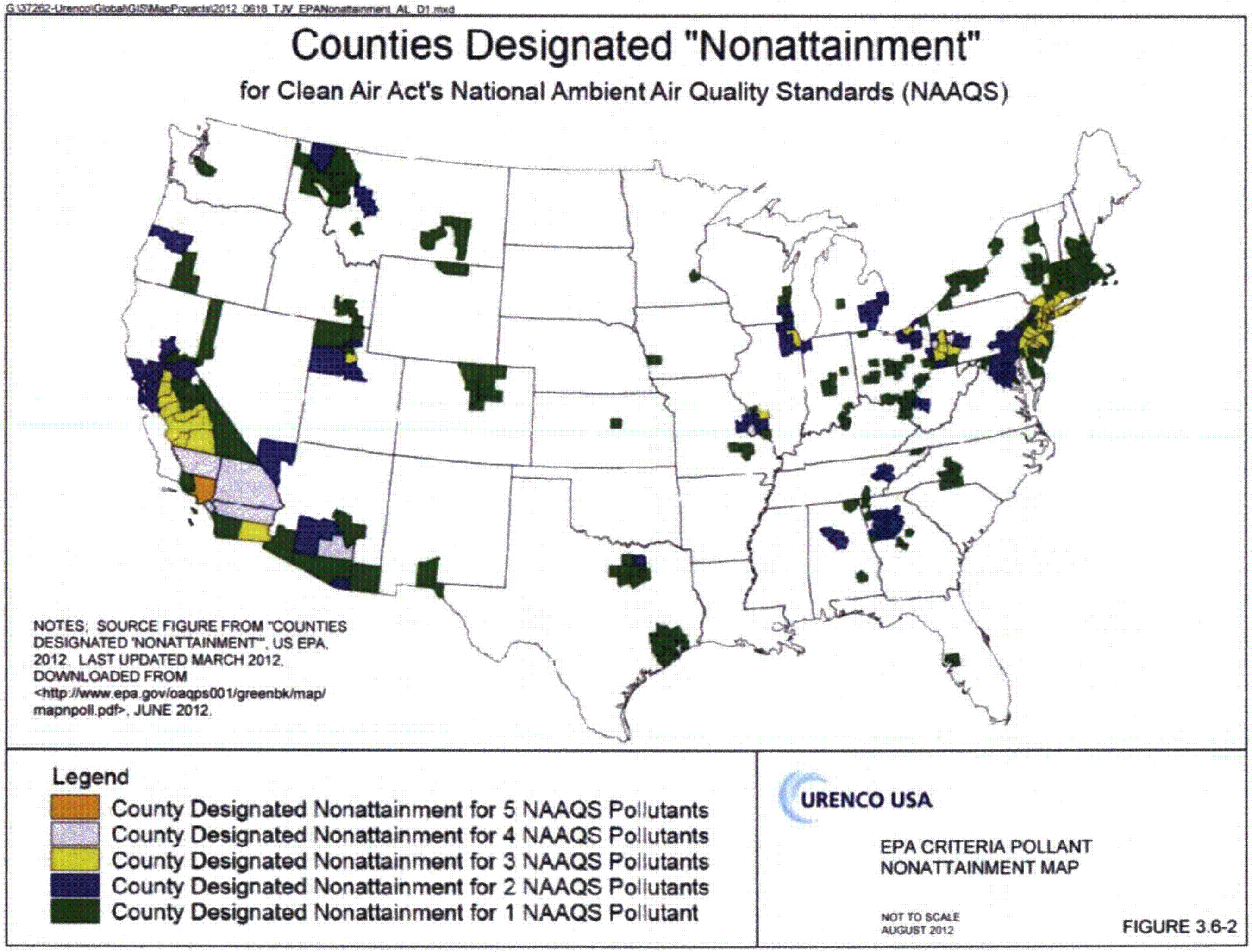


Figure 3.6-2 EPA Criteria Pollutant Nonattainment Map

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	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	Area			
	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

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

Area

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

	Area			
Topic	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

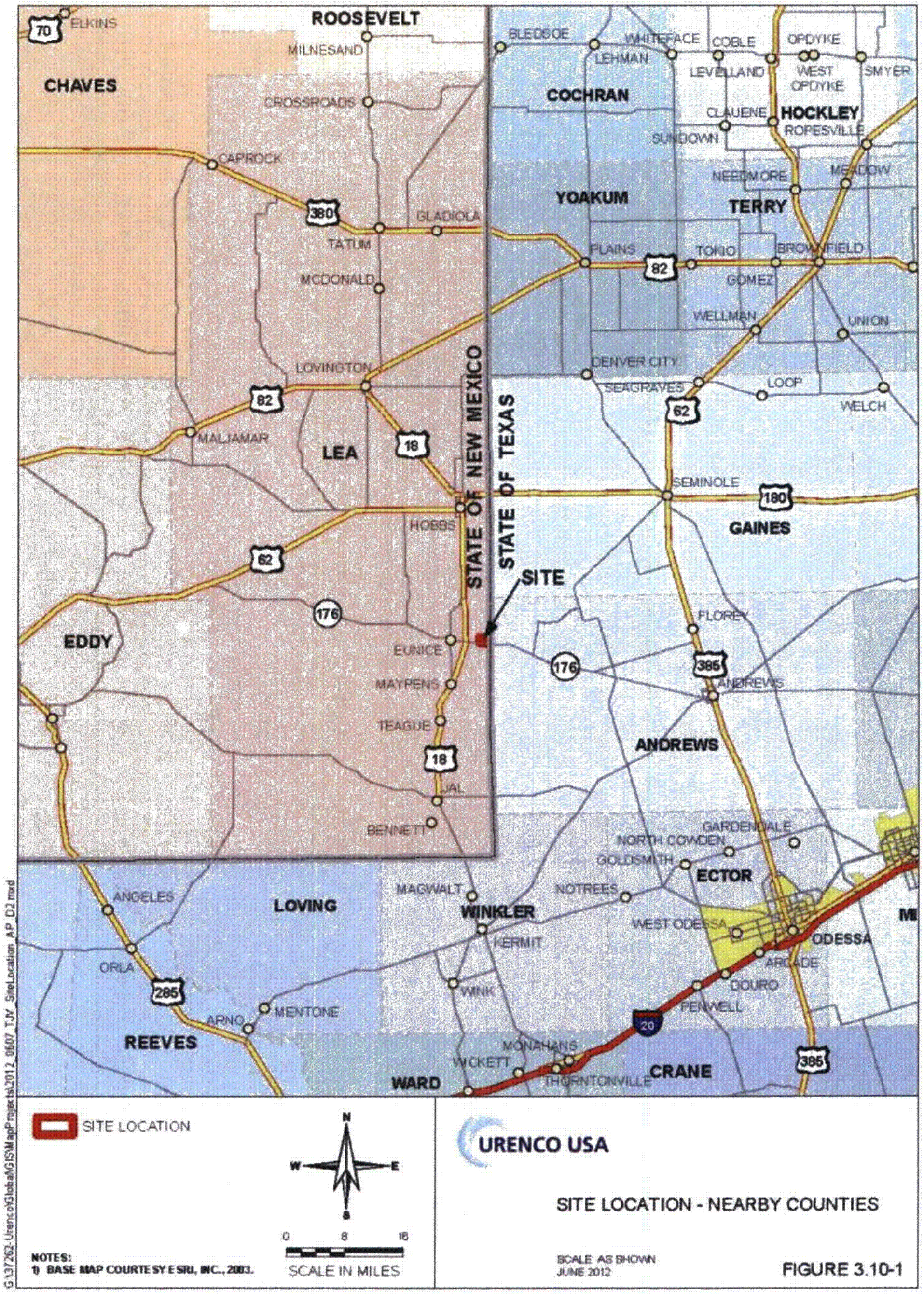


Figure 3.10-1 Site Location–Nearby Counties

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 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

[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 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 facilitates 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.

As described above, the laundry systems were eliminated and the hand wash/showers relocated outside of radiological zones into the Technical Service Building (TSB). All radiological contamination handling zones were moved out of the TSB. These non-radiological waste waters discharge to the City of Eunice sanitary sewer. The State of New Mexico Environment Department (NMED) issue Discharge Permit, DP-1612, to the City of Eunice on December 31, 2008. Prior to NMED issuing the Discharge Permit, LES held a series of coordination meetings with the City of Eunice and Molzen-Corbin & Associates, the consulting engineering firm for the City of Eunice, to insure that both the current Waste Water Treatment Plant (WWTP) and the new WWTP would be able to process the LES sewer volumes of 20,000 gpd (7,300,000 gpy). The professional engineers for Molzen-Corbin & Associates determined that, in their professional opinion, the City of Eunice's WWTP will be able to adequately handle the LES sewer discharge as designed. This determination was conveyed to the NMED in the Molzen-Corbin & Associates letter to the NMED Ground Water Quality Bureau dated November 14, 2008. The positive environmental impacts of discharging the water to the Eunice WWTP are that three approved onsite sewage treatment plants were eliminated and the water, after treatment, will be used for local irrigation. The environmental impact of the 4 mile pipeline constructed from the UUSA facility to the WWTP was minimal, in that, the line was laid inside the previously disturbed New Mexico State Highway 176/234 right-of-way.

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:

- 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 March 23, 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 March 23, 2012 Solid Radiological Waste

Solid Radiological Waste	2010 Startup to 2012 Present			
Assorted paper, rubber & cloth materials *	1,091	kg	2,400	lbs
Ventilation filters **	57	kg	125	lbs
Totals	**1,148**	**kg**	**2,525**	**lbs**

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

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

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	
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.

4 ENVIRONMENTAL IMPACTS

This chapter evaluates the potential environmental impacts associated with the UUSA facility capacity expansion. The chapter is divided into sections that assess the impact to each related resource described in Chapter 3, Description of Affected Environment. These include land use (4.1), transportation (4.2), geology and soils (4.3), as well as water resources (4.4), ecological (4.5), air quality (4.6), noise (4.7), historic and cultural (3.8), and visual/scenic (4.9). Other topics included are socioeconomic (4.10), environmental justice (4.11), public and occupational health (4.12), and waste management (4.13).

4.1 Land Use Impacts

4.1.1 Construction Impacts

The proposed expansion site is already developed by the existing UUSA facility. Additional land use impacts from the expansion will be limited as the site has been cleared and additional construction will occur within previously disturbed areas.

The facility capacity expansion would not result in any conflicts between Federal, State, regional and local (and in the case of a reservation, American Indian tribe) land-use plans, policies and controls because all land use will continue to be within the pre-existing and fenced borders of the UUSA site. The proposed facility capacity expansion would not result in any impacts to land classified as floodplain, wetlands or coastal zone.

The continued land use for the facility capacity expansion would not result in any additional impacts that would prevent current or planned mineral resources exploitation (e.g., sand and gravel, coal, oil, natural gas or ores). None of this activity is currently allowed on the site property, and the land use to support the proposed facility capacity expansion will be limited to the current property.

During the expansion of the UUSA facility, conventional earthmoving and grading equipment will be 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 already limited due to the existing facility and currently erected fencing. Any small wildlife will have the opportunity to move to areas of suitable habitat bordering the UUSA site.

The anticipated effects on the soil during the expansion are limited to a potential short-term increase in soil erosion. However, this will be 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 Chapter 5, Mitigation Measures, onsite construction roads will be periodically watered down, if required, to control fugitive dust emissions. Water conservation will be 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 will be controlled during the expansion through compliance with the National Pollution Discharge Elimination System (NPDES) Construction General Permit obtained from Region 6 of the Environmental Protection Agency (EPA). BMPs will be 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 will be used to minimize solid waste and hazardous materials during the construction of the expanded facility. 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 will be collected. If external washing of construction vehicles is necessary, no detergents will be used, and the runoff will be diverted to onsite retention basins. Adequately maintained sanitary facilities will be provided for construction crews.

4.1.2 Utilities Impacts

The ongoing construction of the UUSA facility to support the proposed facility capacity expansion will not require the installation of additional water and electrical utility lines. Existing potable and sewer water connection exist to support the proposed facility capacity expansion.

Existing and previously upgraded electrical transmission lines on a large loop system are adequate to support the proposed facility capacity expansion. Sanitary wastewater will continue to be sent to the City of Eunice Wastewater Treatment Plant via a system of lift stations and sewage lines. Overall land use impacts to the site and vicinity will be small considering that the majority of the site is developed and operating, the industrial activity on neighboring properties, the nearby expansive oil and gas well fields, and the sufficient existing utility installations. UUSA is not aware of any Federal action that would have cumulatively significant land use impacts.

4.1.3 Cumulative Impacts

As described, the current operation of UUSA is located in a sparsely populated area surrounded by several industrial installations. Land further to the north, south, and west of the site has been mostly developed by the oil and gas industry with hundreds of oil pump jacks and associated rigs. Range cattle are also raised on this land. WCS has been granted a license application for disposal of low-level radioactive wastes approximately 1.6 kilometers (1 mile) east of the UUSA site. Of the 582 hectares (1,438 acres) of the land owned by WCS, 81 hectares (200 acres) are occupied by the existing disposal and waste storage facilities and the disposal cells would occupy an additional 81 hectares (200 acres) (WCS, 2004). This would be in addition to a sanitary landfill, several land farms, and disposal facilities for oil industry wastes operated by others in the area. Other projects considered for cumulative impacts are located more than 10 miles from the UUSA site and would therefore not impact this local resource.

The proposed expansion of UUSA will be confined to construction within the existing property, and would not substantially change the land use in the region. The current local land use is predominantly industrial and no cumulative impacts to this resource are anticipated from UUSA and the activities at the surrounding properties.

4.1.4 Comparative Land Use Impacts of No-Action Scenarios

Supplemental ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the capacity expansion construction and operation of UUSA, including an alternative of "no action," i.e., not expanding the current capacity. The following information provides comparative conclusions specific to the concerns addressed in this subsection for each of the three "no action" alternative scenarios addressed in ER Section 1.2.5 and Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios.

While small, all of these No-Action Scenarios will have limited land use impacts at the UUSA site because 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.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. No additional land use impacts at the UUSA site or at other potential sites.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The land use resource impact would likely be increased due to construction and clearing on two additional sites. The land use resource impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The land use resource impact would likely be increased due to construction and clearing on three additional sites. The land use resource impacts for these three additional projects are evaluated in the individual environmental impact statements for the projects.

4.1.5 Section 4.1 Figures

Figure 4.1-1 Site Plan Showing Proposed Facility Capacity Expansion and Undeveloped Areas

4.2 Transportation Impacts

Section 4.2 of the LES ER describes the transportation impacts of constructing and operating the UUSA facility; Section 3.2 of this Supplemental ER describes the current transportation impacts of the existing operations and construction. The impacts to transportation from the expansion will be similar in nature to those created by the initial construction and operation. LES ER Section 4.2 is incorporated by reference; only how the expansion will or will not affect its conclusions is described below.

4.2.1 Construction of Access Road

No additional access roads will be required to support the proposed facility capacity expansion. The existing construction access road will be utilized up to the point of additional UBS Basin construction. At that point the access road will be restored and modified as necessary to accommodate the basin construction. Impacts due to access road construction will be negligible.

4.2.2 Transportation Route

Expansion will not change the routes described in Section 4.2.2 of the LES ER and Section 3.2.2 of this Supplemental ER.

4.2.3 Traffic Pattern Impacts

The expansion will impact local traffic patterns in a way similar to the initial construction and operation of the plant, but with a small increase in traffic due to a slightly larger number of construction and operational workers. See LES ER Section 4.2.4. New Mexico Highway 176 already provides direct access to the site. As a main east-west trucking thoroughfare for local industry, it will handle this slight uptick in traffic adequately.

With the expansion and current operations, the operational workforce at UUSA will increase to approximately 258 people, up from the 210 evaluated prior to site construction, and slightly higher than the current 250. Thus the maximum potential increase from the impacts initially evaluated to traffic due to operational workers is an additional 48 roundtrips per day. This is an upper bound estimate since all workers do not work on any given day. 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 towards 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.

The maximum potential increase to traffic due to operational deliveries and waste removal will be 4,300 roundtrips per year (see LES ER Section 4.2.3). This value is based on an estimated 1,500 radiological shipments per year plus 2,800 non-radiological shipments per year.

Referring to Table 4.10-1, Estimated Number of Construction Workers by Annual Pay, the maximum number of construction workers will be approximately 1000 during the peak of the expansion construction period, 200 more than estimated in the LES ER. Thus the maximum potential increase to traffic due to construction workers is 200 more roundtrips per day. The maximum potential increase to traffic due to construction deliveries and waste removal is 10,318 roundtrips over the ongoing construction period. This value is based on the estimated number of material deliveries and construction waste shipments during the period of ongoing construction. Work shifts will be implemented and carpooling will be encouraged to minimize the impact to traffic due to construction workers in the site vicinity.

4.2.4 Construction Transportation Impacts

Impacts from expansion-related construction transportation will include the generation of fugitive dust, changes in scenic quality, and added noise. These impacts will be very similar to those generated during the initial and ongoing construction (see LES ER Section 4.2.4 and Supplemental ER Section 3.2).

Dust will be generated to some degree during the various phases of construction activity. The amount of dust emissions will vary according to the types of activity. Air quality impacts from construction of the UUSA were evaluated using emission factors and air dispersion modeling prior to the initial construction on the site. Emission rates for fugitive dust were calculated using emission factors provided in AP-42, the U.S. Environmental Protection Agency's Compilation of Air Pollutant Emission Factors (EPA, 1995). More detailed discussions of air emissions and dispersion modeling can be found in Supplemental ER Section 4.6.1, Air Quality Impacts from Construction.

For air modeling purposes, emission rates for fugitive dust, as listed in Table 4.6-1, Peak Emission Rates were estimated for construction work hours assuming peak construction activity levels were maintained throughout the year. The calculated Total Work-Day Average Emissions result for fugitive emission particulates is 2.4 g/s (19.1 lbs/hr). Fugitive dust will originate predominantly from vehicle traffic on unpaved surfaces, earth moving, excavating and bulldozing, and to a lesser extent from wind erosion. Fugitive dust emissions were estimated using an AP-42 emission factor for construction site preparation that was adjusted to account for dust suppression measures, and the fraction of total suspended particulate that is expected to be in the range of particulates less than or equal to 10 micrometers (PM10) in diameter.

Emissions were modeled as a uniform area source with emissions occurring during construction work hours throughout the year. PM10 emissions from fugitive dust were also below the National Ambient Air Quality Standards (NAAQS). The results of the fugitive dust estimates should be viewed in light of the fact that the peak anticipated fugitive emissions were assumed to occur throughout the year, and that a reduction in the fugitive dust emissions was assumed for dust suppressant activities. These conservative assumptions will result in predicted air concentrations that tend to overestimate the potential impacts.

As detailed in ER Section 4.7, Noise Impacts, the temporary increase in noise levels along New Mexico Highways 18 and 176 and Texas Highway 176 due to construction vehicles are not expected to impact nearby receptors significantly, due to substantial truck traffic currently using these roadways.

4.2.5 Mitigation Measures

Mitigation measures are described in Section 4.2.5 of the LES ER and are incorporated by reference.

4.2.6 Radioactive Material Transportation

Radioactive material shipments will be transported in packages that meet the requirements of 10 CFR 71 and 49 CFR 173. The Nuclear Regulatory Commission (NRC) has evaluated the environmental impacts resulting from the transport of nuclear materials in NUREG-0170, Final Environmental Statement on the Transportation of Radioactive Material By Air and Other Modes (NRC, 1977a), updated by NUREG/CR-4829, Shipping Container Response to Severe Highway and Railway Accident Conditions (NRC, 1987a). These references include accident scenarios related to the transportation of radioactive material. The NRC found that these accidents have no significant environmental impacts. The materials that will be transported to and from UUSA are within the scope of the environmental impacts previously evaluated by the NRC. Because these impacts have been addressed in a previous NRC environmental impact statement, these impacts do not require further evaluation in this report (NRC, 1977a).

UUSA's processes for transporting radioactive materials and their impacts are comprehensively described in LES ER Section 4.2.7. That section is incorporated by reference; only changes relating to the expansion or to the existing facility's operation will be described in this Supplemental ER.

4.2.6.1 Uranium Feed

The uranium feed for UUSA is natural uranium in the form of uranium hexafluoride (UF_6). No reprocessed uranium is currently used as feed material for the facility. The UF_6 is transported to the facility in 48Y cylinders. These cylinders are designed, fabricated and shipped in accordance with American National Standards Institute (ANSI) N14.1, Uranium Hexafluoride – Packaging for Transport. Feed cylinders are transported to the site by 18-wheeled trucks, one per truck (48Y).

With the expansion to 10 MSWU facility, the total feed shipments are anticipated to range from 350 to 1,365 shipments of feed cylinders per year.

4.2.6.2 Uranium Product

The product of the UUSA facility is transported in 30B cylinders. These cylinders are designed, fabricated and shipped in accordance with the ANSI standard for packaging and transporting UF_6 cylinders, N14.1. Product cylinders are transported from the site to fuel fabrication facilities by modified flatbed truck.

With the expansion, shipment frequency will increase from approximately one shipment every three days to one every one and a half days, or 220 shipments a year, up from 122 per year.

4.2.6.3 Depleted Uranium and Uranium Wastes

Depleted uranium in UBCs will be shipped to conversion or storage 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). UUSA does not anticipate rail transport will be used to ship UBCs from the site.

With the expansion, the operational capacity for storage, the amount of UBCs generated, and the quantity of anticipated future shipments of UBCs per year will all increase. For the proposed facility capacity expansion, the total operational capacity for storage will be 25,000 cylinders. UBCs will be generated at a maximum rate of 1,250 cylinders per year at the proposed 10 MSWU facility capacity. For purposes of modeling and assessing the transportation impacts shipments of UBCs per year (type 48Y) will range from 185 to 1,390 per year. At present, UBCs will be temporarily stored onsite until conversion facilities are available. The transportation impacts for shipments of depleted uranium have been evaluated for transfers to deconversion facilities either in Paducah, Kentucky, or to the proposed new facility in Hobbs, New Mexico (the International Isotopes Fluorine Products Facility - IIFP). The IIFP site, if constructed and commissioned, will be located approximately 20 miles from the UUSA site (H&A, 2012a). The

Paducah site is more distant and was included to evaluate the potential transportation impacts for shipments to more distant deconversion facilities.

4.2.6.4 Low Level Uranium Wastes

Low level radioactive 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, which will be shipped from the UUSA facility for disposal are presented in Supplemental ER Section 3.12, Waste Management. Supplemental ER Table 4.13-1 presents a summary of the types of waste materials. The number of these waste material packages will increase with the expansion, from approximately 477 fifty-five gallon drums of solid waste annually, to between 1,140 and 1,380. Using a nominal 60 drums per waste truck shipment, approximately 19 to 23 low level waste shipments per year are anticipated with the expansion. Impacts for transportation of the annual generation of these wastes to a potential disposal site located near Clive, UT have been evaluated by modeling (H&A, 2012a). The neighboring WCS facility, which has recently been approved for disposal of these wastes, was not evaluated for transportation impacts, due to the short transportation distance.

4.2.7 Incident-Free Scenario Dose

An evaluation of the impacts associated with the transport of radiological materials for the proposed facility capacity expansion was completed for this Supplemental ER. The assessment evaluated potential impacts during transportation to and from a similar list of facilities as was previously evaluated in prior to the initial site construction. For purposes of the evaluation the following assumptions were made:

- Options to source feed from Port Hope, Ontario, Canada and Metropolis, IL were evaluated. Feed brought to the site will increase to a rate of 1,365 cylinders annually, when the facility completes construction and commissioning of the proposed 10 MSWU capacity. The initial modeling assessment considered a rate of 1,386.
- Product will continue to be delivered to Fuel Fabrication Facilities at Richland, Washington, Columbia, South Carolina, and Wilmington, North Carolina. Product shipments are expected to reach 220 per year based on the proposed facility capacity expansion to 10 MSWU.
- DUF_6 has been evaluated to be transferred to deconversion facilities either in Paducah, Kentucky, or to the proposed new facility in Hobbs, New Mexico (the International Isotopes Fluorine Products Facility - IIFP). The IIFP site, if constructed and commissioned, will be located approximately 20 miles from the UUSA site. The DUF_6 would be placed in Type 48Y cylinders for temporary onsite storage with eventual shipment offsite.
- Radioactive wastes have been evaluated to be transported to one of two disposal locations Energy Solutions in Clive, Utah (formerly Envirocare), and Waste Control Specialists in Andrews County, Texas, which has recently been approved to dispose of Class A, B, and C wastes at the facility neighboring the UUSA location. Because one facility does not require an extended over the road transport, the impacts were assessed for transport to the Clive, Utah facility. Due to the proposed facility capacity expansion to 10 MSWU the quantities of radiological wastes do increase slightly during the operation of the facility.

The transportation impacts modeled and reported are inclusive of additional low level radiological waste generated by the solidification of waste water. This wastewater had previously been evaluated for impacts associated with onsite treatment through evaporative processes. Wastewater will be solidified with grout and both the volume and weight will increase, resulting in approximately 20 additional truckloads of low level waste transported to Clive, Utah, annually. The additional potential impacts due to transport of the solidified waste water have been shown to represent a negligible addition to impacts previously evaluated. The curie inventory for these materials is also slightly different and those changes have been evaluated in the model output.

The impact assessment determines the origin and destination of each type of radioactive material, the amount of material in each shipment, the route to be used, and impacts to the environment from these shipments. The WebTragis and RADTRAN 6 computer codes were used extensively and are discussed in detail (ORNL, 2003; Neuhauser and Kanipe, 2003). The analysis is organized into separate sections that describe the radioactive materials, the shipping routes, the dose assessments, and the results. The radionuclide data and shipping container characteristics for input into RADTRAN 6 were obtained from the U.S. Department of Energy's (DOE's) *A Resource Handbook on DOE Transportation Risk Assessment* (DOE, 2002) and the NRC's NUREG-0170 (NRC, 1977).

UUSA has identified Port Hope in Ontario, Canada as a source of feed material to the Eunice, NM site, and has identified the potential for shipment of enriched uranium from the facility for export to Japan. It is possible that UUSA could also import feed materials from overseas suppliers. This case was previously evaluated in the initial EIS and the impacts were determined to be small. If import or export were to be pursued, UUSA would need to comply with licensing and other requirements for import and export activities in 10 CFR Part 110. Any import or export activity would also need to be conducted in accordance with transportation security requirements in 10 CFR Part 73. Imports and exports would be transported via truck between the seaport and the UUSA facility. East coast or west coast seaports would be utilized. Modeling was completed for the transport of enriched uranium from UUSA to fuel fabrication facilities in Wilmington, North Carolina; Columbia, South Carolina; and Richland, Washington. These analyses are representative of enriched uranium shipments from UUSA to east coast and west coast seaports identified above, because the truck and rail routes that would be used in transporting enriched uranium to these seaports have similar distances and population densities to the routes analyzed for shipments to the domestic fuel fabrication facility destinations.

Table 4.2-1 presents the nonradiological impacts from the shipment of radioactive material. It shows the estimated potential impact in terms of fatalities resulting from traffic accidents. The nonradiological impacts (fatalities from traffic accidents) dominate the impacts for each material-route combination. Fatalities from traffic accidents were estimated to range between 0.0174 individuals per year in Phase 1 to 0.122 per year in Phase 5 (full capacity shipping rates).

Table 4.2-2 presents the radiological impacts in terms of latent cancer fatalities from incident-free transport. Incident-free transport represents the transport of the radioactive shipment without a release from the shipment. Radiological latent cancer fatalities from incident-free transport were estimated to range between 0.00333 individuals per year in Phase 1 to 0.0168 individuals per year in Phase 5.

Table 4.2-3 presents the radiological impacts from accidents during these shipments. Accident results include the impact (risk per year) from various accident scenarios that potentially could occur during the transport of the radioactive material. The results are presented in terms of risk, which means weighting the impact, of the various accident scenarios by the frequency that the accident scenario occurs. Radiological latent cancer fatalities from accidents during shipment range between 0.00314 individuals a year in Phase 1 to 0.0140 individuals per year in Phase 5.

4.2.8 Cumulative Impacts

The ongoing construction, operation, and decommissioning of the UUSA through the proposed facility capacity expansion would result in a small to moderate impact due to traffic from commuting construction workers and operational personnel. There will be increased shipments of radiological materials to and from the UUSA facility due to the proposed facility capacity expansion. Cumulative impacts associated with transportation of radiological materials will occur with the recent licensing of the WCS facility as a disposal location, which is nearly adjacent to the UUSA facility. It is anticipated the cumulative impact to the state highway systems that service the facilities (NM176 and TX 176) will be minimal as there is sufficient capacity on these major roadways. No cumulative impact is anticipated due to other energy projects in the vicinity due to existing development in the nearby areas or due to the WIIP project, which is a significant distance from the UUSA site. There are potential cumulative impacts from the proposed construction and operation of the IIFP facility in Hobbs, New Mexico as this facility is anticipated to receive depleted materials from UUSA for deconversion processes. The proposed IIFP site will be located approximately 20 miles from the UUSA site. It is anticipated the IIFP site will also receive depleted materials from other sources along the same or similar transportation routes. The EIS for the IIFP site concluded that the radiological impacts associated with combined Phase 1 and Phase 2 operations at IIFP would result in a total population dose of 1.7 person-Sv (170 person-rem) annually. Statistically, this dose could result in 0.10 LCFs annually. When combined with the radiological transportation impacts from operation of the UUSA facility (0.1 LCFs over the facility life) and radiological transportation impacts from the WIPP (less than 1 LCF annually), the NRC staff found that the cumulative radiological impacts from transportation would be SMALL (less than 1 LCF annually) (IIFP, 2009a). The radiological transportation impacts evaluated for the UUSA proposed facility capacity expansion remain less than 1 LCF annually, and the evaluation of the cumulative impacts from these projects will remain small as evaluated recently by NRC on the IIFP evaluation.

With the implementation of all current and planned or proposed future actions within the vicinity of the existing UUSA facility traffic volumes would contribute to cumulative impacts. However, no changes are anticipated in the small to moderate cumulative effects for nonradiological or radiological transportation.

4.2.9 Comparative Transportation Impacts of No Action Scenarios

Supplemental ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the capacity expansion construction and operation of UUSA, including an alternative of "no action," i.e., not expanding the current capacity. The following information provides comparative conclusions specific to the concerns addressed in this subsection for each of the three "no action" scenarios addressed in ER Section 2.3 and Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. No additional transportation impacts at the UUSA site or at other potential sites.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of

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Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The transportation impacts would likely be increased due to construction and operation on two additional sites. The transportation impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The transportation impacts would likely be increased due to construction and operations on three additional sites. The transportation impacts for these three additional projects are evaluated in the individual environmental impact statements for the projects.

4.2.10 Section 4.2 Tables

Table 4.2-1. Nonradiological Fatalities from Truck Transportation

Phase 1	Accidents	Fatalities
Port Hope, ON	1.95E-01	6.25E-03
Metropolis, IL	1.25E-01	3.99E-03
Richland, WA	3.37E-03	1.08E-04
Columbia, SC	2.56E-03	8.19E-05
Wilmington, NC	2.81E-03	8.99E-05
Clive, UT (Solid Waste)	4.80E-01	6.48E-03
Clive, UT (Liquid Waste)	5.55E-04	1.78E-05
Paducah, KY	8.54E-02	3.19E-04
Hobbs, NM	5.55E-04	1.78E-05
Total	**8.95E-01**	**1.74E-02**
Phase 2	**Accidents**	**Fatalities**
Port Hope, ON	4.00E-01	1.28E-02
Metropolis, IL	2.56E-01	8.18E-03
Richland, WA	7.49E-03	2.40E-04
Columbia, SC	5.69E-03	1.82E-04
Wilmington, NC	6.25E-03	2.00E-04
Clive, UT (Solid Waste)	6.15E-01	1.97E-02
Clive, UT (Liquid Waste)	1.60E-03	5.11E-05
Paducah, KY	2.46E-01	7.86E-03
Hobbs, NM	1.60E-03	5.11E-05
Total	**1.54E+00**	**4.92E-02**
Phase 3	**Accidents**	**Fatalities**
Port Hope, ON	4.64E-01	1.49E-02
Metropolis, IL	2.97E-01	9.49E-03
Richland, WA	1.27E-02	4.07E-04
Columbia, SC	9.67E-03	3.09E-04
Wilmington, NC	1.06E-02	3.40E-04
Clive, UT (Solid Waste)	1.01E+00	3.23E-02
Clive, UT (Liquid Waste)	2.50E-03	8.01E-05
Paducah, KY	3.85E-01	1.23E-02

Hobbs, NM	2.50E-03	8.01E-05
Total	**2.19E+00**	**7.02E-02**
Phase 4	**Accidents**	**Fatalities**
Port Hope, ON	6.22E-01	1.99E-02
Metropolis, IL	3.97E-01	1.27E-02
Richland, WA	1.76E-02	5.63E-04
Columbia, SC	1.34E-02	4.28E-04
Wilmington, NC	1.47E-02	4.70E-04
Clive, UT (Solid Waste)	1.38E+00	4.41E-02
Clive, UT (Liquid Waste)	3.41E-03	1.09E-04
Paducah, KY	5.25E-01	1.68E-02
Hobbs, NM	3.41E-03	1.09E-04
Total	**2.97E+00**	**9.52E-02**
Phase 5	**Accidents**	**Fatalities**
Port Hope, ON	7.74E-01	2.48E-02
Metropolis, IL	4.94E-01	1.58E-02
Richland, WA	2.21E-02	7.07E-04
Columbia, SC	1.68E-02	5.37E-04
Wilmington, NC	1.84E-02	5.90E-04
Clive, UT (Solid Waste)	1.85E+00	5.89E-02
Clive, UT (Liquid Waste)	4.17E-03	1.33E-04
Paducah, KY	6.42E-01	2.05E-02
Hobbs, NM	4.17E-03	1.33E-04
Total	**3.82E+00**	**1.22E-01**

Source: SNL, 2007.

Table 4.6-2. Radiological Latent Cancer Fatalities from Incident-Free Transportation of Radioactive Materials

Phase 1	Crew	Public Off Link	Public On Link	Stops	Loading	Total
Port Hope, ON	3.95E-04	4.69E-05	3.87E-04	6.00E-07	5.53E-05	8.85E-04
Metropolis, IL	2.33E-04	2.43E-05	1.67E-04	9.30E-04	5.53E-05	1.41E-03
Richland, WA	2.04E-06	2.03E-07	2.51E-06	1.24E-05	2.37E-06	1.95E-05
Columbia, SC	1.73E-06	3.15E-07	2.16E-06	8.11E-06	2.37E-06	1.47E-05

Wilmington, NC	1.88E-06	3.32E-07	2.26E-06	9.67E-06	2.37E-06	1.65E-05
Clive, UT (Solid)	4.81E-07	2.97-08	3.26E-07	2.45E-06	3.82E-07	3.16E-06
Clive, UT (Liquid)	9.18E-08	6.27E-09	7.65E-08	5.16E-07	4.02E-08	7.31E-07
Paducah, KY	1.40E-04	8.95E-06	8.15E-05	7.15E-04	1.61E-05	9.61E-04
Hobbs, NM	9.86E-07	1.52E-07	3.85E-07	5.31E-06	1.61E-05	2.29E-05
Total	**7.75E-04**	**8.12E-05**	**6.43E-04**	**3.10E-03**	**1.50E-04**	**3.33E-03**
Phase 2	**Crew**	**Public Off Link**	**Public On Link**	**Stops**	**Loading**	**Total**
Port Hope, ON	8.07E-04	9.60E-05	7.91E-04	6.00E-07	1.31E-04	1.83E-03
Metropolis, IL	4.77E-04	4.98E-05	3.40E-04	1.90E-03	1.31E-04	2.90E-03
Richland, WA	4.74E-06	4.75E-07	5.85E-06	2.89E-05	8.68E-06	4.86E-05
Columbia, SC	4.04E-06	7.37E-07	5.06E-06	1.89E-05	8.68E-06	3.74E-05
Wilmington, NC	4.37E-06	7.75E-07	5.28E-06	2.26E-05	8.68E-06	4.17E-05
Clive, UT (Solid)	4.59E-07	3.13E-08	3.82E-07	2.58E-06	4.02E-07	3.85E-06
Clive, UT (Liquid)	9.18E-08	6.27E-09	7.65E-08	5.16E-07	4.02E-08	7.31E-07
Paducah, KY	3.99E-04	2.56E-05	2.33E-04	2.04E-03	7.24E-05	2.77E-03
Hobbs, NM	2.82E-06	4.34E-07	1.10E-06	1.52E-05	7.24E-05	9.20E-05
Total	**1.70E-03**	**1.74E-04**	**1.38E-03**	**6.93E-03**	**4.33E-04**	**7.72E-03**
Phase 3	**Crew**	**Public Off Link**	**Public On Link**	**Stops**	**Loading**	**Total**
Port Hope, ON	9.37E-04	1.11E-04	9.18E-04	6.00E-07	1.31E-04	2.10E-03
Metropolis, IL	5.53E-04	5.78E-05	3.95E-04	2.21E-03	1.31E-04	3.35E-03
Richland, WA	7.47E-06	7.46E-07	9.19E-06	4.54E-05	8.68E-06	7.15E-05
Columbia, SC	6.35E-06	1.16E-06	7.94E-06	2.97E-05	8.68E-06	5.38E-05
Wilmington, NC	6.87E-06	1.21E-06	8.31E-06	3.55E-05	8.68E-06	6.06E-05
Clive, UT (Solid)	4.82E-07	3.29E-08	4.01E-07	2.71E-06	4.22E-07	4.05E-06
Clive, UT (Liquid)	9.18E-08	6.27E-09	7.65E-08	5.16E-07	4.02E-08	7.31E-07
Paducah, KY	6.26E-04	4.01E-05	3.65E-04	3.20E-03	7.24E-05	4.30E-03
Hobbs, NM	4.42E-06	6.80E-07	1.73E-06	2.38E-05	7.24E-05	1.03E-04
Total	**2.14E-03**	**2.13E-04**	**1.71E-03**	**8.92E-03**	**4.33E-04**	**1.00E-02**
Phase 4	**Crew**	**Public Off Link**	**Public On Link**	**Stops**	**Loading**	**Total**
Port Hope, ON	1.26E-03	1.49E-04	1.23E-03	6.00E-07	1.76E-04	2.81E-03
Metropolis, IL	7.41E-04	7.73E-05	5.29E-04	2.96E-03	1.76E-04	4.48E-03
Richland, WA	1.08E-05	1.08E-06	1.34E-05	6.60E-05	1.26E-05	1.04E-04
Columbia, SC	9.23E-06	1.69E-06	1.16E-05	4.33E-05	1.26E-05	7.84E-05
Wilmington, NC	1.00E-05	1.78E-06	1.21E-05	5.16E-05	1.26E-05	8.80E-05
Clive, UT (Solid)	4.82E-07	3.29E-08	4.01E-07	2.71E-06	4.22E-07	4.05E-06

Clive, UT (Liquid)	9.18E-08	6.27E-09	7.65E-08	5.16E-07	4.02E-08	7.31E-07
Paducah, KY	8.54E-04	5.47E-05	4.98E-04	4.37E-03	9.88E-05	5.88E-03
Hobbs, NM	6.03E-06	9.28E-07	2.36E-06	3.25E-05	9.88E-05	1.41E-04
Total	**2.89E-03**	**2.87E-04**	**2.30E-03**	**1.20E-02**	**5.88E-04**	**1.36E-02**
Phase 5	**Crew**	**Public Off Link**	**Public On Link**	**Stops**	**Loading**	**Total**
Port Hope, ON	1.56E-03	1.86E-04	1.53E-03	6.00E-07	2.19E-04	3.50E-03
Metropolis, IL	9.22E-04	9.63E-05	6.58E-04	3.68E-03	2.19E-04	5.58E-03
Richland, WA	1.36E-05	1.36E-06	1.67E-05	8.25E-05	1.58E-05	1.30E-04
Columbia, SC	1.15E-05	2.10E-06	1.44E-05	5.41E-05	1.58E-05	9.80E-05
Wilmington, NC	1.25E-05	2.21E-06	1.51E-05	6.45E-05	1.58E-05	1.10E-04
Clive, UT (Solid)	5.28E-07	3.60E-08	4.40E-07	2.97E-06	4.62E-07	4.44E-06
Clive, UT (Liquid)	9.18E-08	6.27E-09	7.65E-08	5.16E-07	4.02E-08	7.31E-07
Paducah, KY	1.04E-03	6.68E-05	6.09E-04	5.34E-03	1.21E-04	7.18E-03
Hobbs, NM	7.37E-06	1.14E-06	2.88E-06	3.97E-05	1.21E-04	1.72E-04
Total	**3.57E-03**	**3.56E-04**	**2.85E-03**	**1.49E-02**	**7.28E-04**	**1.68E-02**

Source: SNL, 2007.

Table 4.2-3. Radiological Latent Cancer Fatalities from Accidents during Transportation of Radioactive Materials

Phase 1	**Inhaled**	**Resuspended Soil**	**Cloud Shine**	**Ground**	**Total Risk of LCF**
Port Hope, ON	1.85E-03	7.72E-05	5.80E-10	4.11E-08	1.93E-03
Metropolis, IL	6.74E-04	2.82E-05	2.11E-10	1.50E-08	7.02E-04
Richland, WA	1.07E-04	4.47E-06	2.67E-11	1.81E-09	1.12E-04
Columbia, SC	8.19E-05	3.42E-06	2.05E-11	1.39E-09	8.54E-05
Wilmington, NC	8.46E-05	3.53E-06	2.11E-11	1.43E-09	8.81E-05
Clive, UT (Solid Waste)	3.02E-09	1.26E-10	1.52E-14	1.07E-12	3.15E-09
Clive, UT (Liquid Waste)	1.17E-08	4.87E-10	3.66E-15	2.59E-13	1.22E-08
Paducah, KY	2.15E-04	8.98E-06	7.19E-11	5.21E-09	2.24E-04
Hobbs, NM	1.06E-06	4.41E-08	3.53E-13	2.56E-11	1.10E-06
Total	**3.01E-03**	**1.26E-04**	**9.32E-10**	**6.59E-08**	**3.14E-03**
Phase 2	**Inhaled**	**Resuspended Soil**	**Cloud Shine**	**Ground**	**Total Risk of LCF**
Port Hope, ON	3.76E-03	1.57E-04	1.18E-09	8.34E-08	3.91E-03
Metropolis, IL	1.34E-03	5.60E-05	4.20E-10	2.98E-08	1.40E-03
Richland, WA	2.50E-04	1.04E-05	6.24E-11	4.24E-09	2.60E-04
Columbia, SC	1.92E-04	8.01E-06	4.79E-11	3.25E-09	2.00E-04
Wilmington, NC	1.93E-04	8.06E-06	4.81E-11	3.27E-09	2.01E-04
Clive, UT (Solid Waste)	2.36E-07	9.88E-09	7.94E-14	5.36E-12	2.46E-07
Clive, UT (Liquid Waste)	2.10E-05	8.78E-07	7.03E-12	5.10E-10	2.19E-05
Paducah, KY	5.93E-04	2.48E-05	1.99E-10	1.44E-08	6.18E-04
Hobbs, NM	2.79E-06	1.17E-07	9.34E-13	6.77E-11	2.91E-06
Total	**6.35E-03**	**2.66E-04**	**1.96E-09**	**1.39E-07**	**6.69E-03**
Phase 3	**Inhaled**	**Resuspended**	**Cloud Shine**	**Ground**	**Total Risk of**

		Soil			LCF
Port Hope, ON	4.39E-03	1.84E-04	1.38E-09	9.75E-08	4.57E-03
Metropolis, IL	1.60E-03	6.69E-05	5.02E-10	3.54E-08	1.66E-03
Richland, WA	3.93E-04	1.64E-05	9.81E-11	6.65E-09	4.09E-04
Columbia, SC	3.01E-04	1.26E-05	7.50E-11	5.09E-09	3.13E-04
Wilmington, NC	3.10E-04	1.30E-05	7.74E-11	5.25E-09	3.23E-04
Clive, UT (Solid Waste)	4.11E-07	1.71E-08	8.40E-14	5.91E-12	4.28E-07
Clive, UT (Liquid Waste)	1.17E-08	4.87E-10	3.66E-15	2.59E-13	1.22E-08
Paducah, KY	9.64E-04	4.03E-05	3.22E-10	2.34E-08	1.00E-03
Hobbs, NM	4.73E-06	1.98E-07	1.58E-12	1.14E-10	4.93E-06
Total	**7.96E-03**	**3.33E-04**	**2.45E-09**	**1.73E-07**	**8.28E-03**
Phase 4	**Inhaled**	**Resuspended Soil**	**Cloud Shine**	**Ground**	**Total Risk of LCF**
Port Hope, ON	5.89E-03	2.46E-04	1.84E-09	1.31E-07	6.13E-03
Metropolis, IL	2.14E-03	8.94E-05	6.71E-10	4.75E-08	2.23E-03
Richland, WA	5.71E-04	2.39E-05	1.43E-10	9.67E-09	5.95E-04
Columbia, SC	4.38E-04	1.83E-05	1.09E-10	7.40E-09	4.56E-04
Wilmington, NC	4.52E-04	1.88E-05	1.13E-10	7.65E-09	4.71E-04
Clive, UT (Solid Waste)	2.48E-07	1.04E-08	8.34E-14	5.63E-12	2.58E-07
Clive, UT (Liquid Waste)	1.17E-08	4.87E-10	3.66E-15	2.59E-13	1.22E-08
Paducah, KY	1.32E-03	5.49E-05	4.40E-10	3.18E-08	1.37E-03
Hobbs, NM	6.46E-06	2.70E-07	2.16E-12	1.57E-10	6.73E-06
Total	**1.08E-02**	**4.51E-04**	**3.32E-09**	**2.35E-07**	**1.13E-02**
Phase 5	**Inhaled**	**Resuspended Soil**	**Cloud Shine**	**Ground**	**Total Risk of LCF**
Port Hope, ON	7.31E-03	3.05E-04	2.29E-09	1.63E-07	7.62E-03
Metropolis, IL	2.66E-03	1.11E-04	8.36E-10	5.91E-08	2.77E-03
Richland, WA	7.14E-04	2.98E-05	1.79E-10	1.21E-08	7.44E-04
Columbia, SC	5.47E-04	2.28E-05	1.36E-10	9.26E-09	5.70E-04
Wilmington, NC	5.63E-04	2.35E-05	1.41E-10	9.55E-09	5.87E-04
Clive, UT (Solid Waste)	3.66E-09	1.53E-10	1.84E-14	1.30E-12	3.82E-09
Clive, UT (Liquid Waste)	1.17E-08	4.87E-10	3.66E-15	2.59E-13	1.22E-08
Paducah, KY	1.61E-03	6.70E-05	5.37E-10	3.90E-08	1.68E-03
Hobbs, NM	7.88E-06	3.29E-07	2.64E-12	1.91E-10	8.21E-06
Total	**1.34E-02**	**5.60E-04**	**4.12E-09**	**2.92E-07**	**1.40E-02**

Source: SNL, 2007.

4.3 Geology and Soil Impacts

Site geology and physiographic summary for the site area and soils, briefly summarized here, are fully described in Section 3.3, Geology and Soils of the LES ER and this Supplemental ER.

Subsurface geologic materials at the UUSA site generally consist of competent clay red beds, a part of the Chinle Formation of the Triassic-aged Dockum Group. Bedrock is covered approximately 40 feet of dune sand, caliche and sand and gravel alluvium.

Foundation conditions at the site are generally good and little to no potential for mineral development exists or has been found at the site, as discussed in LES ER Section 3.4.1.1, Major Surface and Subsurface Hydrological Systems.

The site terrain currently ranges in elevation from +3,390 to +3,430 ft mean sea level (msl) (Figure 3.3-1, Site Topographic Map). If needed, select engineered fill material may be brought onsite to achieve the backfill specifications for building footprints and some volume of native soil may be disposed of offsite to maintain a desirable soil stockpile balance. Surface stormwater runoff for the permanent facility are controlled by an engineered system described in LES ER Section 3.4.1.2, Facility Withdrawals and/or Discharges to Hydrologic Systems. Those controls essentially eliminate any potential for discharge of runoff from the UUSA site, including from the expansion.

Expansion construction activities may cause some short-term increases in soil erosion at the site, although rainfall in the region is limited. Erosional impacts due to site clearing and grading will be mitigated by utilization of construction and erosion control BMPs. (See ER Section 4.1, Land Use Impacts, for a discussion of construction BMPs.) Disturbed soils will be stabilized as part of construction work. Earth berms, dikes and sediment fences will be utilized as necessary during all phases of construction to limit runoff. Much of the excavated areas will be covered by structures or paved, limiting the creation of new dust sources. Watering will be used to control potentially fugitive construction dust. Water conservation will be considered when deciding how often dust suppression sprays will be applied. See ER Section 4.4.8, Control of Impacts for Water Quality, for a discussion of water conservation measures.

The Lea County Soils Survey describes soils found at the UUSA site (Figure 3.3-5, Site Soil Survey) as applicable for range, wildlife and recreation areas, and not for any standard agricultural activities (although selected soils are designated as farmlands of statewide importance, no current or anticipated agriculture development is likely at the site or vicinity). Construction and operation of the UUSA plant are thus not anticipated to displace any potential agrarian use.

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 specific project sites. The UUSA site is located in a region where there has been previous 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.

4.3.1 Comparative Geology and Soil Impacts of No Action Scenarios

Supplemental ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the capacity expansion construction and operation of the UUSA facility, including an alternative of "no action," i.e., expanding the current capacity. The following information provides comparative conclusions specific to the concerns addressed in this subsection for each of the three "no action" scenarios addressed in ER Section 2.3, Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. No additional geological or soil impacts at the UUSA site or at other potential sites.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The geology and soil impacts would be increased due to construction and clearing on two additional sites. The geological and soil resource impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The geology and soil impacts would be increased due to construction and clearing on three additional sites. The geological and soil resource impacts for these three additional projects are evaluated in the individual environmental impact statements for the projects.

4.4 Water Resource Impacts

Section 4.4 of the LES ER contains a complete discussion of the impacts of construction and operation of the UUSA facility to the site's water resources and is incorporated by reference. That analysis concluded that the potential for negative impacts on the limited water resources are very low due to lack of water presence and formidable natural barriers to any surface or subsurface water occurrences.

This LES ER Section 4.4 analysis continues to apply to the proposed expansion and is incorporated by reference. The proposed facility capacity expansion will have no new impacts or changed impacts to:

- the hydrological system,
- the water quality of surface water and groundwater,
- water availability, or
- ongoing mitigative measures.

Compared to the water consumption estimate of 23.1 million gallons per year evaluated prior to the initial construction, UUSA's 2010 annual water consumption calculation (LES, 2010) indicates a reduced impact to water consumption with the UUSA site using an estimated 15.8 million gallons per year.

4.4.1 Updates to Compliance with Water Resource Regulatory Requirements

With the operation of the UUSA facility and the proposed expansion, UUSA's compliance with water related regulatory requirements has and will change slightly from what was described in Section 4.4 of the LES ER. This section updates that discussion in LES ER Section 4.4.

- *A 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 (NMWQB). In 2009, the UUSA submitted a "No Exposure" Certification to the EPA (March 09, 2009), which exempted the site from National Pollution Discharge Elimination System stormwater permitting.
- *NPDES General Permit for Construction Stormwater:* Because ongoing construction at the UUSA site will continue to involve the disturbance of more than 0.4 ha (1 acre) of land, an NPDES Construction General Permit from EPA Region 6 and an oversight review by the New Mexico Water Quality Bureau (NMWQB) are required. UUSA developed a Storm Water Pollution Prevention Plan (SWPPP) and filed a NOI with the EPA, Washington, D.C., at least two days prior to the commencement of construction activities. Updated NOIs and appropriate plans will be maintained through the period of ongoing construction at the site.
- *Groundwater Discharge Permit/Plan:* The NMWQB 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 discharges stormwater to surface impoundments, and sends domestic septic wastes to the City of Eunice Wastewater Treatment Plant under Discharge Permit 1481 (DP-1481). Section 20.6.2.3.3104 NMAC of the New Mexico Water Quality

Control Commission (NMWQCC) Regulations (20.6.2 NMAC) requires that any person proposing to discharge effluent or leachate so that it may move directly or indirectly into groundwater must have an approved discharge permit, unless a specific exemption is provided for in the Regulations.

- *Section 401 Certification:* A Section 401 certification will continue to not be required: 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 does not require a 404 permit (USACE, 2004).

The overall UUSA site design relating to discharge of stormwater to site retention/detention basins and initial construction activities is discussed in LES ER Section 4.4. For the proposed facility capacity expansion, construction activities will continue beyond the original completion date of May 2014. The scope of construction will not change, but will continue over three additional phases projected through May 2020. Therefore, the potential water resource impacts due to construction will be spread over the additional period. The evaluation of impacts associated with the proposed facility capacity expansion assumes that annual water usage during construction will not exceed the original amount evaluated prior to the start of construction at the site.

4.4.2 Receiving Waters

With the expansion, the UUSA site will continue not to obtain any water or discharge any process effluents onto the site or into surface waters. Sanitary waste water is sent to the City of Eunice Wastewater Treatment Plant for processing via a system of lift stations and 8-inch sewage lines. Rain runoff from developed portions of the site is collected in retention/detention basins, described previously and in ER Section 3.4, Water Resources. These include the Site Stormwater Detention Basin and the UBC Storage Pad Stormwater Retention Basin. Additional UBC Storage Pad Retention Basins will be constructed to increase volume in support of the facility capacity expansion and the increase in size of the UBC Storage Pad.

Discharge from the Site Stormwater Detention Basin is performed by evaporation and by infiltration into the ground. Discharge from the UBC Storage Pad Stormwater Retention Basins will be by evaporation only.

The UUSA site includes no surface hydrologic features. Groundwater was encountered at depths of 65 to 68 m (214 to 222 ft). Significant quantities of groundwater are only found at a depth over 340 m (1,115 ft) where cover for that aquifer is provided by 323 to 333 m (1,060 to 1,092 ft) of clay, as described in LES ER Section 3.4.15, Groundwater Characteristics.

Due to high evapotranspiration rates for the area, there are not any receiving waters for runoff derived from the UUSA facility other than residual amounts from that collected in the Site Stormwater Detention Basin. At shallower depths vegetation at the site provides highly efficient evapotranspiration processes, as described in LES ER Section 3.4.1.1, Major Surface and Subsurface Hydrological Systems. That natural process removes the major part of stormwater runoff at the site.

Stormwater runoff detention/retention basins for the site, shown in Figure 4.4-1, Site Plan with Stormwater Detention/Retention Basins are designed to provide a means of controlling discharges of rainwater and runoff for about 39 ha (96 acres) of the UUSA site plus an additional 23 acres of UBC Storage Pad area. These areas represent a combined 119 acres of the 220 ha (543 acre) total UUSA site area.

The UBC Storage Pad Stormwater Retention Basins, which exclusively serve the paved, outdoor UBC Storage Pad, is lined to prevent any infiltration, and designed to retain a volume (233,100 m^3 (189 acre-ft)) slightly more than twice that for the 24-hour duration, 100-year frequency storm. The basin configuration allows for radiological testing of water and sediment (see ER Section 4.4.3, Impacts on Surface Water and Groundwater Quality), but the basins will contain no flow outlet. All discharge for the UBC Storage Pad Retention Basins is through evaporation. The current UBC Storage Pad was constructed of reinforced concrete with a minimal number of construction joints, and pad joints were provided with joint sealer and water stops as a leak-prevention measure. The ground surface around the UBC Storage Pad was contoured to prevent rainfall in the area surrounding the pad from entering the pad drainage system. Similar construction techniques will be followed for the additional basin construction.

The existing Site Stormwater Detention Basin is designed with an outlet structure for drainage, as needed. Local terrain serves as the receiving area for this basin. The basin is included in the site environmental monitoring program as described in ER Section 6.1, Radiological Monitoring and ER Section 6.2, Physiochemical Monitoring.

4.4.3 Impacts on Surface Water and Groundwater Quality

The UUSA operation does not obtain any water from the site or discharge process effluents to groundwater and surface waters. Therefore, the expansion is not expected to have any impacts on natural water systems quality due to facility water use.

With the expansion, control of surface water runoff will continue to be required for UUSA ongoing construction activities, covered by the NPDES Construction General Permit. As a result, no significant impacts are expected for either surface water bodies or groundwater.

During UUSA operation, stormwater from the site is collected in a collection system that includes runoff detention/retention basins, as described in ER Section 4.4.2, Receiving Waters and shown in ER Figure 4.4-1, Site Plan with Stormwater Detention/Retention Basins.

No wastes from facility operational systems are discharged to stormwater. UUSA provided an No Exposure Certificate to the EPA (March 09, 2009), which exempted the site from National Pollution Discharge Elimination System stormwater permitting. In addition, stormwater discharges during plant operation are controlled by a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP meets the requirements of U.S. EPA Construction General Permit (CGP) Section 3. The SWPPP identifies all potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharge from the site, describes the practices used to reduce pollutants in stormwater, and assures compliance with the terms and conditions of the CGP.

The UBC Storage Pad Stormwater Retention Basins will collect the runoff water from the UBC Storage Pad. This water runoff has a low potential to contain low-level radioactivity from cylinder surfaces or leaks. Runoff from the pad is currently channeled to a dedicated retention basin that is single-lined with a synthetic fabric with ample soil cover over the liner to prevent surface damage and ultraviolet degradation. This basin is described in ER Section 3.4.1.2, Facility Withdrawal and/or Discharges to Hydrologic Systems. It is suitable to contain at least the volume of water from slightly more than twice the 100-year, 24-hour-frequency rainfall of 15.2 cm (6.0 in). The drainage system includes precast catch basins and concrete trench drains; piping material is high density polyethylene (HDPE) with fused joint construction to prevent leakage. An assessment was made by UUSA that assumed a conservative level of radioactive contamination level on cylinder surfaces and 100% washoff to the UBC Storage Pad Stormwater Retention Basin from a single rainfall event. Results show the level of radioactivity in such a discharge to the basin will be well below the regulatory unrestricted release criteria. Two additional UBC basins will be constructed using similar design considerations as the UBC Storage Pad is expanded.

The UBC Storage Pad Stormwater Retention Basin is provided with a means to sample sediment. Refer to ER Section 6.1, Radiological Monitoring, for more information regarding environmental monitoring of stormwater site detention/retention basins.

4.4.4 Hydrological System Alterations

Excavation and placement of fill will provide the site with a finished level grade of about +1,041 m (+3,415 ft), msl. This work will not require alteration or filling of any surface water features on the site.

No alterations to groundwater systems occurred due to facility construction and none are expected during the proposed facility capacity expansion. Referring to ER Section 3.4 and LES ER Section 3.4.15, since there is no consistent groundwater in the sand and travel layer above the Chinle Formation, it does not provide a likely contaminant pathway in a lateral or vertical direction. Although engineered fill was used during site preparation and was placed against the existing dense sand and gravel layer in some locations, the potential for water or other liquids from spills or pipeline leaks to introduce sufficient amounts of liquid to saturate the sand and gravel layer to a point where significant contaminant migration reaches and flows along the top of the Chinle Formation, is considered unlikely. The addition of onsite fill is not expected to alter this situation. Furthermore, the travel time to downstream users through a lateral contaminant pathway would be significant since potential contamination would travel laterally at very small rates, if at all. Groundwater travel through the Chinle clay would be on the order of thousands of years.

4.4.5 Hydrological System Impacts

Due to absence of water extraction, limited effluent discharge from the facility operations, the lack of groundwater in the sand and gravel layer above the Chinle Formation and the considerable depth to groundwater at the UUSA site, no significant impacts are expected for the site's hydrologic systems.

Control of surface water runoff is required for the ongoing UUSA construction activities, covered by the NPDES Construction General Permit. As a result, no significant impacts are expected to either surface or groundwater bodies. Control of impacts from construction runoff is discussed in ER Section 4.4.8, Control of Impacts to Water Quality.

Discharges from the Site Stormwater Detention Basin will be through infiltration and evaporation. Except for small amounts of oil products and grease from onsite traffic, recharged water would not be expected to have any contaminants. The recharged plume dimensions would be 1,000 meters (3,280 feet) wide; 2.85 meters (9.3 feet) deep; 2,850 square meters (30,700 square feet) cross-sectional area perpendicular to flow. Portions of the plume could result in a minor seep at Monument Draw, 4.8 kilometers (3 miles) southwest of the UUSA site.

The volume of water discharged into the ground from the Site Stormwater Detention Basin is expected to be minimal, as evapotranspiration is expected to be the dominant natural influence on standing water.

Operational inflow to the UBC Storage Pad Stormwater Retention Basin is not expected to impact water resources since all of the inflow water is expected to evaporate. Further, this amount is less than was originally evaluated prior to site construction.

4.4.6 Ground and Surface Water Use

The UUSA site does not obtain any water from the site or have any planned surface discharges at the site other than to the retention and detention basins. All potable, process and fire water supply used at the UUSA will be obtained from the Eunice, New Mexico, municipal water system. Wells serving these systems are about 32 km (20 mi) from the site. Average plant water consumption and peak plant water requirements are provided in Table 3.4-5, Average Plant Water Consumption, and Table 3.4-6, Anticipated Peak Plant Water Consumption, respectively.

Site groundwater is not utilized for any reason, and therefore, should not be impacted by routine UUSA operations. The UUSA water supply is obtained from the city of Eunice, New Mexico. Current capacity of the Eunice, New Mexico municipal water supply system is 16,350 m^3/day (4.32 million gpd; 1.6 billion gpy) and current usage, excluding UUSA needs, is 5,600 m^3/day (1.48 million gpd; 540 million gpy). Average and peak potable water requirements for operation of the UUSA were re-evaluated in 2010 and are expected to be approximately 164 m^3/day (43,200 gpd; 15.8 million gpy) and 85 m^3/hr (378 gpm), respectively (LES, 2010). These usage rates are well within the capacity of the water system.

In a groundwater modeling exercise conducted prior to site construction, the NRC simulated 23.1 million gpy water supply by Eunice and Hobbs municipal water systems by assuming groundwater withdrawal would be from a single point approximately 3.2 kilometers (2 miles) northeast of Hobbs. Over a 30-year period (2010-2040), additional drawdown of 0.4 meter (1.2 feet) would be observed at the groundwater withdrawal location associated with the construction of the facility. At 13.7 to 15.3 kilometers (8.5 to 9.5 miles) from the groundwater withdrawal location, drawdown of 0.003 meter (0.01 foot) would be expected associated with the construction and predicted water usage rates for UUSA. Since the water supply was revised downward to 15.8 million gpy, the 30-year drawdown effects due to the continued operation of the facility will likely be less than the previously modeled drawdowns.

For both peak and the normal usage rates, the needs of the UUSA facility should be readily met by the municipal water system. Impacts to water resources onsite and in the vicinity of the UUSA are expected to be negligible.

4.4.7 Identification of Impacted Ground and Surface Water Users

Location of an intermittent surface water feature and groundwater users in the site vicinity including an area just beyond a 1.6-km (1-mi) radius of the site boundary are shown on Figure 3.4-1, Water and Oil Wells in the Vicinity of the UUSA Site. These locations were provided by the Office of New Mexico State Engineer (NMSE) (NMSE, 2003), the Texas Water Development Board (TWDB) (TWDB, 2003) and the United States Geological Survey (USGS) (USGS, 2003a). No producing supply water wells are within 1.6 km (1 mi) of the boundaries of the UUSA site as shown on Figure 3.4-1. However, nearby facilities do have groundwater monitoring wells within this region.

The absence of near-surface groundwater users within 1.6 km (1 mi) from the site and the absence of surface water on the UUSA site prevents any impact to local surface or groundwater users. Due to the lack of process water discharge from the facility to the environment, no impact is expected for these water users.

Effluent discharges are controlled in a way that also prevents any impacts. The locations of the closest municipal water systems for both Eunice and Hobbs are in Hobbs, New Mexico, 32 km (20 mi) north northwest of the site. There is no potential to impact these sources.

4.4.8 Control of Impacts to Water Quality

Recent groundwater quality results do not indicate any current impacts due to site activities (Haley & Aldrich, 2011, 2012a, 2012b). Impacts are not anticipated during future operations and precautions and procedures will remain the same through the proposed facility capacity expansion.

Site runoff water quality impacts will be controlled during ongoing construction by compliance with NPDES Construction General Permit requirements and BMPs described in the site Stormwater Pollution Prevention Plan (SWPPP).

Wastes generated during site construction will be varied, depending on activities in progress. Any hazardous wastes from construction activities will be handled and disposed of in accordance with applicable state regulations. This includes proper labeling, recycling, controlling and protected storage and shipping offsite to approved disposal sites. Sanitary wastes generated at the site are sent to the City of Eunice Wastewater Treatment Plant for processing via a system of lift stations and 8-inch sewage lines.

The need to level the site and improve soil compression for construction has and will continue to require some soil excavation as well as soil fill. Fill placed on the site has the similar characteristics as the existing natural soils thus providing similar runoff characteristics as the natural soils on the site.

During operation, the UUSA's stormwater runoff detention/retention system allows controlled release of site runoff from the Site Stormwater Detention Basin only. Stormwater discharge is periodically monitored in accordance with state and/or federal permits. This system is also used for routine sampling of runoff as described in ER Section 6.1, Liquid Effluent Monitoring. Wastewater reporting meets required levels for all contaminants stipulated in any permit or license required for that activity, including the 10 CFR 20 and the Discharge Permit 1481 (DP-1481). The facility's Liquid Effluent Collection and Treatment System provides a means to control liquid waste within the plant. The system provides for collection, analysis, and processing of liquid wastes for disposal. The State of New Mexico has adopted the U.S. EPA hazardous water regulations (40 CFR Parts 260 through 266, 268 and 270) governing the generation, handling, storage, transportation, and disposal of hazardous materials. These regulations are found in 20.4.l NMAC, "Hazardous Waste Management".

The UBC Storage Pad Stormwater Retention Basins, which serve the UBC Storage Pad, is lined to prevent infiltration. It is designed to retain a volume slightly more than twice that for the 24-hour, 100-year frequency storm. Designed for sampling and radiological testing of the contained water and sediment, these basins have no flow outlet. All discharge is through evaporation.

The Site Stormwater Detention Basin is designed with an outlet structure for drainage. Local terrain serves as the receiving area for this basin. During a rainfall event larger than the design basis, the potential exists to overflow the basin if the outfall capacity is insufficient to pass beyond design basis inflows to the basin. Overflow of the basin is an unlikely event. The additional impact to the surrounding land over that which would occur during such a flood alone is assumed to be small. Therefore, potential overflow of the Site Stormwater Detention Basin during an event beyond its design basis is expected to have a minimal impact to surrounding land. The Site Stormwater Detention Basin also receives runoff from a portion of the site stormwater diversion ditch. The purpose of the diversion ditch is to safely divert surface runoff from the area upstream of the UUSA around the east and west sides of the UUSA structures during extreme precipitation events. There is no retention or attenuation of flow associated with this feature. The east side diverts surface runoff into the Site Stormwater Detention Basin. The basin is designed to provide no flow attenuation for this component of flow. The west side diverts surface runoff around the site where it continues on as overland flow. Since there are no modifications or attenuation of flows, there are no adverse impacts and no mitigative measures are required.

Mitigation measures are in place to minimize potential impact on water resources. These include employing BMPs and the control of hazardous materials and fuels. In addition, the following controls are also implemented:

- Construction equipment is in good repair without visible leaks of oil, greases, or hydraulic fluids.
- Use of BPMs to prevent spills and releases.
- Use of the BMPs assures stormwater runoff related to these activities will not release runoff into nearby sensitive areas (EPA, 2003g). See ER Sections 4.1.1 and 4.2.5 for construction BMPs.
- BMPs are also used for dust control associated with excavation and fill operations during construction. Water conservation is considered when deciding how often dust suppression sprays is applied (EPA, 2003g).
- Silt fencing and/or sediment traps are used.
- External vehicle washing (no detergents, water only).
- Stone construction pads are placed at entrance/exits if unpaved construction access adjoins a state road.
- All temporary construction and permanent basins are arranged to provide for the prompt, systematic sampling of runoff in the event of any special needs.
- Water quality impacts are controlled during construction by compliance with the National Pollution Discharge Elimination System – General Permit requirements and by applying BMPs as detailed in the site Stormwater Pollution Prevention (SWPP) plan.
- A procedure has been implemented for the reporting and response to releases and spills.
- All above-ground diesel storage tanks are bermed.
- Any hazardous materials are handled by approved methods and shipped offsite to approved disposal sites. Sanitary wastes generated during site construction are handled plant sanitary facilities, which discharge to the City of Eunice municipal system.
- The UUSA Liquid Effluent Collection and Treatment System provides a means to control liquid waste within the plant including the collection, analysis, and processing of liquid wastes for disposal.

- Control of surface water runoff occur for activities covered by the EPA Region 6 NPDES Construction General Permit.
- The UUSA is designed to minimize the use of natural and depletable water resources as shown by the following measures:
    - The use of low-water consumption landscaping versus conventional landscaping reduces water usage.
    - The installation of low flow toilets, sinks and showers reduces water usage when compared to standard flow fixtures.
    - Localized floor washing using mops and self-contained cleaning machines reduces water usage compared to conventional washing with a hose twice per week.
    - Closed-loop cooling systems (chillers) have been incorporated in the proposed facility capacity expansion to reduce water usage.

4.4.9 Cumulative Impacts on Water Resources

There has been regional groundwater contamination from the oil and gas industry activities. Sundance Services, Inc., has a ground-water monitoring well network to monitor for possible future offsite contamination resulting from its own operations. As with potential soil contamination, potential groundwater contaminants from its activities would be in the form of hydrocarbons. Any potential contamination resulting from the proposed UUSA facility capacity expansion would most likely be radioactive in nature. There have been no incidents to date from the operating UUSA which have resulted in any soil or groundwater contamination. All liquid effluents are managed either through discharge to offsite treatment and disposal or in the case of stormwater, through collection and evaporation. The potential cumulative impact of nearby facilities on local water resources is accounted for through consideration of the Eunice and Hobbs municipal water-supply systems. The additional incremental UUSA water use under the proposed facility capacity expansion would continue to be a small percentage of the systems' capacity. Forecasts predict that long term future regional water demand, if unrestrained, would deplete current regional supplies and, if required, UUSA and other local facilities would be expected to comply with the Lea County Drought Management Plan.

WCS estimates that the construction of the two disposal cells (i.e., a Federal disposal cell and a Texas compact disposal cell) would require approximately 3,785 cubic meters (1 million gallons) of water to be obtained either from the onsite well or would be brought in from offsite (WCS, 2004). During operation of the disposal cells, WCS projects that there would be no changes in water use from their current levels. Since UUSA will not rely on groundwater sources during construction or operations, no cumulative impacts from the UUSA expansion and WCS construction are expected to groundwater resources.

For the proposed IIFP in Hobbs, approximately 3.79 m3/day (1,000 gal/day) of groundwater would be required during Phase 2 construction, mainly for dust suppression control, fill compaction, and concrete formation. Average and peak site water requirements for Phase 2 operations are expected to be approximately 11.36 m3/day (3,000 gal/day) and 37.85 m3/day (10,000 gal/day), respectively. Phase 2 facility operation would require relatively low volumes of water because it would recycle process water and re-circulate cooling water. Groundwater use during operation is projected to be less than 37,854 L (10,000 gal) per day (IIFP, 2011a), and would be below the water allotment set aside by Lea County. In the IIFP EIS, the NRC staff concluded that cumulative impacts to groundwater use from preconstruction of the proposed IIFP facility, the proposed action and Phase 2 construction and operation would be small.

Potable water to the project would be supplied through the Hobbs water system and no impacts are anticipated. The cumulative impacts of the UUSA propoed expansion and the construction and operation of the IIFP facility to local water resources, both to groundwater and municipal supplies would be SMALL.

4.4.10 Comparative Water Resources Impacts of No Action Scenarios

Supplemental ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the capacity expansion construction and operation of UUSA, including an alternative of "no action," i.e., not expanding the current capacity. The following information provides comparative conclusions specific to the concerns addressed in this subsection for each of the three "no action" scenarios addressed in ER Section 2.3 and Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. No additional water resource impacts at the UUSA site or at other potential sites.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The water resource impact would likely be increased due to construction and clearing on two additional sites. The water resource impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The water resource impact would likely be increased due to construction and clearing on three additional sites. The water resource impacts for these three additional projects are evaluated in the individual environmental impact statements for the projects.

4.4.11 Section 4.4 Figures

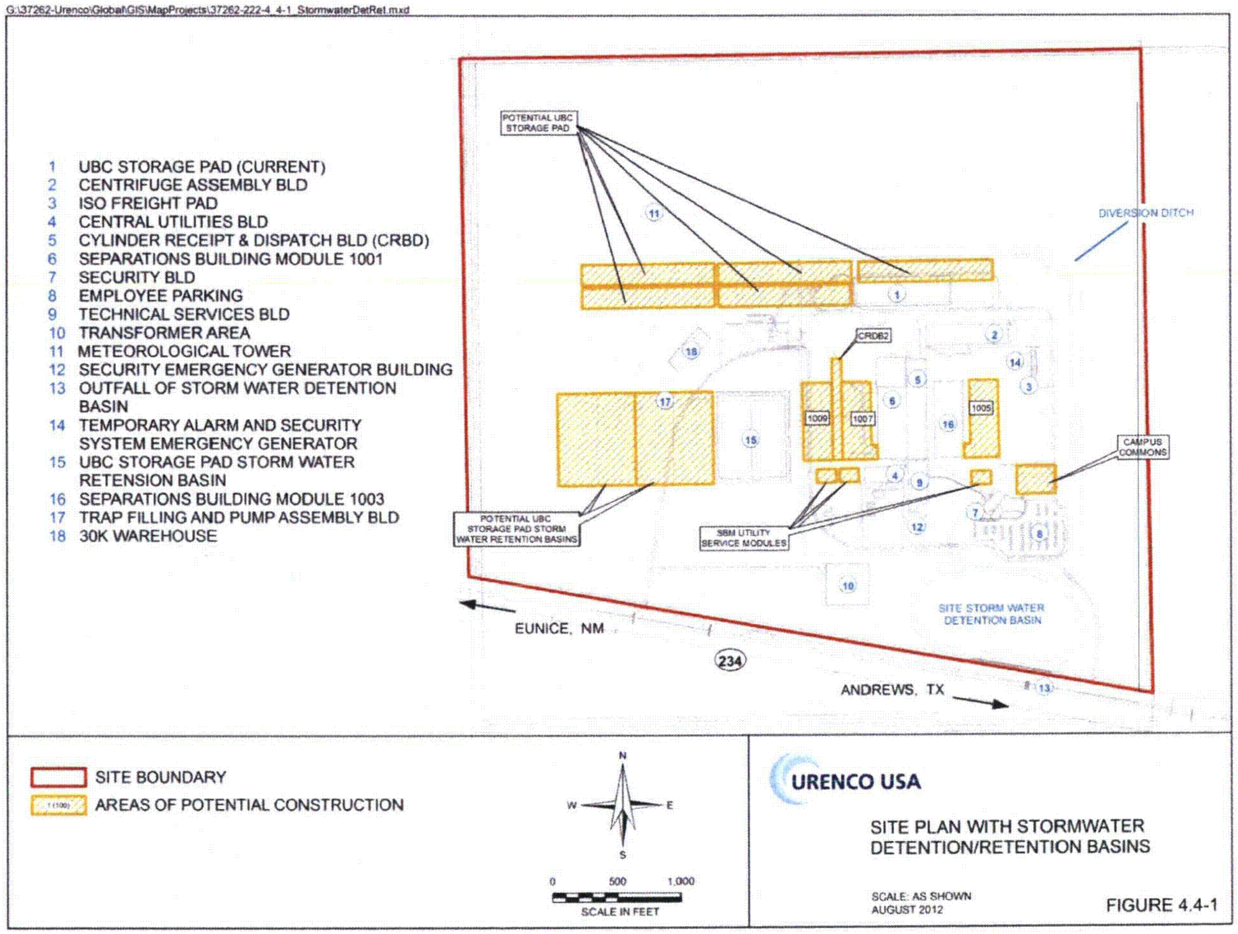

Figure 4.4-1 Site Plan with Stormwater Detention/Retention Basins

4.5 Ecological Resources Impacts

Sections 3.5 and 4.5 of the LES ER describe the ecological resources of the UUSA site and expected impacts to these resources by the initial construction and operation. While some minimal additional clearing of ground vegetation may be required during each construction phase of the UUSA facility capacity expansion, the currently proposed expansion will only use already-disturbed land within the existing footprint of the facility. Supplemental ER Figure 4.5-1, Ecological Resource Impacts Area, shows the site boundary and area of current site construction and operation, and additional construction and operations for the facility capacity expansion. See also Figure 1.3-4, Facility Layout.

Given that the construction will take place on these already (and recently) disturbed areas, the expansion will not create any new or additional impacts to ecological resources, including communities or habitats defined as rare or unique, to areas that support threatened and endangered species, or to species newly identified as New Mexico Department of Fish and Game Rare, Threatened, or Endangered (RTE) species (see Table 3.5-1).

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.

Section 4.5 of the LES ER is thus incorporated by reference to this Supplemental ER.

4.5.1 Comparative Ecological Resource Impacts of No Action Scenarios

Supplemental ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the capacity expansion construction and operation of UUSA, including an alternative of "no action," i.e., not expanding the current capacity. The following information provides comparative conclusions specific to the concerns addressed in this subsection for each of the three "no action" scenarios addressed in ER Section 2.3 and Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. No additional ecological impacts at the UUSA site or at other potential sites.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The ecological resource impact would be increased due to construction and clearing on two additional sites. The ecological resource impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The ecological resource impact would be increased due to construction and clearing on three additional sites. The ecological resource impacts for these three additional projects are evaluated in the individual environmental impact statements for the projects.

4.5.2 Section 4.5 Figures

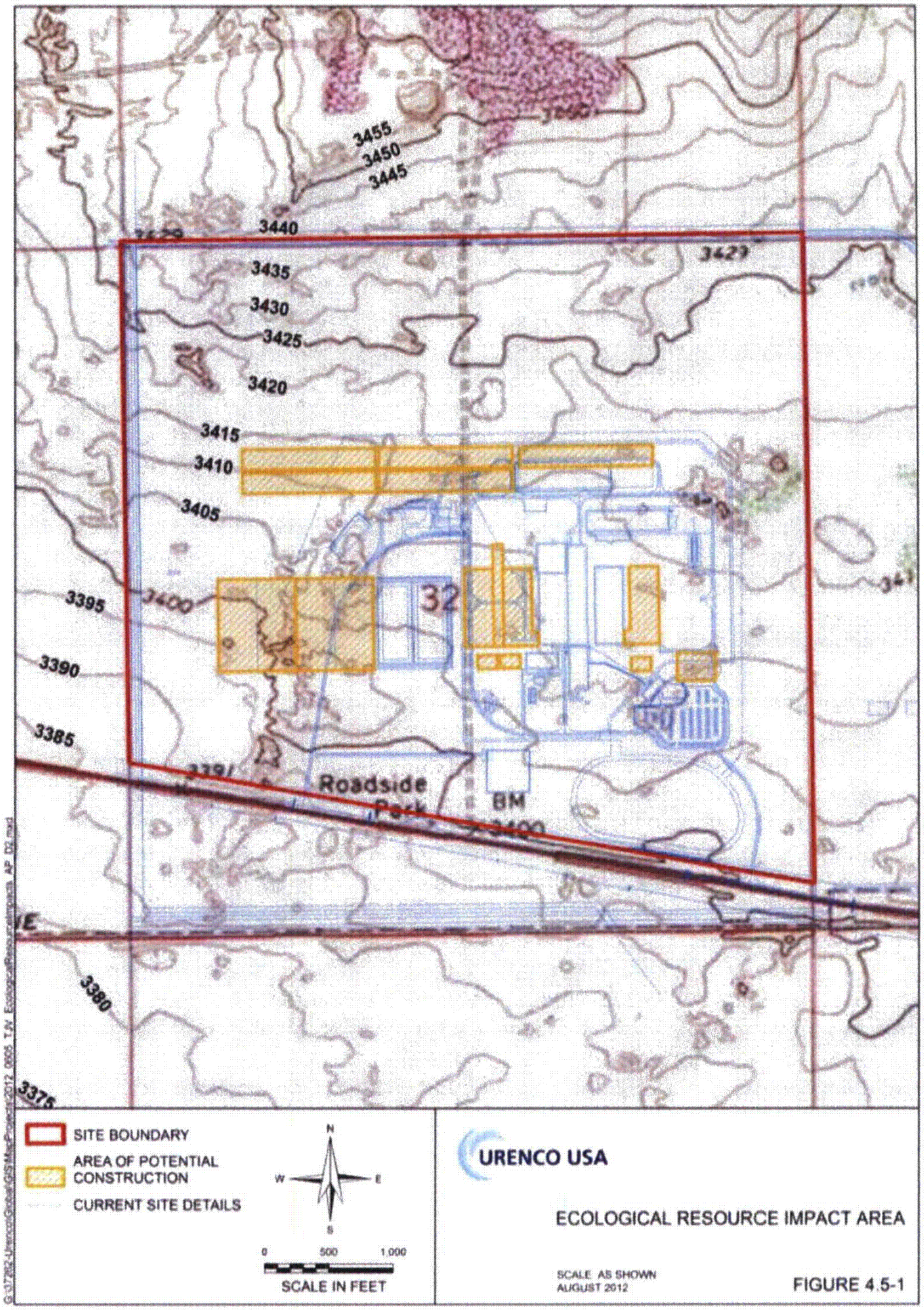

Figure 4.5-1 Ecological Resource Impact Area

4.6 Air Quality Impacts

This section describes the air quality impacts of the proposed expansion up through a facility capacity of 10 MSWU. Section 4.6 of the LES ER described the air quality impacts of the initial construction and operation. That section is updated below to reflect the air quality impacts of the proposed expansion.

4.6.1 Air Quality Impacts from Construction

Air quality impacts from site preparation for the UUSA facility were evaluated prior to site construction using emission factors and air dispersion modeling. The construction of the additional expansion will be similar and will involve construction on previously disturbed areas of the site. Emission rates of Clean Air Act Criteria Pollutants and non-methane hydrocarbons (a precursor of ozone, a Criteria Pollutant) were estimated for exhaust emissions from construction vehicles and for fugitive dust using emission factors provided in AP-42, the U.S. Environmental Protection Agency's Compilation of Air Pollutant Emission Factors (EPA, 1995). The total emission rates were used to scale the output from the Industrial Source Complex Short-Term (ISCST3) air dispersion model (air concentrations derived using a unit source term) to estimate both short-term and annual average air concentrations at the facility property boundary. ISCST3 is a refined, U.S. EPA-approved air dispersion model in the Users Network for Applied Modeling of Air Pollution (UNAMAP) series of air models (EPA, 1987). It is a steady-state Gaussian plume model that can be used to estimate ground-level air concentrations from industrial sources out to a distance of 50 km (31 mi). The air emissions calculations and air dispersion modeling are discussed in more detail in LES ER Chapter 12, Appendix B Air Quality Impacts of Construction Site Preparation Activities.

Emission rates from vehicle exhaust and fugitive dust, as listed in Table 4.6-1, Peak Emission Rates, were estimated for construction work hours assuming peak construction activity levels were maintained throughout the year. Fugitive dust will originate predominantly from vehicle traffic on unpaved surfaces, earth moving, excavating and bulldozing, and to a lesser extent from wind erosion. Fugitive dust emissions were estimated using an AP-42 emission factor for construction site preparation that was adjusted to account for dust suppression measures and the fraction of total suspended particulate that is expected to be in the PM10 range. It was assumed that no more than 18 ha (45 acres) would be involved in construction work at any one time.

Of the combustion sources, vehicle exhaust will be the dominant source. Fugitive volatile emissions will also occur because vehicles will be refueled onsite. Estimated vehicles that will be operating on the site during construction consist of two types: support vehicles and construction equipment. Detailed air quality impact evaluation assumptions, including types and numbers of support vehicles and construction equipment, are given in Chapter 12 of the initial LES ER, Appendix B Air Quality Impacts of Construction Site Preparation Activities. Emission factors in AP-42 for "highway mobile sources" were used to estimate emissions of criteria pollutants and non-methane hydrocarbons for support vehicles. Emission factors are also provided in AP-42 for diesel-powered construction equipment that will be operating on the site during peak construction.

Emissions were modeled in ISCST3 as a uniform area source with emissions occurring during construction work hours, throughout the year. The maximum predicted air concentrations at the site boundary for the various averaging periods predicted using five years (1987 to 1991) of hourly meteorological data from the Midland-Odessa, Texas, National Weather Service (NWS) station are presented in ER Table 4.6-2, Predicted Property Boundary Air Concentrations and

Applicable NAAQS. These concentrations are compared to the appropriate National Ambient Air Quality Standard (NAAQS). No NAAQS has been set for hydrocarbons; however, the total annual emissions of hydrocarbons predicted from the site (approximately 4,535 kg (5 tons)) are well below the level of 36,287 kg (40 tons) that defines a significant source of volatile organic compounds (40 CFR 50.21). Air concentrations of the Criteria Pollutants predicted for vehicle emissions were all at least an order of magnitude below the NAAQS. PM10 emissions from fugitive dust were also below the NAAQS. The results of the fugitive dust estimates should be viewed in light of the fact that the peak anticipated fugitive emissions were assumed to occur throughout the year. These conservative assumptions will result in predicted air concentrations that tend to overestimate the potential impacts. ER Section 1.4.2, State Agencies, presents information regarding the status of all State of New Mexico permits.

Other onsite air quality impacts will occur due to the construction work, such as portable generator exhaust, air compressor exhaust, welding torch fumes, and paint fumes. Since UUSA will continue to be constructed using a phased construction plan, some of the facility will be operational while construction continues. As such, other air quality impacts will occur due to the operation of standby diesel generators. Construction emission types, source locations, and emission quantities are presented in Table 4.6-3, Construction Emission Types.

During the ongoing period of site preparation and major building construction, offsite air quality will be impacted by passenger vehicles with construction workers commuting to the site and trucks delivering construction materials and removing construction wastes. Emission rates from passenger vehicle exhaust were estimated for a 64.4-km (40-mi) roundtrip commute for 800 vehicles per workday. No credit was taken for the use of car pools. Emission rates from delivery trucks were estimated for a 322-km (200-mi) roundtrip for 14 vehicles per workday. Emission factors are based on AP-42. The resulting emission factors, tons of daily emissions, number of vehicles and heavy duty engines are provided in Table 4.6-4, Offsite Vehicle Air Emissions During Construction.

The construction estimates for daily emissions are based on the average number of trucks per day. There will be peak days, such as when large concrete pours are executed, where there will be more than the average number of trucks per day. This peak daily value of truck trips is not available at this time. It is estimated, however, that the daily emission values presented in Table 4.6-4, that are based on the average number of trucks could be about an order of magnitude higher on the peak days.

4.6.2 Air Quality Impacts from Operation

During operation, offsite air quality will be impacted by passenger vehicles with UUSA workers commuting to the site, delivery trucks, UF_6 cylinder shipment trucks, and waste removal trucks. Prior to construction emission rates from passenger vehicle exhaust were estimated for a 64.4-km (40-mi) roundtrip commute for 210 vehicles per workday. No credit was taken for the use of car pools. Emission rates from trucks were estimated for an average distance of 805-km (500-mi) for 18 vehicles per workday. It was assumed that there are 250 workdays per year (five-day work week and fifty-week work year). Emission factors are based on AP-42. The resulting emission factors, tons of daily emissions, number of vehicles and heavy duty engines are provided in Table 4.6-6, Offsite Vehicle Air Emissions During Operations. With a slightly higher total employee count of 258 at the proposed expansion, these emissions would increase slightly but remain insignificant.

NUREG-1748 requires that atmospheric dispersion factors (X/Q's) be used to assess the environmental effects of normal plant operations and facility accidents. In the following subsections, information is presented about the gaseous effluents, the gaseous effluent control systems, and computer models and data used to calculate atmospheric dispersion and deposition factors.

4.6.2.1 Description of Gaseous Effluents

Uranium hexafluoride (UF_6) will be the radioactive effluent for gaseous pathways. 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 UUSA.

Nonradioactive gaseous effluents include HF and products of combustion. The proposed expanded facility would release approximately 1.2 kilograms (2.7 pounds) per year of hydrogen fluoride and 0.012 kilograms (0.027 pounds) per year of uranium. These are compared to approximately 1 kilogram (2.2 pounds) per year of hydrogen fluoride and 0.01 kilograms (0.022 pounds) per year of uranium from the existing operation and the values of the annual gaseous release of 10 grams (0.022 pounds) of uranium evaluated in the initial EIS. The emission rates are estimated based on operating experience at other global URENCO enrichment facilities. In addition, there will be six diesel generators onsite for use as standby power sources. Three diesel generators will be added during the proposed facility expansion to accommodate the back-up power needs at the new SBMs (1005, 1007, 1009). However, the use of these diesel generators will be administratively controlled (i.e., only run a limited number of hours per year) and are exempt from air permitting requirements of the State of New Mexico.

Gaseous 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)

The periods for which URENCO USA has had Uranium Hexafluoride (UF_6) on site (beginning with 1^{st} quarter 2009) there has not been a monitored 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 monitored. Provided the quantity of measurable values remain below that required for statistical comparison, UUSA will continue to use the operational data from our sister facilities. It should be noted that the Cylinder Receipt and Dispatch Building (CRDB) Chemistry Laboratories became operational in February 2013 and the Decontamination Systems are not yet approved for operation.

Existing emissions of criteria pollutants from standby diesel generators, 12 cooling towers and five diesel fuel tanks would be increased due to the addition of three emergency generators and associated diesel fuel storage for the proposed facility capacity expansion. Additional emissions from these units would be minor as they will not operate unless there is need for emergency power to the new buildings.

4.6.2.2 Description of Gaseous Effluent Vent System

The principal function of the Gaseous Effluent Vent System (GEVS) is to protect both the operator during the connection/disconnection of uranium hexafluoride (UF_6) process equipment, and the environment, by collecting and cleaning all potentially hazardous gases from the plant prior to release to the atmosphere. Releases to the atmosphere will be in compliance with regulatory limits.

The stream of air and water vapor drawn into the GEVS can have suspended within it uranium hexafluoride (UF_6), (HF, oil and uranium particulates (mainly UO_2F_2)). Online instrument measurements will provide a continuous indication to the operator of the quantity of radioactive material and HF in the emission stream. This will enable rapid corrective action to be taken in the event of any deviation from the normal operating conditions.

There are three types of Gaseous Effluent Vent Systems for the plant: (1) the Pumped Extract GEVS (2) Local Extract GEVS and (3) the CRDB GEVS. In addition, the Centrifuge Test and Post Mortem Facilities have an exhaust filtration system that serves the same purpose as the other GEVS. The Pumped Extract GEVS is installed in the SBM-1001 with the CRDB Local Extract system providing local extract services to the SBM-1. Pumped Extract and Local Extract are included in all later SBMs. to support the facility capacity expansion. For these systems sub-atmospheric pipework system transports potentially contaminated gases to a set of redundant filter stations (containing pre-filters, HEPA filters, and impregnated activated carbon filters) and fans. The cleaned gases are discharged to the atmosphere via a monitored stack on the SBM. All the GEVS utilize variable-speed fans, which will maintain an almost constant sub-atmospheric pressure in front of the filter sections by means of a differential pressure controllers.

The CRDB GEVS is a large airflow unit serving the CRDB Bunker decontamination facilities and fume hoods. The CRDB GEVS and CRDB Local Extract GEVS systems exhaust through monitored stacks on the roof of the existing CRDB. No emissions units are associated with the proposed construction and operation of an additional CRDB associated with SBMs 1007 and 1009. The Centrifuge Test and Post Mortem Exhaust Filtration System Consists of a fan/filter unit that exhausts through a monitored stack on the roof of the Centrifuge Assembly Building (CAB).

Instrumentation is provided to detect and signal via alarm all non-routine process conditions so that the processes can be returned to normal by automatic or local operator actions. Trip actions from the same instrumentation automatically put the systems into a safe condition.

4.6.2.3 Calculation of Atmospheric Dispersion and Deposition Factors

NUREG-1748 requires that atmospheric dispersion factors (X/Q's) be used to assess the environmental effects of normal plant operations and facility accidents. In the absence of onsite meteorological data, the analysis may be conducted using data from 5-year NWS summaries, provided applicability of these data to the proposed site is established. The X/Q's had previously been calculated using meteorological data from Midland-Odessa, Texas (1987 to 1991) and the XOQDOQ dispersion computer program listed in NUREG/CR-2919. Use of the Midland-Odessa data for predicting the dispersion of gaseous effluents was deemed appropriate. Midland-Odessa, Texas is the closest first-order NWS station to the UUSA site and both Midland-Odessa and the UUSA site have similar climates. A first-order weather data source is one that is a major weather station staffed by NWS personnel. For the evaluation of impacts due to the proposed facility capacity expansion to 10 MSWU, the output from the onsite meteorology instrumentation for the year 2011 was used in the modeling.

The NRC computer program XOQDOQ is intended to provide estimates of atmospheric transport and dispersion of gaseous effluents in routine releases from nuclear facilities. XOQDOQ implements NRC Regulatory Guide 1.111 and has been used by the NRC staff in their independent meteorological evaluation of routine airborne radionuclide releases.

XOQDOQ is based on the theory that material released to the atmosphere will be normally distributed (Gaussian distribution) about the plume centerline. In predicting concentrations for longer time periods, the horizontal plume distribution is assumed to be evenly distributed within the directional sector, the so-called sector average model. A straight-line trajectory is assumed between the point of release and all receptors.

The EPA computer program STAR (STability ARray) was used during initial evaluations to produce joint frequency distributions. The STAR program processes NWS meteorological data to generate joint frequencies of six wind speeds, sixteen wind directions, and six stability categories (Pasquill – Gifford stability classes A through F) for the station and time period provided as input, one year at a time.

Distances to the site boundary were determined using guidance from NRC Regulatory Guide 1.145 (NRC, 1982b). The distance to the nearest resident was determined using global positioning system (GPS) measurements.

Annual average atmospheric dispersion and deposition factors for the site boundary, nearest resident, and nearest business and school are presented in LES ER Table 4.6-3A, Annual Average Atmospheric Dispersion and Deposition Factors from NWS (1987 to 1991) Data. The highest site boundary X/Q was 1.0×10^{-5} s/m^3 in the south sector. The nearest resident χ/Q was 2.0×10^{-7} s/m^3 at a distance of 4.3 km (2.63 mi) in the west sector. Tables 4.6-3B through 4.6-3D present atmospheric dispersion and deposition factors out to 80 km (50 mi).

The X/Q for the Centrifuge Assembly Building has been calculated following a similar methodology to the X/Q's calculated for the other facilities at UUSA. The difference being the meteorological conditions for the CAB use a generic assumption of Pasquill Stability Class F with a wind speed of 0.6 m/s and no precipitation to calculate the X/Q for a ground level release. This assumption is highly conservative and represents conditions beyond the 95th percentile 5-year site specific meteorological conditions. A correction factor for X/Q from ARCON96 is assumed for low wind speed correction in the enhanced dispersion model.

An air quality impact analysis was performed to predict maximum ambient impacts of hydrogen fluoride (HF) and uranium (U) emissions from the proposed facility capacity expansion of the URENCO USA (UUSA) facility.

AERMOD (Version 12060), incorporating Plume Rise Model Enhancement (PRIME) downwash algorithms was used in this refined modeling analyses for flat, elevated and complex terrain. The AERMOD model was run using the Lakes Environmental AERMOD View (version 7.6.1) interface for EPA's AERMOD model.

Default AERMOD control options were used in the modeling analysis consistent with EPA recommendations, including the following:

- Stack-tip downwash
- Incorporate effects of elevated terrain
- Calm wind processing routine
- Missing data processing routine
- Default wind profile exponents
- Default vertical potential temperature gradients

For the refined modeling analysis, a non-uniform polar grid receptor network was set up in AERMOD using rings of receptors spaced at 10-degree intervals on 36 radials originating at the approximate center of the modeled stacks. Receptor rings were defined at the following distances in meters from the origin:

- 0 – 2 km with 50 meter spacing
- 2 – 5 km with 100 meter spacing
- 5 – 10 km with 500 meter spacing
- 10 – 15 km with 1,000 meter spacing

Terrain elevations at each of the receptor points were specified by importing a USGS National Elevation Dataset (NED GeoTIFF) terrain data file covering the modeling domain into the Lakes AERMOD View™ interface. As of March 19, 2009, USGS NED GeoTIFF is the terrain data set recommended by the US EPA for use in the United States for regulatory purposes. The 1/3 arc second (10 meter spatial resolution) NED elevation GeoTIFF file was obtained for the modeling domain from the USGS Seamless Data Server. Through this data resource, the user defines a domain for downloading through various options, and can download a single file to cover the entire modeling domain. The inverse distance method was used in AERMAP to process the terrain data and to select the elevation at each receptor. This method, as recommended by Lakes Environmental in its AERMOD View™ User's Guide for non-gridded and gridded receptors, involves interpolation of neighboring points using inverse distance to obtain elevation at the desired points.

The total amount of each criteria pollutant from the existing and proposed facility capacity expansion is less than 91 metric tons (100 tons) per year. In addition, potential emissions of hydrogen fluoride and uranium (both listed as federal hazardous air pollutants) would be below applicable major source levels (9.1 metric tons [10 tons] per year of a single and 22.7 metric tons [25 tons] per year of any combination of federal HAPs). Therefore, neither the existing nor expanded operation would be classified as a major source or required to obtain an operating permit subject to 20.2.70 NMAC.

Although emissions of ethanol and methylene chloride were evaluated during the initial EIS these materials are not used at the current UUSA and are not proposed for use during the proposed facility capacity expansion and will not be emissions from the location.

Separate AERMOD model runs were performed to predict maximum 8-hour average ambient impacts due to U and HF emissions from the six process stacks from the proposed expanded UUSA operation. The model inputs are as summarized in Table 4.6-5a and 4.6-5b. Table 4.6-5c summarizes the predicted UUSA U and HF ambient impacts in comparison to the applicable OEL/100 listed for toxic air pollutants listed in 20.2.72.502 NMAC. The modeling results demonstrate that U and HF impacts are well below the applicable OEL/100 levels.

The proposed UUSA facility capacity expansion is subject to 20.2.73 NMAC, Notice of Intent and Emission Inventory Requirements; because the existing facility has potential emissions greater than 10 tons per year of any regulated air contaminant. Therefore, an updated Notice of Intent will be submitted for the proposed expanded facility. However, the existing and proposed expanded operation will not be subject to 20.2.72 NMAC, Air Quality Construction Permits. The existing diesel generators and proposed additional units are exempt as standby generators. The cooling towers and diesel storage tanks are exempt as emission units with potential emissions less than one-half ton per year. In addition, the sources of state-regulated toxic air pollutants (hydrogen fluoride and uranium) are not subject to construction permit requirements in 20.2.72.402 NMAC because the potential emissions of each toxic air pollutant are less than their respective emission levels listed in 20.2.72.502 NMAC (potential uncontrolled emissions of fluorides are less than 0.167 pounds per year and potential emissions of uranium are less than 0.0133 pounds per year).

Although not required in this case, a dispersion modeling analysis was performed to evaluate the ambient impacts of hydrogen fluoride and uranium in comparison to one-hundredth of the respective Occupational Exposure Levels (OEL) listed in 20.2.72.502 NMAC. The maximum 8-hour average hydrogen fluoride impact predicted by the model was 2,500 times lower than the OEL/100 and the maximum predicted 8-hour average uranium impact was 20,000 lower than the OEL/100.

4.6.3 Visibility Impacts from Construction

Visibility impacts from construction will be limited to fugitive dust emissions. Fugitive dust will originate predominantly from vehicle traffic on unpaved surfaces, earth moving, excavating and bulldozing, and to a lesser extent from wind erosion. The only potential visibility impacts from operation of the UUSA is from the cooling towers. The cooling towers that UUSA uses at the site combine adiabatic and evaporative heat transfer processes to significantly reduce visible plumes. Cooling to support the proposed facility capacity expansion will be provided by closed loop chiller units. No further construction of cooling towers is anticipated for the proposed facility capacity expansion. Therefore, UUSA has concluded that any visibility impacts from cooling tower plumes will be minimal. Visibility impacts from decommissioning will be limited to fugitive dust. Fugitive dust will originate predominately from building demolition bulldozing, and vehicle traffic on unpaved surfaces.

4.6.4 Air Quality Impacts from Decommissioning

Air quality impacts will occur during decommissioning work, such as fugitive dust, vehicle exhaust, portable generator exhaust, air compressor exhaust, cutting torch fumes, and solvent fumes. Decommissioning emission types, source locations, and emission quantities are presented in Table 4.6-7, Decommissioning Emission Types. Fugitive dust and vehicle exhaust during decommissioning are assumed to be bounded by the emissions during construction.

4.6.5 Mitigative Measures for Air Quality Impacts

Air concentrations of the Criteria Pollutants for vehicle emissions and fugitive dust will be below the NAAQS and thus will not require mitigative measures. Visibility impacts from fugitive dust emissions will be minimized by watering of the site, during the construction phase to suppress dust emissions. Water conservation will be considered when deciding how often dust suppression sprays will be applied.

Mitigative measures for all credible accident scenarios considered in the Safety Analysis Report (SAR) are summarized in ER Section 4.12, Public and Occupational Health Impacts and ER Chapter 5, Mitigation Measures.

Mitigation measures will be in place to minimize potential impact on air quality. These include the following items:

- The CRDB GEVS, Local Extract GEVS, and Pumped Extract GEVS at the existing installation are designed to collect and clean all potentially hazardous gases from the plant prior to release into the atmosphere. Instrumentation is provided to detect and signal via alarm, all non-routine process conditions, including the presence of radionuclides or HF in the exhaust stream that will trip the systems to a safe condition, in the event of effluent detection beyond routine operational limits.
- The Centrifuge Test and Post Mortem Facilities Exhaust Filtration System is designed to collect and clean all potentially hazardous gases from the serviced areas in the CAB prior to release into the atmosphere. Instrumentation is provided to detect and signal the Control Room via alarm, all non-routine process conditions, including the presence of radionuclides or HF in the exhaust stream. Operators will then take appropriate actions to mitigate the release.
- Construction BMPs will be applied as described previously to minimize fugitive dusts.
- Air concentrations of the criteria pollutants for vehicle emissions and fugitive dust will be below the National Ambient Air Quality Standards (NAAQS) and thus will not require further mitigation measures.

The only potential air quality cumulative effect is increases in the Total Suspended Particulate (TSP) from combined emissions from the Waste Control Specialists (WCS) and ongoing construction activities at UUSA. This potential cumulative effect (impact) will be transitory and limited to the construction period.

4.6.6 Cumulative Impacts to Air Quality

Both Lea County, New Mexico, and Andrews County, Texas, are in attainment for all of the criteria pollutants (EPA, 2012a), despite the presence of oil and gas development and other industries in the area. Other considered projects such as the WIIP and IIFP facility are located a distance from the UUSA facility, and are not anticipated to impact local air quality.

WCS's annual emissions are generally less than those expected from the UUSA operation including the impact of the proposed facility capacity expansion (except for volatile organic compounds) and significantly less than 1 percent of the total point source contribution for all criteria pollutants. The construction of the disposal cells would add some fugitive dust emissions and the emissions of criteria pollutants but would be controlled to well below the NAAQS values (WCS, 2004) as they are for the current and proposed UUSA operation. Therefore, the cumulative impacts of the WCS and UUSA to the surrounding area would also be small. In addition, there will be ongoing low level and fugitive emissions of hydrocarbons associated with the local operation of oil and gas development and recovery operations. The nature of the emissions from oil and gas will be different from that of the UUSA facility (hydrocarbons only versus products of combustion, and process specific compounds such as uranium and hydrogen fluoride) and therefore not considered a cumulative impact with the emissions from the oil and gas local industry. No other foreseeable point-source activity can be identified that would cumulatively impact the air quality in the vicinity of the UUSA facility.

4.6.7 Comparative Air Quality Impacts of No Action Scenarios

Supplemental ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the capacity expansion construction and operation of UUSA, including an alternative of "no action," i.e., not expanding the current capacity. The following information provides comparative conclusions specific to the concerns addressed in this subsection for each of the three "no action" scenarios addressed in ER Section 2.3 and Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. Except for minimal air quality impacts associated with pre-construction and construction-at-risk activities, there will be no additional meteorological or air quality impacts at the UUSA site. Reliance on coal-fired power plants for Paducah's energy needs would continue.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The meteorological or air quality impacts would be increased due to construction and operation on two additional sites. The meteorological or air quality impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The meteorological or air quality impacts would be increased due to construction and operations on three additional sites. The meteorological or air quality impacts for these three additional projects are evaluated in the individual environmental impact statements for those projects.

4.6.8 Section 4.6 Tables (10 MSWU Facility)

Table 4.6-1 Peak Emission Rates (10 MSWU facility)

Pollutant	Total Work-Day Average Emissions g/s (lbs/hr)
VEHICLE EMISSIONS:	
Hydrocarbons	0.58 (4.6)
Carbon Monoxide	3.70 (29.4)
Nitrogen Oxides	7.53 (59.8)
Sulfur Oxides	0.76 (6.0)
Particulates	0.54 (4.3)
FUGITIVE EMISSIONS:	
Particulates	2.4 (19.1)

Table 4.6-2 Predicted Property-Boundary Air Concentrations And Applicable NAAQS

	Maximum 1-Hr Average (μg/m³)		Maximum 3-Hr Average (μg/m³)		Maximum 8-Hr Average (μg/m³)		Maximum 24-Hr Average (μg/m³)		2nd Highest 24-Hr Average (μg/m³)		Maximum Annual Average (μg/m³)	
Pollutant	**Predicted**	**NAAQS**	**Predicted**	**NAAQS**	**Predicted**	**NAAQS**	**Predicted**	**NAAQS**	**Predicted**	**NAAQS**	**Predicted**	**NAAQS**
VEHICLE EMISSIONS												
Hydrocarbons	635.3	NA	238.9	NA	84.5	NA	36.9	NA	18.8	NA	2.9	NA
Carbon Monoxide	4,036.5	40,000	1,518.1	NA	537.0	10,000	234.4	NA	119.6	NA	18.5	NA
Nitrogen Oxides	8,204.2	NA	3,085.5	NA	1,091.5	NA	476.5	NA	243.1	NA	37.6	100
Sulfur Oxides	822.9	NA	309.5	1,310(a)	109.5	NA	47.8	365	24.4	NA	3.8	80
Particulates	591.8	NA	222.6	NA	78.7	NA	34.4	NA	17.5	150	2.7	50
FUGITIVE DUST												
Particulates	2,615.8		983.8		348.0		151.9		77.5	150	12.0	50

(a) Secondary standard

Table 4.6-3 Construction Emission Types

Emission Type	Source Location	Quantity
Fugitive Dust	Onsite	2.4 g/s (19.1 lb./hr)
Vehicle Exhaust	Onsite	4,535 kg/yr (5 tons/yr)
Portable Generator Exhaust	NA[1]	NA[1]
Paint Fumes	Onsite buildings	NA[1]
Welding Torch Fumes	Onsite buildings	NA[1]
Solvent Fumes	NA[1]	NA[1]
Air Compressors	NA[1]	NA[1]

[1]Information is not available at this time.

Table 4.6-4 Offsite Vehicle Air Emissions During Construction

Estimated Vehicle Type	Emission Factor (g/mi)	Estimated Daily Number of Vehicles	Estimated Daily Mileage km (mi)	Daily Work Day Emissions (g)
NONMETHANE HYDROCARBONS				
Light Duty Vehicles (Gasoline)	1.2	800	64.4 (40)	38,400
Heavy Duty Truck (Diesel)	2.1	14	322 (200)	5,880
Total				44,280
Daily Emissions				**4.4E-02 metric tons (4.9E-02 tons)**
CARBON MONOXIDE				
Light Duty Vehicles (Gasoline)	4.6	800	64.4 (40)	147,200
Heavy Duty Truck (Diesel)	10.2	14	322 (200)	28,560
Total				175,760
Daily Emissions				**1.8E-01 metric tons (2.0E-01 tons)**
NITROGEN OXIDES				
Light Duty Vehicles (Gasoline)	0.7	800	64.4 (40)	22,400
Heavy Duty Truck (Diesel)	8.0	14	322 (200)	22,400
Total				44,800
Daily Emissions				**4.5E-02 metric tons (5.0E-02 tons)**

Table 4.6-5 Air Emissions During Operations

Table 4.6-5a – Summary of Stack Parameters for Model Input

Type	ID	Desc	Base_Elev	Height	Diam	Exit_Vel	Exit_Temp	Release_Type	Emission_Rate	Coord (East UT	oord (North U
			[m]	[m]	[m]	[m/s]	[K]		[g/sec]	[m]	[m]
POINT	STCK1	Fume Hood GEVS	1039.31	16.46	0.9144	16.8888	Ambient	VERTICAL	2.97355E-07	680,494.1	3,590,281.2
POINT	STCK34_1	Local Exhausts	1039.31	16.46	0.3048	9.37867	Ambient	VERTICAL	1.83957E-08	680,494.1	3,590,281.2
POINT	STCK34_2	Local Exhausts	1039.31	16.46	0.3048	9.37867	Ambient	VERTICAL	1.83957E-08	680,609.3	3,590,280.3
POINT	STCK34_3	Local Exhausts	1039.31	16.46	0.3048	9.37867	Ambient	VERTICAL	1.83957E-08	680,426.1	3,590,278.6
POINT	STCK34_4	Local Exhausts	1039.31	16.46	0.3048	9.37867	Ambient	VERTICAL	1.83957E-08	680,352.4	3,590,277.7
POINT	STCK34_5	Local Exhausts	1039.31	16.46	0.3048	9.37867	Ambient	VERTICAL	1.83957E-08	680,682.5	3,590,276.8

Table 4.6-5b – Dimensional Data for GEP Stack Height and Downwash Analysis

Major Buildings and Structures Dimensions		
Building/Structure	**Height in feet**	**Footprint Size**
Existing Separations Building	41	234' x 565'
Capacity Expansion Area 1	41	234' x 565'
Capacity Expansion Area 2	41	234' x 565'
Capacity Expansion Area 3	41	234' x 565'
Capacity Expansion Area 4	41	234' x 565'

Table 4.6-5c Summary of U and HF Modeling Results (8-hour average impacts)

Toxic Air Pollutant	Max. NEF Impact (µg/m³)	OEL/100 (µg/m³)	Output File
Uranium	9.9E-5	2	NEF1.ado
Hydrogen Fluoride	9.3E-3	25	NEF3.ado

Table 4.6-6 Offsite Vehicle Air Emissions During Operations

Estimated Vehicle Type	Emission Factor (g/mi)	Estimated Daily Number of Vehicles	Estimated Daily Mileage km (mi)	Daily Work Day Emissions (g)
NONMETHANE HYDROCARBONS				
Light Duty Vehicles (Gasoline)	1.2	210	64.4 (40)	10,080
Heavy Duty Truck (Diesel)	2.1	18	805 (500)	18,900
Total				28,980
Daily Emissions				**2.9E-02 metric tons (3.2E-02 tons)**
CARBON MONOXIDE				
Light Duty Vehicles (Gasoline)	4.6	210	64.4 (40)	38,640
Heavy Duty Truck (Diesel)	10.2	18	805 (500)	91,800
Total				130,400
Daily Emissions				**1.3E-01 metric tons (1.4E-01 tons)**
NITROGEN OXIDES				
Light Duty Vehicles (Gasoline)	0.7	210	64.4 (40)	5,880
Heavy Duty Truck (Diesel)	8.0	18	805 (500)	72,000
Total				77,880
Daily Emissions				**7.8E-02 metric tons (8.6E-02 tons)**

Table 4.6-7 Decommissioning Emission Types

Emission Type[1]	Source Location	Quantity
Fugitive Dust	Onsite	2.4 g/s (19.1 lb./hr)
Vehicle Exhaust	Onsite	4,535 kg/yr (5 tons/yr)
Portable Generator Exhaust	NA[2]	NA[2]
Cutting Torch Fumes	Onsite buildings	NA[2]
Solvent Fumes	NA[2]	NA[2]
Air Compressors	NA[2]	NA[2]

1 Fugitive dust and vehicle exhaust during decommissioning are assumed to be bounded by the emissions during construction.

2 Information is not available at this time.

4.7 Noise Impacts

Supplemental ER Section 3.7 describes the noise impacts from the initial construction and current operation. This section describes any additional impacts to noise from the expansion.

4.7.1 Predicted Noise Levels - Construction Impacts

The facility capacity expansion at UUSA will require 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 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).

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. This feature is now existing at the site and no further construction at the Stormwater Detention Basin is required to support the facility capacity expansion. 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. Construction associated with the capacity expansion will occur farther from the property boundary and will have less of an impact at the property boundaries.

Noise sources will also 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 due to the capacity expansion did not have 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.

4.7.2 Operational Impacts

The facility capacity expansion at UUSA would generally continue a similar level of noise as exists from the current operation. Vehicular traffic will be slightly increased on New Mexico Highway 176 and New Mexico Highway 18 during operation, but due to the considerable truck traffic already present, noise levels should not increase significantly.

4.7.3 Mitigation

Mitigation of operational noise sources occurs primarily from the plant design, as cooling systems, valves, transformers, pumps, generators, and other facility equipment, will generally be located inside plant structures. The buildings themselves will absorb the majority of the noise generated within. Natural land contours, vegetation (such as scrub brush and trees), and site buildings and structures will mitigate noise from other equipment located outside of site structures. Distance from the noise source is also a key factor in the control of noise levels to area receptors. It is generally true that the sound pressure level from an outdoor noise source decreases 6 dB per doubling of distance (Cowan, 1994). Thus, a noise that measures 80 dB at 15.2 m (50 ft) away from the source will measure 74 dB at 30.5 m (100 ft), 68 dB at 61 m (200 ft), and 62 dB at 122 m (400 ft). Noise from construction activities will have the highest sound levels, occasionally peaking at 99 dBA at 9.1 m (30 ft) from the source, which would be equivalent to 69 dBA at 305 m (1,000 ft) (Cowan, 1994). As noted above, the nearest home is located west of the site at a distance of approximately 4.3 km (2.63 miles). However, heavy truck and earth moving equipment usage will be restricted after twilight and during early morning hours. All noise suppression systems on construction vehicles shall be kept in proper operation.

4.7.4 Cumulative Impacts

Cumulative impacts from all site noise sources should typically remain at or below HUD guidelines of 65 dBA Ldn and the EPA guidelines of 55 dBA Ldn (EPA 550/9) during the UUSA facility capacity expansion and continued operation. Residences closest to the site boundary will experience only minor impacts from construction noise, with the majority of the noise sources being from additional construction vehicle traffic. Since phases of construction include a variety of activities, there may be short-term occasions when higher noise levels will be present; examples include the use of backhoes and large generators.

The level of noise anticipated offsite is comparable to noise levels near a busy road and less than noise levels found in most city neighborhoods. Expected noise levels will mostly affect a 1.6-km (1-mi) radius. The noise of all site activities should have a minor impact and only those receptors closest to the site boundary. It is anticipated a level similar to UUSA construction noise will be associated with the planned construction at WCS. WCS will be under similar noise control guidelines. The cumulative noise from UUSA and WCS construction is anticipated to be small on the potential receptors. Other adjacent facilities such as the landfill and Wallach Concrete will also generate some potential noise which in cumulation with UUSA and WCS will be minimal and in nature with the local industrial setting.

4.7.5 Comparative Noise Impacts of No Action Scenarios

Supplemental ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the capacity expansion construction and operation of UUSA, including an alternative of "no action," i.e., not expanding the current capacity. The following information provides comparative conclusions specific to the concerns addressed in this subsection for each of the three "no action" scenarios addressed in ER Section 2.3 and Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios.

While small, all of these No-Action Scenarios will have limited noise impacts at the UUSA site because 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, and these will generate some amount of noise.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. No noise impacts at the UUSA site or at other potential sites.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of

Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The noise impact may be increased due to construction and operation at two additional sites. The noise impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The noise impact may be increased due to construction and operation at three additional sites. The noise impacts for these three additional projects are evaluated in the individual environmental impact statements for the projects.

4.8 Historic and Cultural Resource Impacts

LES ER Section 4.8 describes the impacts of construction and operation of the initial facility on the site's historical and cultural resources. Since the initial survey and treatment plan execution, no additional historic and cultural resources have been identified onsite.

Because the proposed expansion will take place within the existing disturbed area of the UUSA site, there will be no new or additional impacts to historical or cultural resources. LES ER Section 4.8 is therefore incorporated by reference; only events subsequent to that initial assessment are discussed below.

4.8.1 Cultural Resources Treatment Plan

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 on the UUSA site. This agreement continues to govern construction and operations at the site.

4.8.2 Agency Consultation

All appropriate state agencies and affected Native American Tribes were consulted prior to the initial construction on the site. Copies of correspondence included in LES ER Appendix A. Since the initial survey and treatment plan execution, no additional historic and cultural resources have been identified onsite.

Because the proposed facility capacity expansion will occur within the previously surveyed and mitigated property, discussions in 2012 with the NM SHPO confirmed mitigation of previously identified sites and that no further action would be required in light of proposed ongoing construction for the facility capacity expansion.

4.8.3 Cumulative Impacts

Given the small number of archaeological sites identified and mitigated on the site, there will be no cumulatively significant impacts to cultural resources.

There are no regional National Registry listed locations in the vicinity of the UUSA or adjacent operations. There would be no cumulative adverse impacts to cultural or historical resources in the area because these resources would be specific to the particular sites, and previously identified resources at the UUSA site have been mitigated in accordance with a treatment plan.

4.8.4 Comparative Historical and Cultural Resource Impacts of No Action Scenarios

ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the capacity expansion construction and operation of UUSA, including an alternative of "no action," i.e., not expanding the current capacity. The following information provides comparative conclusions specific to the concerns addressed in this subsection for each of the three "no action" scenarios addressed in ER Section 2.3 and Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. No additional historic and cultural resource impacts at the UUSA site or at other potential sites.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The historic and cultural resource impact would potentially be increased due to construction and clearing on two additional sites. The historic and cultural resource impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The historic and cultural resource impact would potentially be increased due to construction and clearing on three additional sites. The historic and cultural resource impacts for these three additional projects are evaluated in the individual environmental impact statements for the projects.

4.9 Visual/Scenic Resources Impacts

This Section describes the additional impact the proposed expansion will have on visual and scenic resources.

4.9.1 Photos

As shown on the site perimeter photographs (see ER Section 3.9 Figures, Site Photographs), the existing structures on the UUSA facility are minimally visible from the surrounding roadways. Continued construction and operation for the facility capacity expansion will be within the same property boundaries and general footprint of the structures appearing in the 2012 perimeter view photographs. The visual impact from the surrounding roadways is not anticipated to change substantially due to the continuing construction and operation of the UUSA facility for the facility capacity expansion.

4.9.2 Significant Visual Impacts

Proposed site development potentially impacting the visual/scenic quality of the UUSA facility includes:

- Several additional buildings surrounded by chain link fencing;
- Additional power lines; and
- Expanded transformer yard.

4.9.3 Physical Facilities Out Of Character with Existing Features

Given that the site is developed, the capacity expansion at the current site is in character with current, onsite conditions. Furthermore, considering the neighboring properties have been developed for industrial purposes (WCS facility, county landfill and quarry), the proposed additional structures are similar to existing, architectural features on surrounding land. Overall, the visual impact of the capacity expansion at UUSA will be minimal.

4.9.4 Structures Obstructing Existing Views

None of the proposed onsite structures will be taller than 40 m (130 ft), which is consistent with the current facility structures/buildings. Due to the relative flatness of the site and vicinity, the structures will be observable from New Mexico Highway 176 and from nearby properties, partially obstructing views of existing landscape. 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 will be comparable to current conditions. Refer to ER Figures 3.9-1A through 3.9-1E.

4.9.5 Structures Creating Visual Intrusions

The additional structures will be set back a substantial distance from New Mexico Highway 176 and within the currently disturbed footprint of the operating facility. Due to the relative flatness of the area, taller proposed plant structures (such as the additional SBM buildings) will be visible from the highway and adjacent properties, however, they will be of similar construction to the existing SBM structures and will not significantly alter the skyline. Furthermore, considering the existing structures associated with neighboring industrial properties to the north, east and south (quarry, WCS facility and county landfill, respectively) the nearby utility poles along New Mexico Highway 176, the high power utility line to the east that runs parallel to the New Mexico/Texas state line, and the numerous pump jacks dotting the landscape to the north, south and west, the proposed additional onsite structures will be no more intrusive.

4.9.6 Structures Requiring the Removal of Barriers, Screens or Buffers

As noted in LES ER Section 3.9.1, Viewshed Boundaries, a series of small sand dunes on the western portion of the site provide natural screening from areas to the west. None of the proposed additional onsite structures will require removal of natural barriers, screens or buffers. Any removal of natural barriers, screens or buffers associated with road construction will be minimized. Additionally natural landscape, using vegetation indigenous to the area, is planned to provide additional aesthetically pleasing screening measures.

4.9.7 Structures that Create Visual, Audible or Atmospheric Elements Out of Character with the Site

The proposed additional onsite structures will be in character with the existing site buildings and structures. They are also comparable to those existing on the surrounding industrial properties. None of the UUSA structures or associated activities will typically produce significant noise levels audible from offsite (see ER Section 4.7.1, Predicted Noise Levels) or create significant atmospheric elements (such as a large emission plumes) visible from offsite.

4.9.8 Visual Compatibility and Compliance

As noted in LES ER Section 3.9.9, Regulatory Information, discussions were held prior to the initial construction between UUSA and the City of Eunice, New Mexico, and Lea County officials, to coordinate and discuss local area community planning issues. No local or county zoning, land use planning or associated review process requirements were identified. All applicable local ordinances and regulations will be followed during the continuing construction and operation of UUSA. Additional development of the site will continue to meet federal and state requirements for nuclear and radioactive material sites regarding design, siting, construction materials, and monitoring.

4.9.9 Potential Mitigation Measures

Mitigation measures will be in place to minimize the impact to visual and scenic resources. These include the following items:

- The use of accepted natural, low-water consumption landscaping techniques to limit any potential visual impacts. These techniques will incorporate, but not be limited to, the use of landscape plantings. As for aesthetically pleasing screening measures, planned landscape plantings will include indigenous vegetation.
- Prompt re-vegetation or covering of bare areas will be used to mitigate visual impacts due to construction activities.

4.9.10 Cumulative Impacts to Visual/Scenic Quality

The area immediately surrounding the UUSA facility is industrial, developed for oil and gas resources, or undeveloped in nature. The proposed UUSA facility capacity expansion will result in additional buildings of a similar nature on the UUSA property. The increased development of the WCS facility for waste disposal is of a similar nature to the existing site development and is consistent with the visual impacts in the vicinity. No cumulative impacts are anticipated to the visual and scenic resources. The cumulative impacts to the visual/scenic quality of the UUSA facility can be assessed by examining proposed actions associated with ongoing construction of the UUSA facility and development of surrounding properties.

4.9.11 Comparative Visual/Scenic Resources Impacts of No Action Scenarios

ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the construction and operation of the NEF, including an alternative of "no action," i.e., not building the NEF. The following information provides comparative conclusions specific to the concerns addressed in this subsection for the three "no action" scenarios addressed in ER Section 2.3 and Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. No additional visual scenic resource impacts at the UUSA site or at other potential sites.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The visual and scenic resources impacts would be increased due to construction and clearing on two additional sites. The visual scenic resource impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The visual scenic resource impact would be increased due to construction and clearing on three additional sites. The visual scenic resource impacts for these three additional projects are evaluated in the individual environmental impact statements for the projects.

4.9.12 Section 4.9 Figures

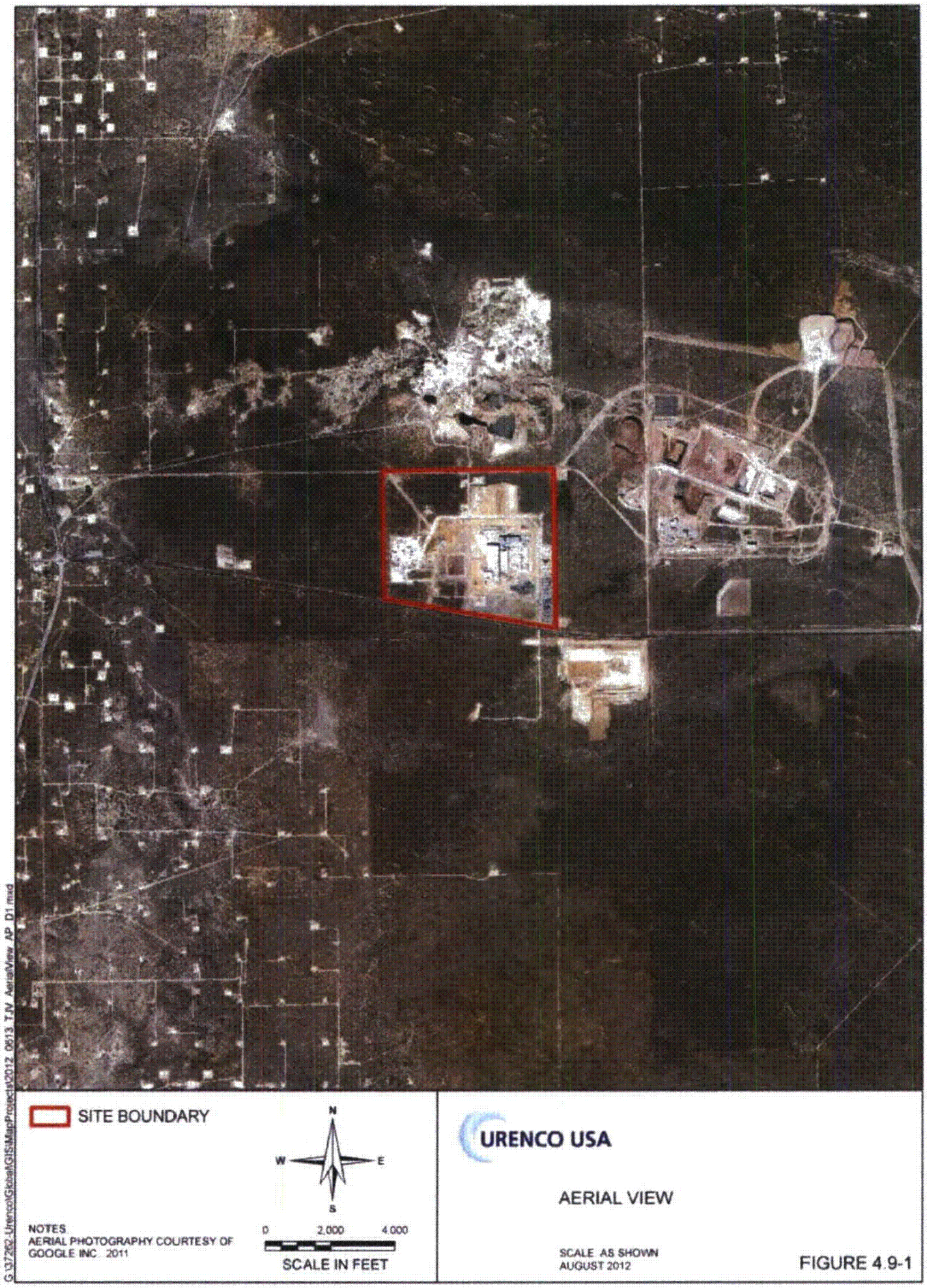

Figure 4.9-1 Aerial View

4.10 Socioeconomic Impacts

This section describes the socioeconomic impacts to the community surrounding the UUSA site, including the impacts from construction and operation associated with the UUSA facility capacity expansion.

In the 2005 EIS, the NRC concluded the overall benefits of the facility outweighed the environmental disadvantages and costs. The NRC concluded: "The beneficial economic impacts of the proposed NEF on the local communities have been determined to be MODERATE" (NRC, 2005).

4.10.1 Facility Construction Worker Population

Groundbreaking at the UUSA site commenced in 2006, with the initial construction of the site anticipated to be completed in 2013. Activities associated with the construction phase of the facility capacity expansion would be similar to the activities of the initial and ongoing construction at the UUSA site. Construction activities for the proposed facility capacity expansion would continue within the current boundaries of the site property.

Approximately 800 to 1,000 workers are or will be employed for construction of the UUSA facility. See LES ER Table 4.10-1, Estimated Number of Construction Workers by Annual Pay. The proposed facility capacity expansion would mean that the size of the construction crew would remain fairly constant at 800 to 1,200 skilled labor providers through 2020.

During the early construction stages of each phase of proposed facility capacity expansion, the workforce is expected to consist primarily of structural crafts. As each construction phase progresses, there would be a transition to predominantly mechanical and electrical crafts in the later stages. The initial ER anticipated the bulk of the UUSA construction workforce would come from the surrounding 120-kilometer (km) (75-mile) region due to the relatively low population of the area. American Community Survey (ACS) Civilian Employment Data for the period 2006-2010 shows an increase in the labor force of the Lea-Andrews County region (Table 3 Civilian Employment Data, 2006-2010). The available regional labor pool is expected to continue to correlate with the required education and skill levels for the construction work force.

4.10.2 Impacts on Human Activities

Initial development of the UUSA site was anticipated to increase demands on local housing, public services and schools. The initial ER estimated 120 housing units would be needed to accommodate the new UUSA construction workforce. The percentage of vacant housing units in the Lea-Andrews County area was about 16% and 15%, respectively, meaning that more than 4,000 housing units were available. The current estimate of vacant housing units in the Lea-Andrews County area is approximately 10.8%, meaning approximately 3,000 housing units are available (Table 3.10-5, Housing Information in the Lea County, New Mexico-Andrews County, Texas Vicinity). Accordingly, there should be no measurable impact related to the need for additional housing associated with the proposed facility capacity expansion.

The impact on schools, including the effects on student-teacher ratios, would be manageable during the period of construction of the UUSA site. The initial evaluation of site impacts estimated a local student-teacher ratio of 17:1. Review of 2010 Census data shows a decrease in the student-teacher ratio, now averaging less than 14:1 in the regional public schools (Table 3.10-6 Educational Facilities near the UUSA). Table 3.10-7 shows the Educational Information in the Lea County, New Mexico/Andrews County, Texas Vicinity. It is anticipated that the UUSA construction and operation would not result in unmanageable demand on the local school system.

4.10.3 Facility Operation - Jobs, Income, and Population

Potential impacts to local economy, housing, schools and public services from the proposed facility capacity expansion are not expected to be different from the small impacts previously evaluated prior to construction of the UUSA facility.

The UUSA operation would create a minimal demand for increase in permanent workforce to support the expanded operations. The permanent increase in employment, income and population in the area associated with the start-up and current operation of the UUSA facility would be at least sustained with the proposed facility capacity expansion. The average number of workers employed for operation of the UUSA is assumed to continue to be approximately 250 (2012), rising slightly to 258 to accommodate additional operational permanent employees through the facility capacity expansion to 10 MSWU.

The increase in permanent employees would be distributed to administrative, maintenance/facility and operational employees. It is anticipated this additional work force would be drawn from, or would settle in the surrounding communities as permanent residents, and wages would be similar to those previously evaluated prior to the site construction.

The UUSA annual operating payroll (including benefits) will be approximately $52.4 million for a workforce of 258 projected at the completion of the proposed facility expansion to 10 MSWU in 2020. The average salary is approximately three times the individual per capita income in the Lea New Mexico-Andrews, Texas County area and approximately 60% and 40% above the median household income for those counties, respectively (Table 3.10-4, Area Income Data).

Unemployment rates and the percentage of individuals and households living below poverty level in Lea County and the state of New Mexico have decreased since the initial socioeconomic evaluation. Andrews County and the state of Texas have shown a slight increase in the number of individuals living below the poverty level. The rate of households below the poverty level decreased in Andrews County and increased slightly in Texas. Individual per capita income and household median income have increased in both counties (Table 3.10-4, Area Income Data, 2006-2010 ACS). Continued operation of the UUSA facility would continue to have a small, but positive impact on area income and employment.

The overall change in population density and population characteristics in Lea County, New Mexico and Andrews County, Texas due to operation of the UUSA facility will be insignificant.

4.10.4 Community Characteristic Impacts

The continued construction and operation of the UUSA facility would result in minimal demand for increase in permanent workforce. The creation of permanent jobs would lead to some additional demands for housing and public services. However, this increase in demands would be small in the region of influence.

The increase in area population due to UUSA operation would be insignificant. Based on the current vacancy rate in the area (Table 3.10-7, Housing Information in the Lea County, New Mexico-Andrews County, Texas Vicinity), the relatively small need for housing units is not anticipated to burden or raise prices in the local real estate market.

Similarly, a smaller increase in local elementary and secondary school enrollment will be expected. The student-teacher ratio averages less than 14:1 in the regional public schools (Table 3.10-6, Educational Facilities near the UUSA). It is anticipated that operation of the UUSA facility would not result in unmanageable demand on the local school system.

Area medical, fire, and law enforcement services should be minimally affected as well. Agreements exist among the cities in Lea County, New Mexico, for emergency services if personnel in Eunice, New Mexico are not available. Otherwise, available services should be able to absorb the needs of new workers and residents. To allow provision of services, the development of new fire departments or police departments, for example, should not be necessary because the UUSA is be equipped with its own Fire Protection System and Security Force.

4.10.5 Regional Impact Due to Construction and Operation

The impact estimates in this ER are based on the combined population of Lea County, New Mexico and Andrews County, Texas. The population in New Mexico and Texas within about 120 km (75 mi) of the site is larger than the combined population of Lea and Andrews counties. Therefore, the projected increase in population reported in this ER would be reduced if spread over the area within 120 km (75 mi) of the site due to the higher population. This is the case for both the construction and operation periods. This minor increase in population would produce a minor impact on population characteristics, economic trends, housing, community services (health, social and educational resources), and the tax structure and distribution within 120 km (75 mi) of the site during both the construction and operation period.

As shown in Table 3.10-1, the population of Lea County, New Mexico was approximately 64,727 in 2010. The three closest population centers to the site in Lea County are Eunice at 8 km (5 mi), Hobbs at 32 km (20 mi), and Jal at 37 km (23 mi). The populations of these three areas in 2010 were approximately 2,922, 34,122, and 2,047, respectively, providing a combined total population of approximately 39,091. The population increase to this region is anticipated to be negligible given that the UUSA facility has been under construction and operating for several years, and the workforce for construction and operation of the proposed facility capacity expansion would be similar to that previously employed in the region.

As shown in Table 3.10-I, the population of Andrews County, Texas, was approximately 17,786 in 2010. The two closest population centers in Texas to the site are Andrews and Seminole at 51 km (32 mi) each. The populations of these two areas in 2010 were 11,088 and 6,430, respectively. It is reasonable to assume that the population increase associated with continued UUSA construction and operation would mostly relocate nearby population centers of Eunice, Hobbs and Jal, New Mexico, and Andrews and Seminole, Texas. All five locations are within 51 km (32 mi) of the site and are reasonable commuting distances for this region of the country. These five areas have a combined population of 56,609. The population increase to this region is anticipated to be negligible given that the UUSA facility has been under construction and operating for several years, and the workforce for continued construction and operation of the facility would be similar to that previously employed in the region. The minor increase in population would produce a minor impact on population characteristics, economic trends, housing, community services (health, social and educational resources), and the tax structure and distribution within Eunice, Hobbs and Jal, New Mexico, and Andrews and Seminole, Texas, during both the construction and operation periods of the UUSA facility.

The estimated tax revenue and estimated allocations to the State of New Mexico and Lea County resulting from the construction and operation of the UUSA facility are provided in Tables 4.10-2, Estimated Tax Revenue and 4.10-3, Estimated Tax Revenue Allocations. Total tax revenue is estimated to range from $821 million up to $973 million. The total tax revenue paid thru 2012 was $93.9 million and is reflected in Table 4.10-2, Estimated Tax Revenue.

4.10.6 Cumulative Impacts

The WCS disposal facility would have a peak construction force of about 40 full-time workers with an expected range of 30 to 50 persons and operations would have approximately 38 permanent workers (WCS, 2004). The source of employees (both construction and permanent operational) would likely be filled by residents in the region. The slight population increases predicted by WCS from constructing and operating the disposal cells would have small impacts to the housing and community services in the region of influence. Cumulative impacts from construction personnel would be small due to the minimal incremental increase from current construction labor forces in the vicinity already servicing the ongoing construction at UUSA. The additional permanent employment at WCS cumulated with the additional minimal operational employment at UUSA represents a small impact to the region.

For the IIFP, preconstruction activities were assumed to begin in 2011 and to conclude prior to the end of 2011. Initially 35 and later as many as 70 workers would be involved in preconstruction activities. During preconstruction, the work force would consist of heavy equipment operators and structural crafts, most of which are expected to come from the local area. Preconstruction activities are expected to result in impacts that would be approximately one-fourth to one-half the impacts for Phase 1 construction. As such, the NRC staff found in the EIS that there would be a correspondingly small impact on housing, taxes, infrastructure and community services (IIFP, 2011a). Phase 2 would use a construction crew of 150 to 180 workers. IIFP estimates approximately 27 workers of the construction work force are expected to move into the vicinity as new residents (15 percent of 180 workers). The increases in area population during Phase 2 construction, therefore, would be approximately the same as Phase 1 construction and the NRC staff found that those increases would have small impacts to socioeconomic resources. The Phase 2 operations of the IIFP facility would require a maximum of 40 additional workers (IIFP, 2009). Using the same assumptions for the Phase 1 operations workforce, the NRC staff assumed that 32 workers would already reside in the area, and that 8 would in-migrate. Given the excess housing, public utilities and capacity in local schools, the NRC staff concluded that socioeconomic impacts from Phase 2 operations would be small. It is likely, given the required construction skills and trades, and location that the IIFP construction activities and UUSA continuing construction would draw from the same labor force. The cumulative impact of the additional construction forces would be moderate as previously evaluated for the UUSA expansion.

No other large-scale projects are anticipated in the near future that would significantly impact the socioeconomics of Lea County, New Mexico, or Andrews and Gaines Counties, Texas. Therefore, cumulative impacts would be MODERATE. Impacts from the construction and operation of WCS disposal facility and IIFP would be cumulative to the UUSA impacts and would continue to be moderate.

4.10.7 Comparative Socioeconomic Impacts of No Action Scenarios

ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the construction and operation of the UUSA, including an alternative of "no action," i.e., not expanding the capacity of the UUSA facility. The following information provides comparative conclusions specific to the concerns addressed in this subsection for each of the three "no action" scenarios addressed in ER Section 2.3 and Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. No additional socioeconomic impacts at the UUSA site or at other potential sites.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The socioeconomic resource impact would be increased due to construction and clearing on two additional sites. The socioeconomic resource impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The socioeconomic resource impact would be increased due to construction and clearing on three additional sites. The socioeconomic resource impacts for these three additional projects are evaluated in the individual environmental impact statements for the projects.

4.10.8 Section 4.10 Tables

Table 4.10-1 Annual Construction Worker Salary

Workers	Annual Worker Salary			Workers
Year	**$0-33,999**	**$34,000-49,999**	**>$50,000**	**Average No./Yr.**
2012	120	200	480	800
2013	120	200	480	800
2014	120	200	480	800
2015	120	200	480	800
2016	120	200	480	800
2017	100	200	400	700
2018	100	200	400	700
2019	100	100	300	500
2020	60	80	160	300

Table 4.10-2 Estimated Tax Revenue

Tax	Estimated Payments Over the Life of the 10 MSWU Plant		
	Low Estimate	High Estimate	Actual Thru 2012
Gross Receipts	$67,200,000	$100,800,000	$77,728,625
NM Corporate Income Tax(1)	$820,800,000	$972,800,000	- -
Corporate Franchise Tax	$1,000	$1,000	- -
NM Withholding Tax	$25,000,000	$25,000,000	$7,943,648
NM Unemployment Insurance	$15,000,000	$15,000,000	$428,844
NM Property Tax(2)	$222,200,000	$312,900,000	$7,826,735
Total	$1,150,201,000	$1,426,501,000	$93,927,852

(1) Based on average income

(2) Average

Table 4.10-3 Estimated Tax Revenue Allocations [(1)(2)]

Tax	State of New Mexico	Lea County	Eunice, NM	Total
Estimated Gross Receipts Tax				
High	$95,760,000	$5,040,000	NA[(3)]	$100,800,000
Low	$63,840,000	$3,360,000	NA[(3)]	$67,200,000
NM Corporate Income Tax[(4)] Estimated total payments over the life of the 10 MSWU plant				
High	$972,800,000	NA[(5)]	NA[(5)]	$972,800,000
Low	$820,800,000	NA[(5)]	NA[(5)]	$820,800,000
NM Corporate Franchise Tax[(6)] Estimated total payments over the life of the 10 MSWU plant	$1,000	--	--	$1,000
NM Withholding Tax Estimated total payments over the life of the 10 MSWU plant	$25,000,000	NA[(5)]	NA[(5)]	$25,000,000
NM Unemployment Insurance Estimated total payments over the life of the 10 MSWU plant	$15,000,000	NA[(5)]	NA[(5)]	$15,000,000
NM Property Tax[(7)]				
High (Estimated total payments over the life of the 10 MSWU plant)	--	$312,900,000	NA[(3)]	$312,900,000
Low (Estimated total payments over the life of the 10 MSWU plant)	--	$222,200,000	NA[(3)]	$222,200,000

(1) Inflation is not included in any estimate.
(2) Tax rates are based on tax rates as of August 2012.
(3) Allocation to Eunice, NM will be performed by Lea County. Allocation estimate is not available.
(4) Based on average earnings over the life of the 10 MSWU plant.
(5) Allocation will be made by the State of New Mexico. Allocation estimate is not available.
(6) Based on $50 per year flat rate.
(7) Property tax is dependent on sustaining investment in the plant.

4.11 Environmental Justice

This section examines whether there are disproportionately high minority or low-income populations residing within a 6.4-km (4-mi) radius of the UUSA site for which further examination of environmental impacts to determine the potential for environmental justice concerns is warranted.

Data presented in the initial environmental justice evaluation was primarily sourced from the United States 2000 Census. Where available, data from the 2010 decennial census has been considered in this section of the ER. Where 2010 decennial census data had not yet been published, data from the previous ER, the 2000 Census, and/or data from the U.S. Census Bureau American Community Survey (ACS) data has been referenced.

As discussed below, no minority or low-income populations were identified that would require further analysis of environmental justice concerns under the criteria established by the NRC.

4.11.1 Procedure and Evaluation Criteria

Evaluation of environmental justice for the UUSA facility capacity expansion has considered the environmental justice evaluation of the initial NRC Environmental Impact Statement (EIS) published prior to the initial UUSA site construction, the Draft EIS (DEIS) for the Proposed International Isotope Fluorine Extraction Process and Depleted Uranium Deconversion Plant (International Isotope Fluorine Product [IIFP]), a site located within 20 miles of the UUSA site, and data gathered from the U.S. Census Bureau.

The environmental justice studies in the initial EIS were considered in approval of licensure for construction, operation and decommissioning of the UUSA facility at a nominal capacity of 3.0 MSWU. The EIS described the evaluation of potential issues of environmental justice as SMALL (NRC, 2005). The environmental justice study reported in the EIS concluded the following:

> *"Although the impacts to the general population were SMALL to MODERATE, an examination of the various environmental pathways by which low-income and minority populations could be affected found no disproportionately high and adverse impacts from construction, operation, or decommissioning on minority and low-income populations living near the proposed NEF or along the transportation routes into and out of the proposed NEF."*

The environmental justice study examined whether there was disproportionately high minority or low-income populations residing within a 6.4-kilometer (km) (4-mile) radius of the UUSA facility for which further examination of environmental impacts to determine the potential for environmental justice concerns was warranted. The evaluation was performed using population and economic decennial census 2000 data available from the U. S. Census Bureau for that area, and was done in accordance with the procedures contained in NUREG-1748. This guidance was endorsed by the NRC's draft Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (FR, 2003). The evaluation concluded: *"...no minority or low-income populations were identified that would require further analysis of environmental justice concerns under the criteria established by the NRC."*

UUSA compared minority group and low-income population percentage data to their counterparts for their respective county and state. These comparisons were made pursuant to the "20%" and "50%" criteria contained in Appendix C to NUREG-1748 to determine: (1) if any individual census block group (CBG) contained a minority population group, aggregate minority population, or low-income household percentage that exceeded its county or state counterparts by more than 20 percentage points; and (2) if any CBG was comprised of more than 50% minorities (either by individual group or in the aggregate) or low-income households. Based on its comparison of the relevant CBG data to their county and state counterparts, the evaluation concluded:

> *"...no further evaluation of potential environmental justice concerns is necessary, as no CBG within the 6.4-km (4-mi) radius of the NEF site contained a minority or low-income population exceeding the NUREG-1748 "20%" or "50%" criteria"* and *"... LES has concluded that no disproportionately high minority or low-income populations exist that would warrant further examination of environmental impacts upon such populations."*

The environmental justice analysis in the DEIS for the Proposed IIFP site, also located in Lea County, New Mexico, focused on census blocks and block groups in an area within 80 km (50 miles) of the proposed IIFP site. The IIFP DEIS concluded:

> *"The largest minority population within 80 kilometers (50 miles) of the proposed site is the Hispanic/Latino population. The nearest minority or low-income population as defined by NRC criteria is 22.5 km (14 mi) from the proposed site. The impacts of IIFP construction and operation on resources would be SMALL and, in most cases, localized. Therefore, because all impacts would be SMALL, and the identified minority and low-income populations are not in close proximity to the proposed site, impacts would not be disproportionately high and adverse for any populations in the region, including minority or low-income populations."* (NRC, December 2011)

The NRC staff determined in the proposed IIFP site DEIS that impacts of the facility on tax revenues, housing, and community services in Lea and Eddy Counties in New Mexico, where most immigrating construction and operations workers are likely to live, and where the majority of economic impacts would occur would be SMALL and positive during the construction and operation of proposed IIFP facility; and where not positive, would still be SMALL. The IIFP DEIS concluded: *"...decommissioning of the proposed IIFP facility would provide short-term employment. All resource impacts are SMALL and the identified minority and low-income populations are not in close proximity to the proposed site, so impacts would not be considered disproportionately high and adverse for any populations in the region, including minority or low-income populations."* (NRC, December 2011)

A minority or low-income community may be considered as either a population of individuals living in geographic proximity to one another or a dispersed/transient population of individuals (e.g., migrant workers) where either type of group experiences common conditions of environmental exposure (NRC, 2003). NUREG-1748 defines minority categories as American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, African American (not of Hispanic or Latino origin), some other race, and Hispanic or Latino ethnicity (of any race) (NRC, 2003). The 2000 Census introduced a multiracial category. Anyone who identifies themselves as white and a minority is counted as that minority group. Individuals that identify themselves as more than one minority are counted in a "two or more races" group (NRC, 2003). Low-income is defined as being below the poverty level as defined by the U.S. Census Bureau (NRC, 2003).

According to the U.S. Census Bureau's Overview of Race and Hispanic Origin: 2010 (March 2011), the minority population in the United States grew by 29% in the period 2000-2010 (USCB, 2012). The most significant minority population growth between 2000 and 2010 was measured in the South census region, which includes Texas, and the West census region, which includes New Mexico. Minority population grew by 34% in the South and 29% in the West. More than 50% of the population of the states of New Mexico and Texas is reported as minority in 2010 census data. The U.S. Census Bureau reports: *"During the past 10 years, it has been the Hispanic population and the Asian population that have grown considerably, in part due to relatively higher levels of immigration."*

This environmental justice assessment assumes that the proposed facility capacity expansion will occur within the current boundaries of the existing UUSA site property. Furthermore, it is assumed that expansion construction activities will be similar to the construction activities associated with the initial development of the UUSA site, as considered in the initial environmental justice evaluation (UUSA, 2012), and that resource needs and workforce needs will be of similar scale to the ongoing construction of the UUSA.

The permanent increase in employment, income and population in the area associated with the start-up and current operation of the UUSA facility would be at least sustained with the proposed facility capacity expansion. The average number of workers employed for operation of the UUSA is assumed to continue to be approximately 250, rising slightly to 258 to accommodate additional operational permanent employees through the facility capacity expansion to 10 MSWU.

Potential impacts to local economy, housing, schools and public services are not expected to be different from the SMALL impacts previously evaluated (NRC, 2005). The primary labor market for the construction of the proposed facility capacity expansion would continue to come from the same regions as the initial development of the UUSA site.

The determination of whether the potential for environmental justice concerns exists associated with the initial development of the UUSA site was made in accordance with the detailed procedures set forth in Appendix C to NUREG-1748. Census data from the 2000 decennial census were obtained from the U. S. Census Bureau on the minority and low-income populations residing within a 6.4-km (4-mi) radius (i.e., 130 km^2 or 50 mi^2) of the center of the UUSA site. These data were obtained by census block group (CBG), and include (for minority populations) percentage totals within each census block group for both each individual minority population group (i.e., African-American, Hispanic, Native American) and for the aggregate minority population. For low-income households (defined in NUREG-1748 as those households falling below the U.S. Census Bureau-specified poverty level), only the total percentage of such households within each CBG was obtained. The low income household data used in the evaluation was for 1999. In examining alternative sites for the UUSA facility, environmental justice was considered as part of the overall site selection process. The above-described minority and low-income population percentage data were compared to their counterparts for their respective county and state. These comparisons were made pursuant to the "20%" and "50%" criteria contained in Appendix C to NUREG-1748, to determine (1) if any individual CBG contained a minority population group, aggregate minority population, or low-income household percentage that exceeded its county or state counterparts by more than 20 percentage points; and (2) if any CBG was comprised of more than 50% minorities (either by individual group or in the aggregate) or low-income households.

Based on its comparison of the relevant CBG data to their county and state counterparts, as discussed below, it determined that no further evaluation of potential environmental justice concerns was necessary, as no CBG within the 6.4-km (4-mi) radius of the UUSA site contained a minority or low-income population exceeding the NUREG-1748 "20%" or "50%" criteria. This evaluation has been updated to consider the data provided by the 2010 US Census.

4.11.2 Results

The 130-km^2 (50-mi^2) area around the UUSA site includes parts of both Lea County, New Mexico and Andrews County, Texas (Figure 3.10-1, Site Location-Nearby Counties). Within that area, there are two census tracts (one in each county and one census block group (CBG) in each census tract).

The previous evaluation presented data for Census Tract 8, CBG 2 for the Lea County, New Mexico area of impact and data for Census Tract 9501, CBG 4 for the Andrews County, Texas area of impact. Data from the 2010 Census was reviewed and evaluated for the proposed UUSA facility capacity expansion. The 2010 Census provides data for Census Tract 8, CGB 2 for the Lea County, New Mexico area of interest; however, the 2010 Census Tract for the Andrews County, Texas area of interest, Census Tract 9501, includes only one census block group, CBG 1. Data for these CBGs is presented in Table 4.11-1, Minority Population 2010.

At the time of the initial evaluation prior to construction and operation of the UUSA facility, the largest minority group was Hispanic or Latino, accounting for 42.1% of the total population in New Mexico and 32.0% in Texas. In Lea County, New Mexico, the highest percentage of a minority population, at 39.6%, was also Hispanic or Latino. In Andrews County, Texas, Hispanic or Latino was the largest minority group as well at 40.0%. Review of 2010 Census data reveals the largest minority group remains the Hispanic or Latino group, accounting for 46.3% of the total population in New Mexico and 37.6% in Texas. Hispanic or Latino represents the largest minority group in both Lea County, New Mexico and Andrews County, Texas at 51% and 48.7%, respectively.

The initial evaluation demonstrated no individual CBG and the 130-km^2 (50-mi^2) area around the UUSA site was comprised of more than 50% of any minority population. With respect to the Hispanic or Latino population, the largest minority population in both census tracts were 24.8% in Census Tract 8, CGB 2 and 19.8% in Census Tract 9501, CBG 4. The largest minority group in the 130-km^2 (50-mi^2) area around the UUSA site was Hispanic or Latino, accounting for 11.7%. Moreover, none of these percentages exceeded the applicable State or County percentages for this minority population by more than 20 percentage points. Census 2010 data shows that Hispanic or Latino remains the largest minority population group in the CBGs reviewed, with 34.9% in Census Tract 8, CBG 2 and 48.7% in Census Tract 9501, CBG 1. None of these percentages exceeded the applicable State or County percentages for this minority population by more than 20 percentage points.

While review of 2010 Census data indicates growth of the Hispanic or Latino minority group in the counties surrounding the UUSA site since 2000, the growth of the Hispanic or Latino minority group in the counties surrounding the UUSA site is not disproportionate to the growth of this minority group in Texas and New Mexico, and across the United States. The proposed facility capacity expansion would not present disproportionately high or adverse impacts from construction, operation or decommissioning on minority and low-income populations living near the UUSA site.

The initial evaluation prior to construction and operation of the UUSA facility demonstrated that no individual CBG is comprised of more than 50% of low-income households. The percentages are as follows: Tract 8, CBG 2 –3.6%; Tract 9501, CBG 4- 9.9%. Neither of these percentages exceeded 50 percent; moreover, neither of these populations significantly exceeds the percentage of low-income households in the applicable State or County. Low income (poverty) data is only compiled down to the CBG level and, therefore, data was not available for only the 130-km^2 (50-mi^2) area around UUSA.

Recent poverty data for the area of impact is generally similar to that documented in the initial evaluations prior to site construction and operation. American Community Survey (ACS) 5-year estimate economic data for the period 2006-2010 shows the percent of individuals and households below poverty level in Lea County and the state of New Mexico has remained steady or has decreased. The percent of individuals below the poverty level in Andrews County, Texas has increased slightly, by less than one percentage point, while the percent of households below the poverty level has decreased. Data for the state of Texas shows increases in the percent of individuals and households below the poverty level, by approximately 1 percentage point. The ACS data shows increases in individual and household incomes in Lea and Andrews Counties and in New Mexico and Texas. Income and poverty data is presented in Table 3.10-4, Area Income Data, 2006-2010 of the Socioeconomic section of this document.

Based on this analysis of the above-described data, no disproportionately high minority or low-income populations exist that would warrant further examination of environmental impacts upon such populations.

The proposed facility capacity expansion would sustain construction-related employment positions through the year 2020. The regional economy would continue to benefit from the capital investment expenditures and recurring costs associated with the proposed facility capacity expansion construction and with the proposed increased operation of the UUSA facility. Operations workforce would increase slightly with increased production capacity, and workers are anticipated to continue to spend earnings on goods and services within the region of the UUSA site.

4.11.3 Cumulative Impacts

Environmental justice analysis performed on the potential cumulative impacts concluded there would be no disproportionally high-minority and low-income populations that exist warranting further examination of environmental impacts to those populations. It is unlikely that minority and low-income persons would be disproportionately affected by adjacent activities at WCS and Lea County Landfill or by the IIFP facility in Hobbs. Any impacts from traffic during construction of the disposal cells by WCS would be short termed and small.

4.11.4 Comparative Environmental Justice Impacts of No-Action Scenarios

ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the capacity expansion construction and operation of UUSA, including an alternative of "no action," i.e., not expanding the current capacity. The following information provides comparative conclusions specific to the concerns addressed in this subsection for each of the three "no action" scenarios addressed in ER Section 2.3 and Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. No environmental justice impacts at the UUSA site or at other potential sites.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The environmental justice impact may be increased due to construction and operation at two additional sites. The environmental justice impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The environmental justice impact may be increased due to construction and operation at three additional sites. The environmental justice impacts for these three additional projects are evaluated in the individual environmental impact statements for the projects.

4.11.5 Section 4.11 Tables

Table 4.11-1 Minority Population, 2010

Geographic Area	New Mexico	Lea County	NM Census Tract 8, Block Group 2 (year 2010)	Texas	Andrews County	TX Census Tract 9501, Block Group 1 (year 2010)
Total:	2,059,179	64,727	727	25,145,561	14,786	1,678
Not Hispanic or Latino	1,105,776	31,664	473	15,684,640	7,591	1195
Percent	53.7%	49.0%	65.1%	62.4%	51.3%	71.2%
White alone	83,810	27,845	671	11,397,345	7,083	1507
Percent	40.5%	43.0%	92.3%	43.3%	48%	89.8%
Black or African American alone	42,550	2,399	4	2,886,825	199	6
Percent	2.1%	3.7%	0.55%	11.5%	1.3%	0.36%
State percentage difference	0.0%	1.6%	-1.55%	0.0%	-10.2%	-11.4%
County percentage difference	N/A	0.0%	-3.15%	N/A	0.0%	-0.94%
American Indian and Alaska Native alone	175,368	468	2	80,586	95	6
Percent	8.5%	0.7%	0.28%	0.3%	0.6%	0.36%
State percentage difference	0.0%	-7.8%	-8.2%	0.0%	0.3%	-0.06%
County percentage difference	N/A	0.0%	-0.42%	N/A	0.0%	-0.24%
Asian alone	28,208	302	0	948,426	85	26
Percent	1.37%	0.5%	0.0%	3.8%	0.6%	1.5%
State percentage difference	0.0%	-0.87%	-1.37%	0.0%	-3.2%	-2.3%
County percentage difference	N/A	-0.0%	-0.5%	N/A	0.0%	0.9%
Native Hawaiian and Other Pacific Islander alone	1,246	18	0	17,920	1	0
Percent	0.06%	0.03%	0.0%	0.07%	0.0%	0.0%
State percentage difference	0.0%	-0.03%	-0.06%	0.0%	-0.07%	-0.07%
County percentage difference	N/A	0.0%	-0.03%	N/A	0.0%	0.0%
Some other race alone	3,750	51	32	33,980	17	99
Percent	0.18%	0.08%	4.4%	0.14%	0.1%	5.9%

Table 4.11-1 Minority Population, 2010

Geographic Area	New Mexico	Lea County	NM Census Tract 8, Block Group 2 (year 2010)	Texas	Andrews County	TX Census Tract 9501, Block Group 1 (year 2010)
State % difference	0.0%	-0.1%	4.2%	0.0%	-0.3%	5.8%

Table 4.11-1 Minority Population, 2010

Geographic Area	New Mexico	Lea County	NM Census Tract 8, Block Group 2 (year 2010)	Texas	Andrews County	TX Census Tract 9501, Block Group 1 (year 2010)
County percentage difference	N/A	0.0%	4.3%	N/A	0.0%	5.8%
Two or more races	29,835	581	18	319,558	111	34
Percent	1.4%	0.9%	2.5%	1.3%	0.75%	2.0%
State percentage difference	0.0%	-0.5%	1.1%	0.0%	-0.55%	0.7%
County percentage difference	N/A	0.0%	1.6%	N/A	0.0%	1.25%
Hispanic or Latino:	953,403	33,063	254	9,460,921	7,195	483
Percent	46.3%	51%	34.9%	37.6%	48.7%	28.8%
State percentage difference	0.0%	4.7%	-11.4%	0.0%	11.1%	-8.8%
County percentage difference	N/A	0.0%	-16.1%	N/A	0.0%	-19.9%
Total Minority	1,204,525	36,301	292	13,428,658	7,592	616
Percent	58.5%	56.1%	40.17%	53.4%	51.3%	36.7%
State percentage difference	0.0%	-2.4%	-18.3%	0.0%	-2.1%	-16.7%
County percentage difference	N/A	0.0%	-15.9%	N/A	0.0%	-14.6%

4.11.6 Section 4.11 Figures

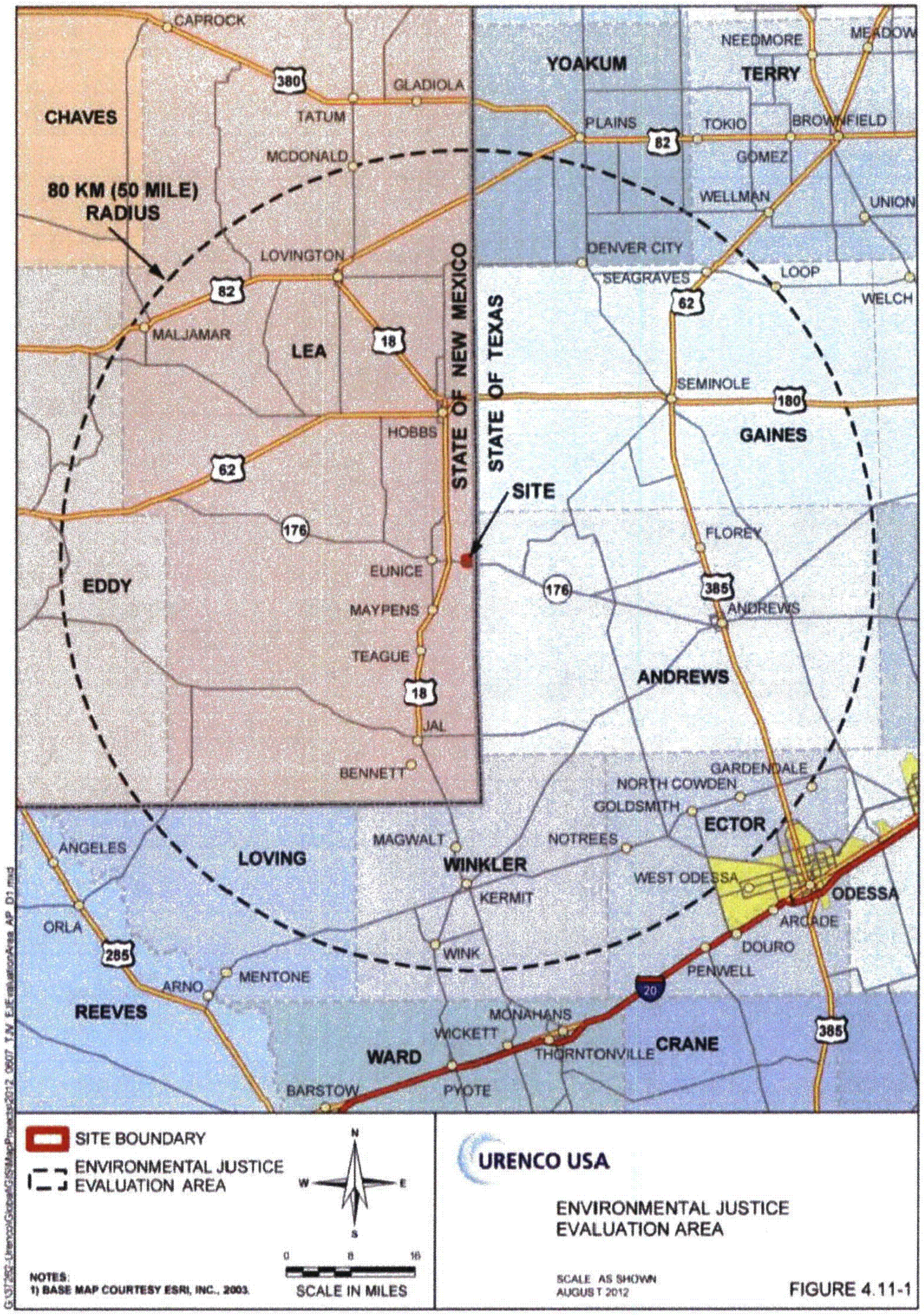

Figure 4.11-1 Environmental Justice Evaluation Area

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4.12 Public and Occupational Health Impacts

4.12.1 Nonradiological Impacts

The proposed expansion will increase the quantity of nonradiological effluents at the UUSA site, but they will continue not to exceed criteria in 40 CFR 50, 59, 60, 61, 122, 129, or 141. 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 will be used at UUSA, by building, is contained in ER Tables 2.1-2 through 2.1-4. ER Figure 2.1-4 and 4.12-2 indicate where these buildings are located on the UUSA site.

4.12.2 Radiological Impacts

Sources of potential radiation exposure at the current UUSA facility to workers are described in the LES ER Section 4.12.2, as well as UUSA's radiation protection program. Sources of potential radiation exposure at the current UUSA facility to the general public and the environment are also described in the LES ER Section 4.12.2. UUSA's effluent monitoring and environmental monitoring/sampling programs provide data to identify and assess plant's contribution to environmental uranium at UUSA and are described in Section 6.1 of this ER and the LES ER.

4.12.3 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 and are incorporated by reference.

4.12.4 Routine Gaseous Effluent

The discharge of routine gaseous effluents is described in Section 4.12.2.1.1 of the LES ER and incorporated by reference. With both the current facility and the expansion, 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). 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. Evaluation for the current proposed facility expansion to 10 MSWU would scale the Capenhurst facility emissions by 10 for expected releases of 1.0 MBq

(28 µCi) which is still less than the bounding condition initially evaluated prior to site construction.

Gaseous Effluent monitoring began at UUSA 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)

The periods for which URENCO USA has had Uranium Hexafluoride (UF_6) on site (beginning with 1st quarter 2009) there has not been a monitored 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 monitored. Provided the quantity of measurable values remain below that required for statistical comparison, UUSA will continue to use the operational data from our sister facilities. It should be noted that the Cylinder Receipt and Dispatch Building (CRDB) Chemistry Laboratories became operational in February 2013 and the Decontamination Systems are not yet approved for operation.

4.12.5 Liquid Effluent

The operation of UUSA includes liquid waste processing to collect and solidify the uranic materials that are collected as part of process operations. The remaining liquid effluent is solidified prior to off-site disposal. LES ER Section 2.1.2, Proposed Action, provides an overview of the liquid waste treatment system. Because of the plant design and the site's geology, with normal operations, there is not a release pathway related to the routine liquid effluents. See LES ER Section 4.12.2.1.1. This will not change with the proposed expansion.

4.12.6 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 Pad is the most significant portion of the total direct dose equivalent and with the expansion, will increase from 2.6 acres to 23 acres to accommodate storage of up to 25,000 DUF_6 cylinders.

The direct dose equivalent from the accumulation of 25,000 cylinders of UBC generation was calculated with the MCNP5 computer code (UUSA CALC-S-00141, Rev 1). The conceptual layout of the UBC Storage Pads is shown in Figure 4.12-3, UBC Pad Dose Equivalent Isopleths

(2,000 Hours Per Year Occupancy). For purposes of evaluation the cylinders were assumed to be in a triple stack configuration for storage on the pad. The calculation does not explicitly model empty 48Y feed cylinders. To protect both workers and the public from receiving excess dose, per the ALARA principle the empty feed cylinders are placed away from the edges of the UBC Storage Pad and inside the array of full cylinders to allow for shielding from the surrounding filled cylinders. Direct dose from cylinders stored in the existing Cylinder Receipt and Dispatch Building (CRDB) has also been included in the UBC Pad Dose Equivalent Isopleths by adding the effective dose to that modeled from the pad. The dose contribution for the CRDB was based on the initial evaluation of dose for this source (AREVA document 32-2400561-00).

All radiation transport calculations of the storage cylinders were performed with the general purpose three-dimensional continuous energy Monte Carlo code MCNP5. The cell tally, F4, was utilized in this calculation for detector placements. MCNP calculated fluxes were converted to dose rates using the ANSI/ANS 6.1.1-1 1977 flux-to-dose conversion factors. The MCNP5, version 1.40, is approved for QL-1 application, as documented in QA Evaluation Report 2009-E-1 1-149 [19], for radiation transport evaluations. The MCNP tally multipliers in the input files account for source strength and the number of cylinders. In addition, TLD measurements have been collected to evaluate photon and neutron dose on the UBC Storage Pad. This information was subsequently utilized to evaluate conservative assumptions in the Monte Carlo calculation.

The regulatory dose equivalent limit for areas beyond the UUSA fence boundary is 0.25 mSv (25 mrem) per year (including direct and effluent contributions) including the contribution from cylinders stored in the CRDB to a member of the public.

The annual offsite dose equivalent was calculated at UUSA fence line assuming 2,000 hours per year occupancy. Implicit in the use of 2,000 hours is the assumption that the dose equivalent is to a non-resident (i.e., a worker at an unrelated business). The annual dose equivalents for the actual nearest worksite and at the nearest residence were also calculated.

The annual dose equivalent due to external radiation from the UBC Storage Pad (skyshine and direct) is estimated to be less than 3.8×10^{-2} mSv (3.8 mrem) to the maximally exposed person at the nearest point on the western site boundary (2,000 hrs/yr) , approximately 9.3×10^{-2} mSv (9.3 mrem) for the maximally exposed person to the north boundary (2000 hours/yr). Initial evaluations of dose to the maximally exposed resident (8,760 hrs/yr) located approximately 4.3 km (2.63 mi) from the UBC Storage Pads were calculated to be less than 8×10^{-12} mSv/yr (8×10^{-10} mrem/yr). This value is bounding for the assessment of impacts, because the total dose at the property lines is less than was initially evaluated for the facility and the location of the nearest resident has not changed since the initial evaluation.. Figure 4.12-3, UBC Pad Dose Equivalent Isopleths (2,000 Hours per Year Occupancy) shows the dose equivalent contours for the summed contributions from the UBC Storage Pad (UUSA CALC-S-00141, Rev 1) and the CRDB for 2,000 hours/year occupancy (AREVA document 32-2400561-00). Figure 4.12-4, UBC Pad Dose Equivalent Isopleths (8,760 Hours per Year Occupancy), indicates the dose equivalent contours assuming full-time occupancy. LES ER Table 4.12-1, Direct Radiation Annual Dose Equivalent by Source, summarizes the annual dose equivalents by source (UBC Storage Pad and CRDB) at different locations as evaluated prior to the initial construction.

4.12.7 Population Dose Equivalents

The estimated population dose equivalents are described in Section 4.12.2.1.4 of the LES ER. Taking into account the small shifts in population revealed in the 2010 census discussed in ER

Section 3.10, these estimated population dose equivalents remain applicable and are incorporated by reference.

4.12.8 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 incorporated features to minimize gaseous and liquid effluent releases and to keep them well below regulatory limits. These features are described in Section 4.12.1.5 of the LES ER.

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 onsite retention basins 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 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.

4.12.9 Public and Occupational Exposure Impacts

The assessment of the dose impacts resulting from the annual liquid and gaseous effluents for the UUSA site conducted prior to the initial construction is described in Section 4.12 of the LES ER. This assessment remains generally applicable and is incorporated by reference; only areas where the analysis has changed due to the expansion are discussed below.

There are two primary changes to the assumptions made in the LES ER: the Treated Effluent Evaporative Basin and the UBC Storage Pads. The LES ER discussion includes the treatment of liquid effluents which would have resulted in resuspended airborne particles from evaporation in the Treated Effluent Evaporative Basin, which is not part of the current operation and not considered as part of the future design. See LES ER Section 4.12.2.1.2 and ER Section 3.12.3. This was evaluated as an additional source of radiation that is not in fact present at the site. The calculations below also assume the existence of the Treated Effluent Evaporative Basin, thus building in additional conservatism.

LES ER Table 4.12-12, Annual Total Effective Dose Equivalent (All Sources), indicates that during the initial evaluation of the UUSA operation the dominant source of offsite radiation exposure was from direct (and scatter) radiation from the UBC Storage Pads (fixed source). For the proposed facility capacity expansion, this remains true. The maximum annual dose equivalent found along the north site boundary has been modeled during the evaluation for facility capacity expansion to 10 MSWU to have an estimated impact of 9.3×10^{-2} mSv /year (9.3 mrem/year) from storage of 25,000 UBC cylinders at the UBC Storage Pad. This calculated dose equivalent is well 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. It is therefore concluded that the operation of the UUSA site at the proposed facility expansion will not exceed the dose equivalent criteria for members of the public as stipulated in Federal regulations.

4.12.10 Environmental Effects of Accidents

All credible accident sequences were considered during the Integrated Safety Analysis (ISA) performed for the facility prior to facility construction and operation. For the proposed action of facility capacity expansion to 10 MSWU, no new accident scenarios were considered. The discussion of these accident sequences in Section 4.12.3.1 the LES ER is incorporated by reference.

4.12.11 Accident Mitigation Measures

Accident mitigation measures for the UUSA facility are described in Section 4.12.3.2 of the LES ER. They include design features to delay and reduce the UF_6 releases inside the buildings from reaching the outside environment, such as seismically designed portions of the UF_6 process piping and UF_6 process components, or automatic shutoff of building HVAC systems during a fire event. With mitigation, the dose equivalent consequences to the public for these accident sequences have been reduced to below an intermediate consequence as defined in 10 CFR 70.61.

4.12.12 *Cumulative Impacts*

Due to the nearly adjacent location, there will be a cumulative impact from the radiological dose at the proposed UUSA facility capacity expansion and the recently approved WCS low-level radioactive wastes disposal site in the State of Texas (an NRC Agreement State). The WCS disposal site is proposed to include approximately 16 acres of disposal cells and allow 1,160,000 cubic yards of waste disposal for a total radioactivity of 24,530 curies. WCS has evaluated total equivalent dose as 9.54 mrem/year for full year exposure by a resident at their fence line. This dose will be cumulative with the UUSA predicted dose equivalent. UUSA modeled the potential fenceline exposure to be 9.3 mrem for 2000 hours of exposure. Projecting that exposure in a linear extrapolation to a full year (>8000hrs) the impact would be approximately 38 mrem/yr. the cumulative impacts from both of these sources even if immediately adjacent would be less than the standard of 100 mrem/yr for a small cumulative impact.The IIFP facility will be located approximately 20 miles away from the UUSA facility and will therefore not have a cumulative impact with UUSA on public and occupational health. The cumulative collective radiological impacts to the offsite population, from all sources, would be SMALL by being below the 1 millisieverts (100 millirem) per year dose limit (10 CFR Part 20) to the offsite maximally exposed individual during the time of the construction, operation, and decommissioning of the proposed UUSA facility capacity expansion.

4.12.13 Comparative Public and Occupational Exposure Impacts of No-Action Scenarios

ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the construction and operation of the UUSA, including an alternative of "no action," i.e., not expanding the capacity of the UUSA facility. The following information provides comparative conclusions specific to the concerns addressed in this subsection for each of the three "no action" scenarios addressed in ER Section 2.3 and Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Scenarios.

No-Action Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. No additional public and occupational health impacts at the UUSA site or at other potential sites.

No-Action Scenario C – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The public and occupational health resource impact would be increased due to construction and operations on two additional sites. The public and occupational health resource impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

No-Action Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The public and occupational health resource impact would be increased due to construction and operations on three additional sites. The public and occupational health resource impacts for these three additional projects are evaluated in the individual environmental impact statements for the projects.

4.12.14 Section 4.12 Tables

Table 4.12-1 Direct Radiation Annual Dose Equivalent by Source (10 MSWU facility)

Location	Annual Occupancy (hours/year)			UBC Storage Pad and CRDB Total mSv/yr (mrem/yr)
Site Fence, North*	2,000			0.093 (9.3)
Site Fence west*	2,000			0.038 (3.8)
Nearest Actual Business, NNW 1.9 km (1.17 mi)**	2,000			$<6.0\times10^{-5}$ (6.0×10^{-3})
Nearest Actual Residence, West 4.3 km (2.63 mi)**	8,760			$<8.0\times10^{-12}$ (8.0×10^{-10})

* Distance from the closest edge of the pad.

**Distance from the center of the site.

Table 4.12-2 Population Data for the Year 2000

Population (All Ages) Distribution (2000 Census) Within 80 km (50 mi)

Sector	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.0 km (4-5 mi)	8.0-16 km (5-10 mi)	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Totals
N	0	0	0	0	0	43	171	275	370	476	1,336
NNE	0	0	0	0	0	61	243	405	568	4,404	5,681
NE	0	0	0	0	0	61	243	405	3,523	3,064	7,296
ENE	0	0	0	0	0	61	188	405	3,523	730	4,906
E	0	0	0	0	0	33	132	220	308	396	1,089
ESE	0	0	0	0	0	33	132	220	9,960	396	10,741
SE	0	0	0	0	0	33	132	220	1,937	7,084	9,406
SSE	0	0	0	0	0	33	132	157	1,321	2,836	4,479
S	0	0	0	0	0	43	171	286	88	6,746	7,334
SSW	0	0	0	0	0	43	171	2,282	167	56	2,719
SW	0	0	0	0	0	43	171	286	400	266	1,166
WSW	0	0	11	6	0	43	171	286	400	537	1,454
W	0	0	11	52	1,286	1,324	171	286	400	537	4,067
WNW	0	0	0	0	0	43	171	286	400	520	1,420
NW	0	0	0	0	0	43	171	286	400	514	1,414
NNW	0	0	0	0	0	43	7,335	7,450	9,871	514	25,213
Ring Totals=	0	0	22	58	1,286	1,981	9,909	13,754	33,635	29,075	89,720
Cum. Totals =	0	0	22	80	1,366	3,347	13,256	27,009	60,644	89,720	

Table 4.12-3 Collective Dose Equivalents to All Ages Population (Person-Sieverts)

(liquid and gas release pathways)

Population Dose Equivalent (All Ages - All Pathways) Within 80 km (50 mi) (Person-Sievert)

Sector	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.0 km (4-5 mi)	8.0-16 km (5-10 mi)	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Totals
N	0.0	0.0	0.0	0.0	0.0	3.3E-07	4.4E-07	3.1E-07	2.5E-07	2.1E-07	1.5E-06
NNE	0.0	0.0	0.0	0.0	0.0	2.3E-07	3.1E-07	2.3E-07	1.9E-07	9.9E-07	2.0E-06
NE	0.0	0.0	0.0	0.0	0.0	1.4E-07	1.8E-07	1.4E-07	7.0E-07	4.0E-07	1.6E-06
ENE	0.0	0.0	0.0	0.0	0.0	1.3E-07	1.3E-07	1.3E-07	6.6E-07	9.1E-08	1.1E-06
E	0.0	0.0	0.0	0.0	0.0	7.5E-08	1.0E-07	7.7E-08	6.3E-08	5.4E-08	3.7E-07
ESE	0.0	0.0	0.0	0.0	0.0	6.3E-08	8.7E-08	6.6E-08	1.7E-06	4.6E-08	2.0E-06
SE	0.0	0.0	0.0	0.0	0.0	7.4E-08	1.0E-07	7.7E-08	4.0E-07	9.7E-07	1.6E-06
SSE	0.0	0.0	0.0	0.0	0.0	7.6E-08	1.0E-07	5.6E-08	2.8E-07	3.9E-07	9.0E-07
S	0.0	0.0	0.0	0.0	0.0	1.5E-07	2.0E-07	1.5E-07	2.7E-08	1.4E-06	1.9E-06
SSW	0.0	0.0	0.0	0.0	0.0	6.9E-08	9.3E-08	5.5E-07	2.3E-08	5.1E-09	7.4E-07
SW	0.0	0.0	0.0	0.0	0.0	7.3E-08	9.7E-08	7.1E-08	5.8E-08	2.5E-08	3.2E-07
WSW	0.0	0.0	1.0E-07	3.2E-08	0.0	6.9E-08	9.1E-08	6.7E-08	5.4E-08	4.8E-08	4.6E-07
W	0.0	0.0	1.7E-07	4.6E-07	7.7E-06	3.5E-06	1.5E-07	1.1E-07	9.3E-08	8.3E-08	1.2E-05
WNW	0.0	0.0	0.0	0.0	0.0	9.8E-08	1.3E-07	9.8E-08	7.9E-08	6.8E-08	4.8E-07
NW	0.0	0.0	0.0	0.0	0.0	1.4E-07	2.0E-07	1.5E-07	1.2E-07	1.0E-07	7.1E-07
NNW	0.0	0.0	0.0	0.0	0.0	2.2E-07	1.3E-05	5.9E-06	4.6E-06	1.6E-07	2.4E-05
Ring Totals=	0	0	2.7E-07	5.0E-07	7.7E-06	5.5E-06	1.5E-05	8.2E-06	9.3E-06	5.0E-06	5.2E-05
Cum. Totals =	0	0	2.7E-07	7.6E-07	8.4E-06	1.4E-05	2.9E-05	3.8E-05	4.7E-05	5.2E-05	

Table 4.12-4 Collective Dose Equivalents to All Ages Population (Person-rem) Based on Initial Site Evaluation

(liquid and gas release pathways)

Population Dose Equivalent (All Ages - All Pathways) Within 80 km (50 mi) (Person-rem)

Sector	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.0 km (4-5 mi)	8.0-16 km (5-10 mi)	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Totals
N	0.0	0.0	0.0	0.0	0.0	3.3E-05	4.4E-05	3.1E-05	2.5E-05	2.1E-05	1.5E-04
NNE	0.0	0.0	0.0	0.0	0.0	2.3E-05	3.1E-05	2.3E-05	1.9E-05	9.9E-05	2.0E-04
NE	0.0	0.0	0.0	0.0	0.0	1.4E-05	1.8E-05	1.4E-05	7.0E-05	4.0E-05	1.6E-04
ENE	0.0	0.0	0.0	0.0	0.0	1.3E-05	1.3E-05	1.3E-05	6.6E-05	9.1E-06	1.1E-04
E	0.0	0.0	0.0	0.0	0.0	7.5E-06	1.0E-05	7.7E-06	6.3E-06	5.4E-06	3.7E-05
ESE	0.0	0.0	0.0	0.0	0.0	6.3E-06	8.7E-06	6.6E-06	1.7E-04	4.6E-06	2.0E-04
SE	0.0	0.0	0.0	0.0	0.0	7.4E-06	1.0E-05	7.7E-06	4.0E-05	9.7E-05	1.6E-04
SSE	0.0	0.0	0.0	0.0	0.0	7.6E-06	1.0E-05	5.6E-06	2.8E-05	3.9E-05	9.0E-05
S	0.0	0.0	0.0	0.0	0.0	1.5E-05	2.0E-05	1.5E-05	2.7E-06	1.4E-04	1.9E-04
SSW	0.0	0.0	0.0	0.0	0.0	6.9E-06	9.3E-06	5.5E-05	2.3E-06	5.1E-07	7.4E-05
SW	0.0	0.0	0.0	0.0	0.0	7.3E-06	9.7E-06	7.1E-06	5.8E-06	2.5E-06	3.2E-05
WSW	0.0	0.0	1.0E-05	3.2E-06	0.0	6.9E-06	9.1E-06	6.7E-06	5.4E-06	4.8E-06	4.6E-05
W	0.0	0.0	1.7E-05	4.6E-05	7.7E-04	3.5E-04	1.5E-05	1.1E-05	9.3E-06	8.3E-06	1.2E-03
WNW	0.0	0.0	0.0	0.0	0.0	9.8E-06	1.3E-05	9.8E-06	7.9E-06	6.8E-06	4.8E-05
NW	0.0	0.0	0.0	0.0	0.0	1.4E-05	2.0E-05	1.5E-05	1.2E-05	1.0E-05	7.1E-05
NNW	0.0	0.0	0.0	0.0	0.0	2.2E-05	1.3E-03	5.9E-04	4.6E-04	1.6E-05	2.4E-03
Ring Totals=	0	0	2.7E-05	5.0E-05	7.7E-04	5.5E-04	1.5E-03	8.2E-04	9.3E-04	5.0E-04	5.2E-03
Cum. Totals =	0	0	2.7E-05	7.6E-05	8.4E-04	1.4E-03	2.9E-03	3.8E-03	4.7E-03	5.2E-03	

Table 4.12-5A Annual and Committed Dose Equivalents for Exposures in Year 30 to an Adult from Gaseous Effluent (Nearest Resident) Based on Initial Site Evaluation

Source		Skin	Gonads	Breast	Lung	Red Bone Marrow	Bone Surface	Thyroid	Remainder	Effective Dose Equivalent
Cloud Immersion	(mSv)	2.3E-13	1.6E-13	1.9E-13	1.5E-13	1.4E-13	4.2E-13	1.6E-13	1.5E-13	1.7E-13
	(mrem)	2.3E-11	1.6E-11	1.9E-11	1.5E-11	1.4E-11	4.2E-11	1.6E-11	1.5E-11	1.7E-11
Inhalation	(mSv)	0.0E+00	9.2E-10	1.0E-09	1.0E-04	2.5E-08	3.9E-07	9.8E-10	3.7E-08	1.2E-05
	(mrem)	0.0E+00	9.2E-08	1.0E-07	1.0E-02	2.5E-06	3.9E-05	9.8E-08	3.7E-06	1.2E-03
Grd. Plane direct	(mSv)	1.9E-05	7.7E-08	7.8E-08	6.2E-08	6.1E-08	1.5E-07	6.5E-08	6.2E-08	7.1E-08
	(mrem)	1.9E-03	7.7E-06	7.8E-06	6.2E-06	6.1E-06	1.5E-05	6.5E-06	6.2E-06	7.1E-06
Ingestion	(mSv)	0.0E+00	4.1E-08	4.1E-08	4.1E-08	1.2E-06	1.8E-05	4.1E-08	1.7E-06	1.2E-06
	(mrem)	0.0E+00	4.1E-06	4.1E-06	4.1E-06	1.2E-04	1.8E-03	4.1E-06	1.7E-04	1.2E-04
Sum Total	(mSv)	1.9E-05	1.2E-07	1.2E-07	1.0E-04	1.3E-06	1.9E-05	1.1E-07	1.8E-06	1.4E-05
	(mrem)	1.9E-03	1.2E-05	1.2E-05	1.0E-02	1.3E-04	1.9E-03	1.1E-05	1.8E-04	1.4E-03

Table 4.12-5B Annual and Committed Dose Equivalents for Exposures in Year 30 to an Teen from Gaseous Effluents (Nearest Resident) Based on Initial Site Evaluation

Source		Skin	Gonads	Breast	Lung	Red Bone Marrow	Bone surface	Thyroid	Remainder	Effective Dose Equivalent
Cloud Immersion	(mSv)	2.3E-13	1.6E-13	1.9E-13	1.5E-13	1.4E-13	4.2E-13	1.6E-13	1.5E-13	1.7E-13
	(mrem)	2.3E-11	1.6E-11	1.9E-11	1.5E-11	1.4E-11	4.2E-11	1.6E-11	1.5E-11	1.7E-11
Inhalation	(mSv)	0.0E+00	1.1E-09	1.2E-09	1.2E-04	3.1E-08	4.6E-07	1.2E-09	4.4E-08	1.5E-05
	(mrem)	0.0E+00	1.1E-07	1.2E-07	1.2E-02	3.1E-06	4.6E-05	1.2E-07	4.4E-06	1.5E-03
Grd. Plane direct	(mSv)	1.9E-05	7.7E-08	7.8E-08	6.2E-08	6.1E-08	1.5E-07	6.5E-08	6.2E-08	7.1E-08
	(mrem)	1.9E-03	7.7E-06	7.8E-06	6.2E-06	6.1E-06	1.5E-05	6.5E-06	6.2E-06	7.1E-06
Ingestion	(mSv)	0.0E+00	7.1E-08	7.0E-08	7.0E-08	2.0E-06	3.1E-05	7.0E-08	3.0E-06	2.1E-06
	(mrem)	0.0E+00	7.1E-06	7.0E-06	7.0E-06	2.0E-04	3.1E-03	7.0E-06	3.0E-04	2.1E-04
Sum Total	(mSv)	1.9E-05	1.5E-07	1.5E-07	1.2E-04	2.1E-06	3.1E-05	1.4E-07	3.1E-06	1.7E-05
	(mrem)	1.9E-03	1.5E-05	1.5E-05	1.2E-02	2.1E-04	3.1E-03	1.4E-05	3.1E-04	1.7E-03

Table 4.12-5C Annual and Committed Dose Equivalents for Exposures in Year 30 to an Child from Gaseous Effluent (Nearest Resident) Based on Initial Site Evaluation

Source		Skin	Gonads	Breast	Lung	Red Bone Marrow	Bone Surface	Thyroid	Remainder	Effective Dose Equivalent
Cloud Immersion	(mSv)	2.3E-13	1.6E-13	1.9E-13	1.5E-13	1.4E-13	4.2E-13	1.6E-13	1.5E-13	1.7E-13
	(mrem)	2.3E-11	1.6E-11	1.9E-11	1.5E-11	1.4E-11	4.2E-11	1.6E-11	1.5E-11	1.7E-11
Inhalation	(mSv)	0.0E+00	8.6E-10	9.6E-10	9.5E-05	2.4E-08	3.6E-07	9.2E-10	3.4E-08	1.1E-05
	(mrem)	0.0E+00	8.6E-08	9.6E-08	9.5E-03	2.4E-06	3.6E-05	9.2E-08	3.4E-06	1.1E-03
Grd. Plane direct	(mSv)	1.9E-05	7.7E-08	7.8E-08	6.2E-08	6.1E-08	1.5E-07	6.5E-08	6.2E-08	7.1E-08
	(mrem)	1.9E-03	7.7E-06	7.8E-06	6.2E-06	6.1E-06	1.5E-05	6.5E-06	6.2E-06	7.1E-06
Ingestion	(mSv)	0.0E+00	6.8E-08	6.8E-08	6.8E-08	1.9E-06	3.0E-05	6.8E-08	2.9E-06	2.0E-06
	(mrem)	0.0E+00	6.8E-06	6.8E-06	6.8E-06	1.9E-04	3.0E-03	6.8E-06	2.9E-04	2.0E-04
Sum Total	(mSv)	1.9E-05	1.5E-07	1.5E-07	9.5E-05	2.0E-06	3.0E-05	1.3E-07	2.9E-06	1.4E-05
	(mrem)	1.9E-03	1.5E-05	1.5E-05	9.5E-03	2.0E-04	3.0E-03	1.3E-05	2.9E-04	1.4E-03

Table 4.12-5D Annual and Committed Dose Equivalents for Exposures in Year 30 to an Infant from Gaseous Effluent (Nearest Resident) Based on Initial Site Evaluation

Source		Skin	Gonads	Breast	Lung	Red Bone Marrow	Bone Surface	Thyroid	Remainder	Effective Dose Equivalent
Cloud Immersion	(mSv)	2.3E-13	1.6E-13	1.9E-13	1.5E-13	1.4E-13	4.2E-13	1.6E-13	1.5E-13	1.7E-13
	(mrem)	2.3E-11	1.6E-11	1.9E-11	1.5E-11	1.4E-11	4.2E-11	1.6E-11	1.5E-11	1.7E-11
Inhalation	(mSv)	0.0E+00	6.8E-10	7.7E-10	7.6E-05	1.9E-08	2.9E-07	7.3E-10	2.7E-08	9.1E-06
	(mrem)	0.0E+00	6.8E-08	7.7E-08	7.6E-03	1.9E-06	2.9E-05	7.3E-08	2.7E-06	9.1E-04
Grd. Plane direct	(mSv)	1.9E-05	7.7E-08	7.8E-08	6.2E-08	6.1E-08	1.5E-07	6.5E-08	6.2E-08	7.1E-08
	(mrem)	1.9E-03	7.7E-06	7.8E-06	6.2E-06	6.1E-06	1.5E-05	6.5E-06	6.2E-06	7.1E-06
Ingestion	(mSv)	0.0E+00	1.2E-08	1.2E-08	1.2E-08	3.5E-07	5.3E-06	1.2E-08	5.1E-07	3.6E-07
	(mrem)	0.0E+00	1.2E-06	1.2E-06	1.2E-06	3.5E-05	5.3E-04	1.2E-06	5.1E-05	3.6E-05
Sum Total	(mSv)	1.9E-05	9.0E-08	9.1E-08	7.6E-05	4.3E-07	5.7E-06	7.8E-08	6.0E-07	9.5E-06
	(mrem)	1.9E-03	9.0E-06	9.1E-06	7.6E-03	4.3E-05	5.7E-04	7.8E-06	6.0E-05	9.5E-04

Table 4.12-6A Annual and Committed Dose Equivalents for Exposures in Year 30 to an Adult From Gaseous Effluent (Nearby Businesses) Based on Initial Site Evaluation

Location: Nearby Business – SE, 925 m (3,035 ft)

Source		Skin	Gonads	Breast	Lung	Red Bone Marrow	Bone Surface	Thyroid	Remainder	Effective Dose Equivalent
Cloud Immersion	(mSv)	7.4E-13	5.3E-13	6.3E-13	5.0E-13	4.6E-13	1.4E-12	5.3E-13	4.7E-13	5.4E-13
	(mrem)	7.4E-11	5.3E-11	6.3E-11	5.0E-11	4.6E-11	1.4E-10	5.3E-11	4.7E-11	5.4E-11
Inhalation	(mSv)	0.0E+00	2.1E-09	2.4E-09	2.3E-04	5.8E-08	8.8E-07	2.2E-09	8.3E-08	2.8E-05
	(mrem)	0.0E+00	2.1E-07	2.4E-07	2.3E-02	5.8E-06	8.8E-05	2.2E-07	8.3E-06	2.8E-03
Grd. Plane direct	(mSv)	3.6E-05	1.5E-07	1.5E-07	1.2E-07	1.2E-07	2.8E-07	1.2E-07	1.2E-07	1.3E-07
	(mrem)	3.6E-03	1.5E-05	1.5E-05	1.2E-05	1.2E-05	2.8E-05	1.2E-05	1.2E-05	1.3E-05
Ingestion	(mSv)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	(mrem)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sum Total	(mSv)	3.6E-05	1.5E-07	1.5E-07	2.3E-04	1.7E-07	1.2E-06	1.3E-07	2.0E-07	2.8E-05
	(mrem)	3.6E-03	1.5E-05	1.5E-05	2.3E-02	1.7E-05	1.2E-04	1.3E-05	2.0E-05	2.8E-03

Table 4.12-6B Annual and Committed Dose Equivalents for Exposures in Year 30 to an Adult From Gaseous Effluent (Nearby Businesses) Based on Initial Site Evaluation

Location: Nearby Business – NNW, 1,712 m (5,617 ft)

Source		Skin	Gonads	Breast	Lung	Red Bone Marrow	Bone Surface	Thyroid	Remainder	Effective Dose Equivalent
Cloud Immersion	(mSv)	6.0E-13	4.3E-13	5.1E-13	4.1E-13	3.7E-13	1.1E-12	4.3E-13	3.9E-13	4.4E-13
	(mrem)	6.0E-11	4.3E-11	5.1E-11	4.1E-11	3.7E-11	1.1E-10	4.3E-11	3.9E-11	4.4E-11
Inhalation	(mSv)	0.0E+00	1.7E-09	1.9E-09	1.9E-04	4.7E-08	7.2E-07	1.8E-09	6.8E-08	2.3E-05
	(mrem)	0.0E+00	1.7E-07	1.9E-07	1.9E-02	4.7E-06	7.2E-05	1.8E-07	6.8E-06	2.3E-03
Grd. Plane direct	(mSv)	5.2E-05	2.1E-07	2.1E-07	1.7E-07	1.7E-07	4.1E-07	1.8E-07	1.7E-07	1.9E-07
	(mrem)	5.2E-03	2.1E-05	2.1E-05	1.7E-05	1.7E-05	4.1E-05	1.8E-05	1.7E-05	1.9E-05
Ingestion	(mSv)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	(mrem)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sum Total	(mSv)	5.2E-05	2.1E-07	2.1E-07	1.9E-04	2.1E-07	1.1E-06	1.8E-07	2.4E-07	2.3E-05
	(mrem)	5.2E-03	2.1E-05	2.1E-05	1.9E-02	2.1E-05	1.1E-04	1.8E-05	2.4E-05	2.3E-03

Table 4.12-7A Annual and Committed Dose Equivalents for Exposure in Year 30 to an Adult From Gaseous Effluent (Site Boundary) Based on Initial Site Evaluation

Location: Maximum Site Boundary – South, 417 m (1,368 ft)

Source		Skin	Gonads	Breast	Lung	Red Bone Marrow	Bone Surface	Thyroid	Remainder	Effective Dose Equivalent
Cloud Immersion	(mSv)	4.5E-12	3.2E-12	3.8E-12	3.0E-12	2.7E-12	8.3E-12	3.2E-12	2.8E-12	3.3E-12
	(mrem)	4.5E-10	3.2E-10	3.8E-10	3.0E-10	2.7E-10	8.3E-10	3.2E-10	2.8E-10	3.3E-10
Inhalation	(mSv)	0.0E+00	1.3E-08	1.4E-08	1.4E-03	3.5E-07	5.3E-06	1.3E-08	5.0E-07	1.7E-04
	(mrem)	0.0E+00	1.3E-06	1.4E-06	1.4E-01	3.5E-05	5.3E-04	1.3E-06	5.0E-05	1.7E-02
Grd. Plane direct	(mSv)	2.7E-04	1.1E-06	1.1E-06	8.8E-07	8.6E-07	2.1E-06	9.1E-07	8.7E-07	1.0E-06
	(mrem)	2.7E-02	1.1E-04	1.1E-04	8.8E-05	8.6E-05	2.1E-04	9.1E-05	8.7E-05	1.0E-04
Ingestion	(mSv)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	(mrem)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sum Total	(mSv)	2.7E-04	1.1E-06	1.1E-06	1.4E-03	1.2E-06	7.4E-06	9.2E-07	1.4E-06	1.7E-04
	(mrem)	2.7E-02	1.1E-04	1.1E-04	1.4E-01	1.2E-04	7.4E-04	9.2E-05	1.4E-04	1.7E-02

Table 4.12-7B Annual and Committed Dose Equivalents for Exposure in Year 30 to an Adult From Gaseous Effluent (Site Boundary) Based on Initial Site Evaluation

Location: Maximum Site Boundary – North, 995 m (3,265 ft) Side Next to UBC Storage Pad)

Source		Skin	Gonads	Breast	Lung	Red Bone Marrow	Bone Surface	Thyroid	Remainder	Effective Dose Equivalent
Cloud Immersion	(mSv)	2.3E-12	1.7E-12	2.0E-12	1.6E-12	1.4E-12	4.3E-12	1.7E-12	1.5E-12	1.7E-12
	(mrem)	2.3E-10	1.7E-10	2.0E-10	1.6E-10	1.4E-10	4.3E-10	1.7E-10	1.5E-10	1.7E-10
Inhalation	(mSv)	0.0E+00	6.5E-09	7.4E-09	7.3E-04	1.8E-07	2.8E-06	7.0E-09	2.6E-07	8.7E-05
	(mrem)	0.0E+00	6.5E-07	7.4E-07	7.3E-02	1.8E-05	2.8E-04	7.0E-07	2.6E-05	8.7E-03
Grd. Plane direct	(mSv)	2.4E-04	9.7E-07	9.8E-07	7.9E-07	7.8E-07	1.9E-06	8.2E-07	7.9E-07	9.0E-07
	(mrem)	2.4E-02	9.7E-05	9.8E-05	7.9E-05	7.8E-05	1.9E-04	8.2E-05	7.9E-05	9.0E-05
Ingestion	(mSv)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	(mrem)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sum Total	(mSv)	2.4E-04	9.8E-07	9.9E-07	7.3E-04	9.6E-07	4.6E-06	8.3E-07	1.0E-06	8.8E-05
	(mrem)	2.4E-02	9.8E-05	9.9E-05	7.3E-02	9.6E-05	4.6E-04	8.3E-05	1.0E-04	8.8E-03

4.12.15 Section 4.12 Figures

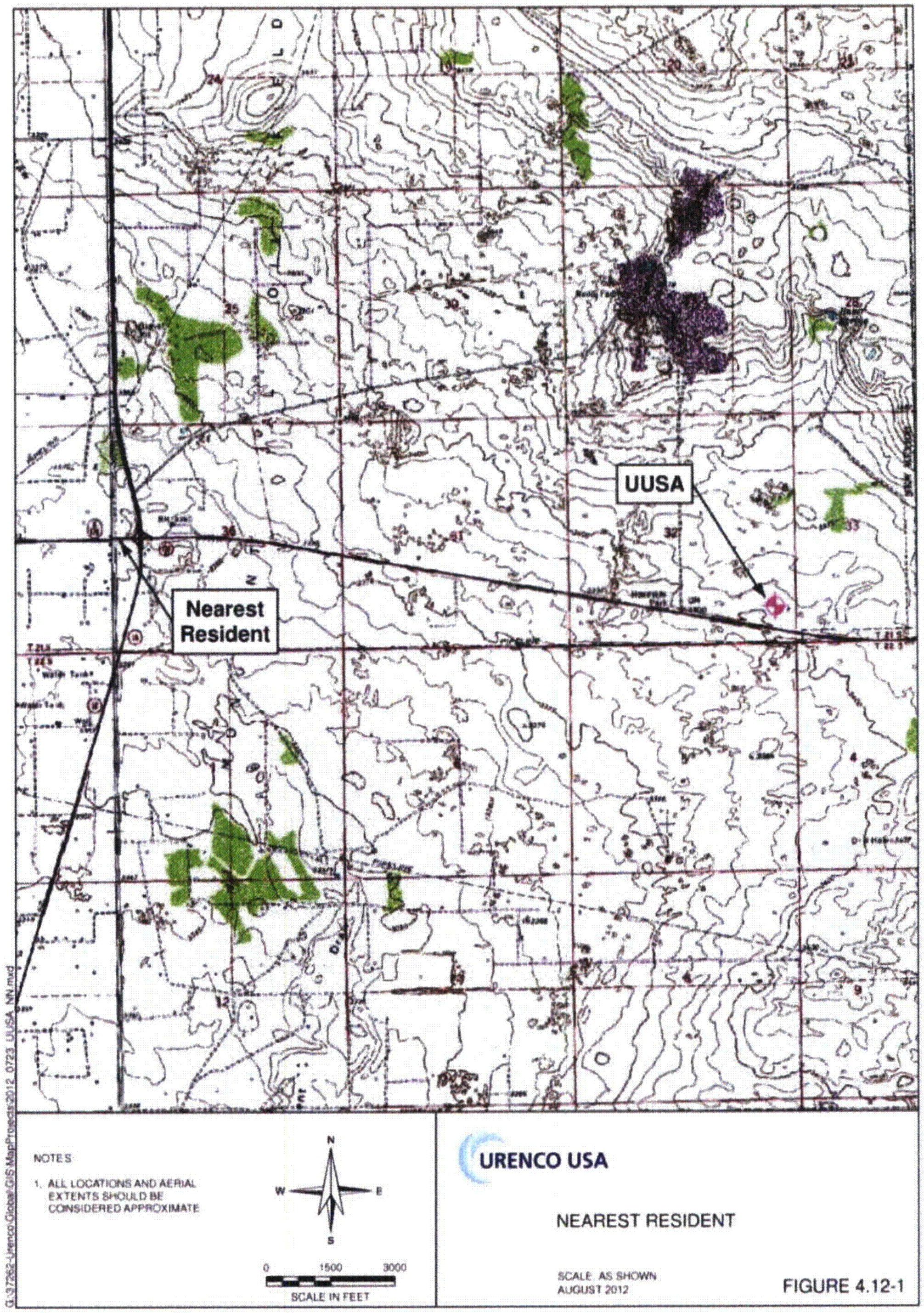

Figure 4.12-1 Nearest Resident

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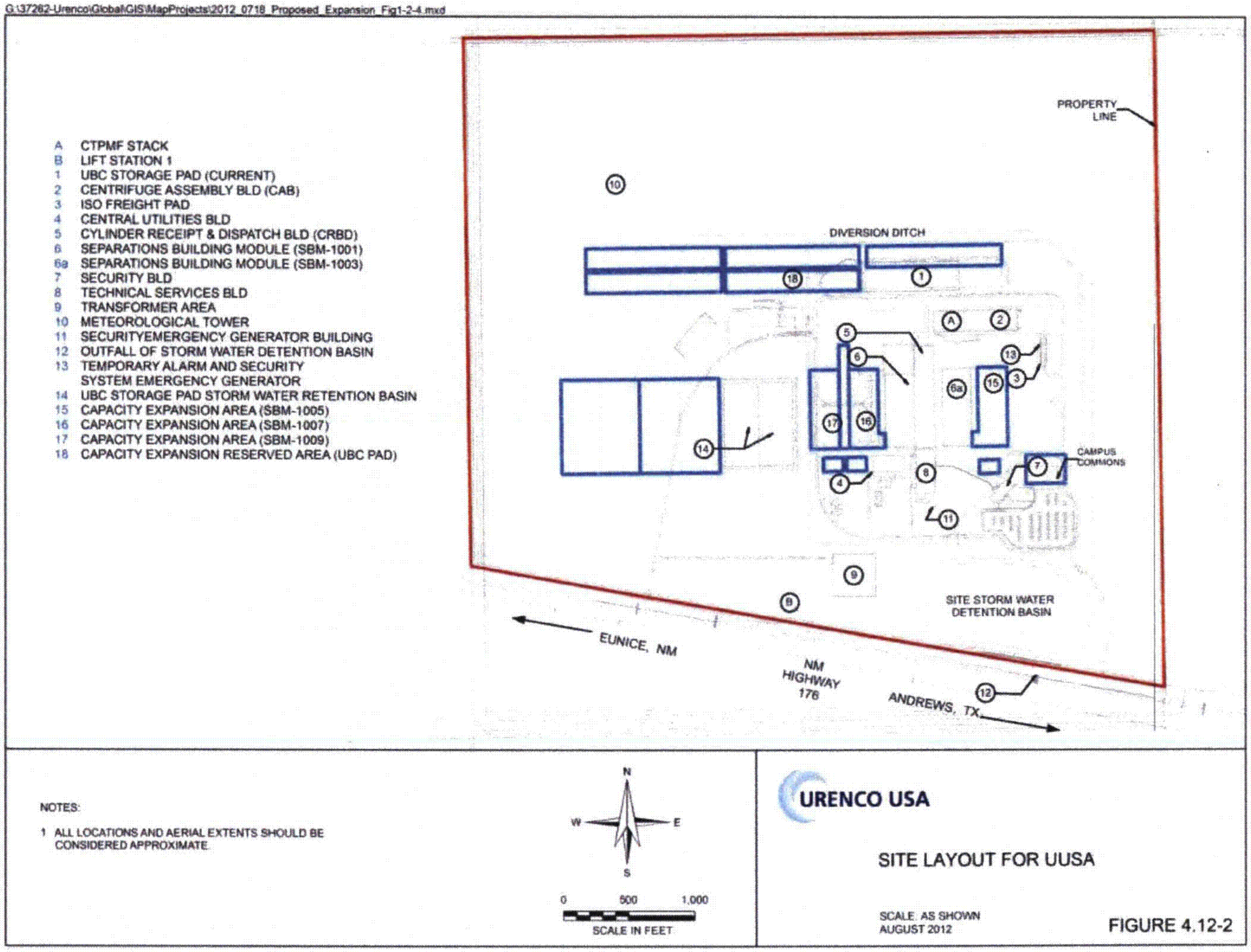

Figure 4.12-2 Site Layout for UUSA

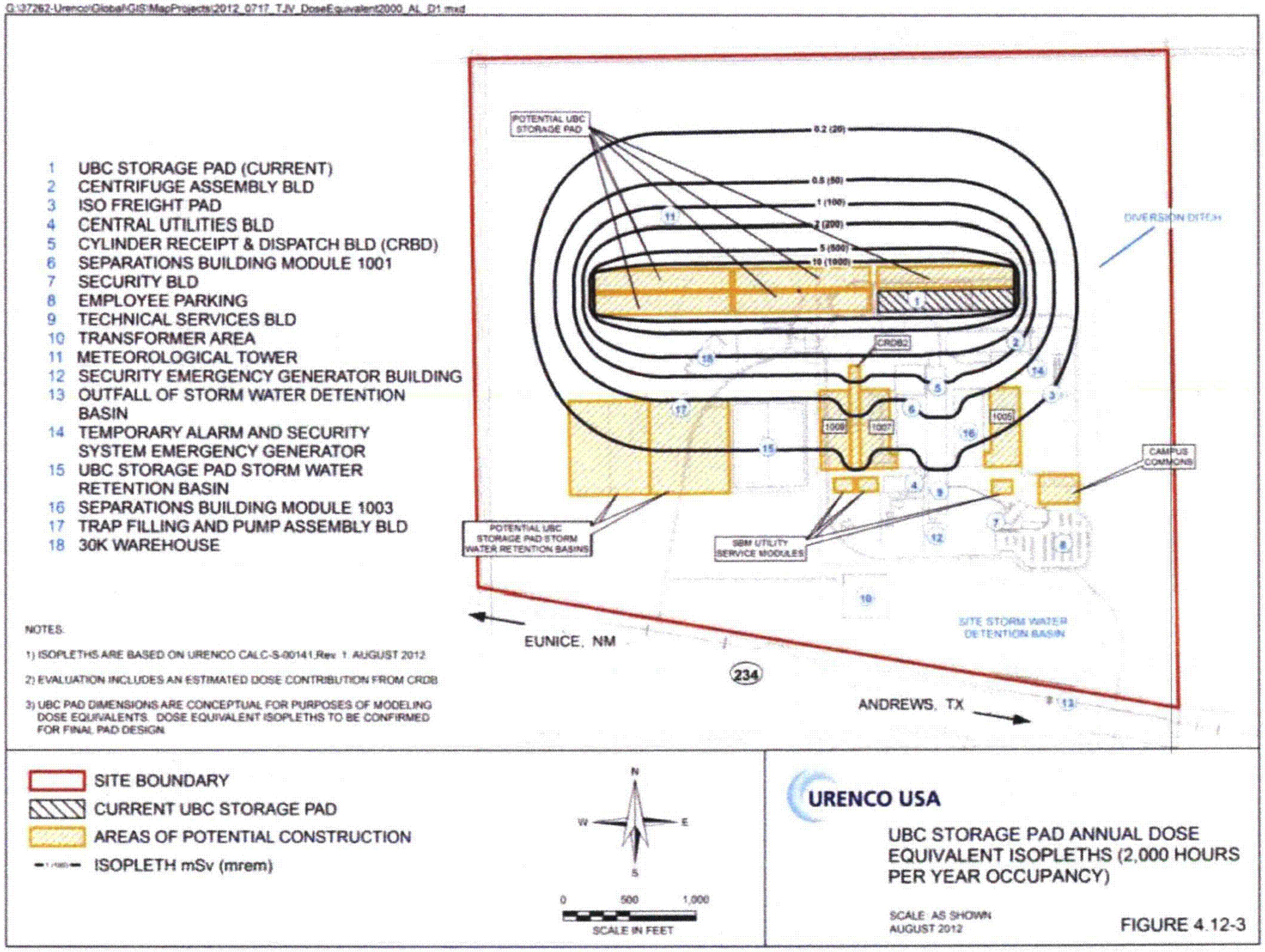

Figure 4.12-3 UBC Storage Pad Annual Dose Equivalent Isopleths (2,000 Hours per Year Occupancy)

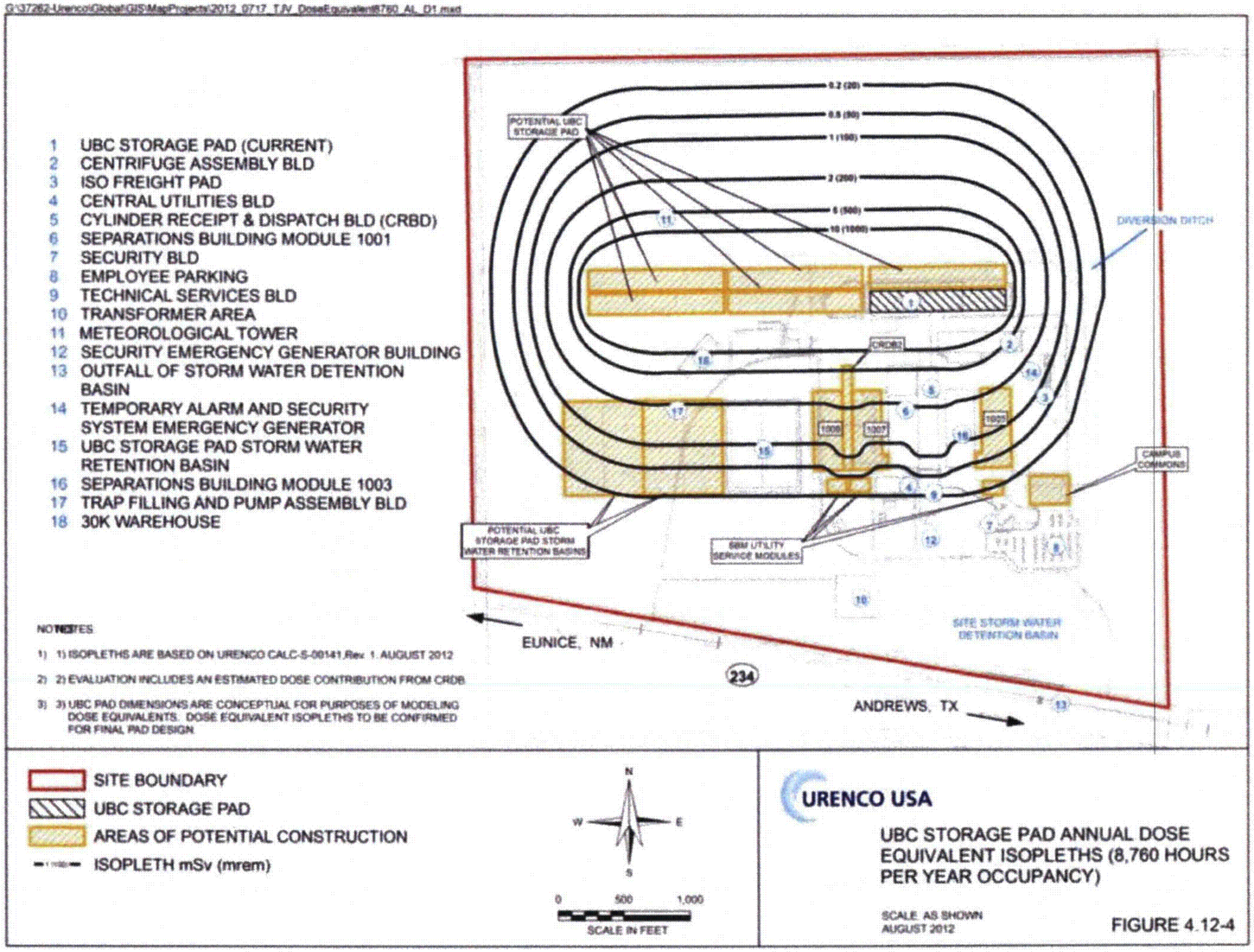

Figure 4.12-4 UBC Storage Pad Annual Dose Equivalent Isopleths (8,760 Hours per Year Occupancy)

4.13 Waste Management Impacts

4.13.1 Solid Waste

Solid waste generated at UUSA will continue to be disposed of at licensed facilities designed to accept the various waste types. The types of waste expected to be generated, the volumes and means for management of the materials through off-site disposal were previously described in LES ER Section 3.12. Increases to onsite storage of UBCs associated with the proposed facility capacity expansion will minimally impact the environment. A detailed pathway assessment for the UBC Storage Pad is provided in ER Section 4.12.6.

The additional SBMs will generate radioactive waste similar to that generated by the operating SBMs, which were previously evaluated for the nominal 3 MSWU facility (e.g., filters and filter media). These wastes will be managed consistent with current management practices for the waste currently being generated. This material will be disposed off-site as Class A low level waste potentially at facilities previously evaluated including Energy Solutions at Clive Utah or at the neighboring Waste Control Specialists (WCS), which has recently been permitted by the Texas Commission on Environmental Quality to receive this type of waste. UUSA will continue to ship all hazardous wastes off-site within the required regulatory timeframe. UUSA will not treat, store or dispose of hazardous wastes onsite; therefore the impacts for such systems are not evaluated.

It is anticipated the volumes of these Class A wastes will increase, at most proportionally, to the increase in proposed facility capacity due to the expansion. The initial EIS evaluated the impacts of annual radiological solid waste generation rates of 191,800 pounds per year. Based on the current actual rate of production of these radioactive solid wastes (shown in LES ER Tables 3.12-1 through 3.12-3), and projections in Table 4.13-1 for increased generation (i.e., ten times current annual generation rate), it appears the total annual generation of these waste materials resulting from the proposed facility capacity expansion will be significantly less than the annual waste generation rate evaluated prior to the construction of the facility (NRC EIS 2005).

The proposed facility capacity expansion impact increases for solid and radioactive waste management will be SMALL, and can be managed effectively based on the current practices and waste disposal infrastructures available to UUSA. These conclusions are based on the fact that the proposed facility capacity expansion is not anticipated to involve any changes to the characteristics or management practices for solid wastes and non-liquid radioactive wastes, and that the proposed changes in management of liquid radioactive wastes (shipment to offsite disposal as either liquid or solidified waste versus onsite treatment by evaporation) will not change the conclusion that sufficient commercial disposal capacity exists for these wastes.

4.13.1.1 Construction

The changes in impacts from waste management due to construction of the proposed facility capacity expansion would increase the time period throughout which the construction wastes are generated. Because the amount and character of waste generated annually by construction activities are not anticipated to change significantly during the proposed facility capacity expansion relative to the initial and on-going construction (only the time frame would be extended), the impact would be SMALL for construction waste management.

The time period that the construction wastes would be generated will extend due to the proposed facility capacity expansion. The construction period for the proposed facility capacity expansion would continue approximately eight (8) years beyond the initial construction period.

4.13.1.2 Operation

The changes in impacts from solid and hazardous waste management due to the operation of the expanded facility will increase by a factor less than the increased separative work unit capacity anticipated for the expansion.

The amount of solid and radioactive waste generated annually during operation of the 10 MSWU proposed facility capacity expansion would increase over the annual quantity evaluated prior to site construction.

During operations, the increase in annual office, packaging and cafeteria waste and hazardous wastes quantities would be only incrementally larger than current quantities. The total permanent employees projected at the proposed facility expansion capacity is an insignificant increase from current levels, and although there will be more maintenance and facilities personnel, the solid and hazardous waste is not anticipated to increase in a proportional way with respect to the facility capacity.

4.13.2 Gaseous Effluents

The gaseous effluents generated by the expanded facility will increase for each of the additional Separation Building Modules (SBM) as they are brought online. The gaseous effluents are anticipated to include uranium and hydrogen fluoride vapor. The additional gaseous effluents associated with the proposed facility capacity expansion will be effectively managed, as with the current state, so that releases remain below the minimum requirements set forth in 10 CFR 20.1101d. The impacts associated with air quality are more fully addressed under section 4.6.

4.13.3 Liquid Effluents

The non-radiological liquid effluents generated and discharged by the facility (which consist solely of domestic wastewater) would not increase significantly due to proposed facility capacity expansion. This is because a limited increase in workforce is needed to implement the expanded facility operations and their projected additional use of potable water for sanitary uses and shower is not anticipated to be significantly different than the impacts previously evaluated.

The expanded UUSA facility will also continue to generate liquid radioactive wastes, including aqueous degreaser water, laboratory wastes, spent citric acid, and miscellaneous effluents. Quantities of radiologically contaminated, potentially radiologically contaminated, and non-radiologically contaminated aqueous liquid effluents are generated in a variety of operations and processes in the CRDB (Cylinder Receipt and Dispatch Building), CAB (Centrifuge Assembly Building), and in the SBMs. The majority of all potentially radiologically contaminated aqueous liquid effluents are generated in the CRDB. All aqueous liquid effluents generated in the CRDB are collected in Safe By Design (SBD) and bulk tanks that are located in the Liquid Effluent Collection and Treatment (LECTS) Room in the CRDB.

Liquid effluents produced include hydrolyzed uranium hexafluoride and aqueous laboratory effluent, degreaser water, citric acid, floor washings, miscellaneous condensates, and active area hand washings/shower water. It is anticipated these systems will continue to be available to the proportional increase in liquid radiological waste generated due to the proposed facility capacity expansion.

Table 4.13-1 indicates the current waste generation for waste streams and also projects the current annual generation rate for liquid radiological waste through the proposed phased facility capacity expansion. Generation rates have been estimated by using the operational experience at the Almelo, Netherlands facility for generation of liquid radiological waste and extrapolating the rate of generation to the proposed 10 MSWU facility capacity expansion.

As discussed in Section 3.12.9, prior to UUSA construction, liquid radiological wastes of 7,850 gallons evaporated or treated were evaluated in the LES ER. The annual generation rate expected through full construction and operation of SBM-1001 and 1003 is now projected to be larger, at approximately 28,000 gallons, because UUSA has determined that it will not use evaporation processes, including the proposed Treated Effluent Evaporative Basin discussed in the LES ER, to reduce waste volumes. Additional flow volume is also anticipated due to an increase in pump decontamination washes and emergency shower effluents. The UUSA license amendment application will reflect this revised projection.

The expansion is then projected, based on the proposed facility capacity expansion producing a proportional increase in the annual generation of liquid radiological wastes and the operational experience at the Almelo facility, to generate up to approximately 77,000 total gallons annually of liquid radiological waste. Table 4.13-1 indicates a projection of the annual generation rate for radiological wastes through the period of proposed facility capacity expansion. The volume of the solidified radioactive effluent is approximately 1.7 times the volume of the wastewater, and will have approximately 3.25 times the original weight due to the added grout.

Neither the increase in projected liquid waste quantities for the currently licensed facility nor the additional quantities expected with the expansion will have significant environmental impacts. It will not have significant transportation or public health impacts. See Sections 4.2.7, 4.12.

Additional shifts will be required to manage the projected annual liquid radiological waste due to the proposed facility capacity expansion because the UUSA collection and disposal system was constructed to have a capacity of approximately 52,800 gallons annual throughput. As the system no longer uses evaporation, no sludge is anticipated to be generated by the liquid radiological waste management.

The majority of the wastes and effluents from the facility will continue to be from auxiliary systems and activities and not from the enrichment process itself.

The evaluation conducted prior to site construction indicated that non-hazardous solid waste management impacts for operation were insignificant for the Lea County Landfill (less than 0.03% of the capacity, and accounted for in the anticipated 10% increase per year) and the amount due to proposed facility capacity expansion would be relatively minor with respect to the landfill capacity (less than 0.1% of the capacity, and accounted for in the anticipated 10% increase per year).

In the case of radiological waste, the annual generation rate is more than the rate evaluated prior to site construction. The increase is due to the facility capacity expansion and the off-site disposal of liquid radiological wastes, the majority of which will be solidified onsite prior to shipment. The impacts of disposal of these wastes were previously evaluated using evaporation as a treatment technology. Since the facility has elected to utilize offsite disposal options instead of onsite evaporation, the volume and weight of liquid radioactive waste and solidified wastewater sent to offsite disposal facilities has increased. Due to sufficient commercial waste disposal capacity the potential impact from the increased waste will continue to be SMALL. Similarly, the 20-year capacity of the nation's hazardous and low-level radioactive waste (LLW) facilities would not be significantly reduced by the anticipated increases in liquid radioactive wastes, or the solidified wastewater wastes.

Because the characteristics of the solid and hazardous wastes will not change due to the proposed facility capacity expansion and because adequate disposal capacity exists, the impacts would continue to be SMALL for solid, hazardous and radiological operational waste management.

4.13.4 Depleted UF_6

The proposed facility capacity expansion will result in increased generation of depleted UF_6. The amount of depleted UF_6 generation evaluated in the initial EIS is 8,600 tons. Based on UUSA projections for annual generation rates through the period of the proposed facility capacity expansion, the annual rate of generation will peak at 1,250 cylinders per year or slightly less than twice the quantities evaluated prior to facility construction. The amount of depleted UF_6 stored at the facility as a result of the proposed facility capacity expansion will increase from the quantity previously evaluated. The total number of UBCs stored at the facility is planned to increase from 15,727 to 25,000 cylinders in accordance with the agreement with the State of New Mexico.

- The depleted UF_6 impacts are anticipated to increase as a result of the increased number of depleted UF_6 UBCs at the Site. Results of analysis of radiation exposure pathways are used to evaluate potential impacts in Section 4.12, Public and Occupational Health Impacts.

  The potential International Isotopes Fluorine Products (IIFP) facility to be located in Lea County increases the options for depleted UF_6 processing over those that were evaluated prior to the site construction. UUSA has signed an agreement with the proposed International Isotopes Fluorine Products, Inc. (IIFP) to accept UUSA depleted UF_6 for deconversion. International Isotopes Fluorine Products, Inc. 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 U_3O_8 that would form at ambient temperature would be disposed of as low-level waste as an absolute final option if no other use could be found for the DU. 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 waste management impacts for the IIFP depleted UF_6 deconversion were determined in the 2012 IIFP DEIS to be SMALL.

The radioactive depleted U_3O_8 waste from the deconversion process would be shipped from the deconversion facility to an offsite low-level radioactive waste (LLW) disposal facility licensed to accept depleted U_3O_8. Licensed facility potential options identified for LLW disposal include the EnergySolutions Clive, Utah facility and the WCS facility on the Texas-New Mexico border west of Andrews, Texas (immediately east of the UUSA facility) with less probable destinations being the U.S. Ecology Washington disposal facility on the Hanford Site near Richland, Washington and the Nevada National Security Site.

The anticipated volume of waste generated by the IIFP facility is up to about 2.8 million kilograms (kg) per year or 1,300 cubic meters depleted U_3O_8 generated compared to the Clive, Utah facility capacity of 3.1 million cubic meters. The NRC staff recently analyzed the potential impact of proposed IIFP depleted U_3O_8 disposal operations (which included depleted U_3O_8 deconverted from UUSA DUF_6) based on the Clive, Utah facility LLW disposal capacity in the IIFP Draft EIS and concluded the impacts would be SMALL.

4.13.5 Waste and Waste Management System Descriptions

Descriptions of the sources, types and quantities of solid, hazardous, radioactive and mixed wastes and the existing UUSA waste management systems are provided in Supplemental ER Section 3.12 and the LES ER Section 3.12.

4.13.5.1 Waste Disposal Plans

In the initial ER, UUSA was expected to produce approximately 172,500 kg (380,400 lbs) of solid waste trash annually. The increase in industrial waste generated by operation of the expanded capacity facility would be only incrementally larger than current quantities. The total *permanent employees projected at the proposed facility expansion to 10 MSWU is an* insignificant increase from current levels of approximately 250, and although there will be more maintenance and facilities personnel, the industrial waste is not anticipated to increase in a proportional way with respect to the facility capacity.

4.13.5.2 Radioactive and Mixed Waste Disposal Plans

Solid radioactive wastes are produced in a number of plant activities and require a variety of methods for treatment and disposal. These wastes, as well as the generation and handling systems, are described in detail in Supplemental ER Section 3.12, Waste Management, and LES ER Section 3.12.

As described in LES ER Section 4.13.3 all radioactive and mixed wastes are disposed of at an offsite, licensed facility. The impact on the environment due to this offsite facility is not addressed in this report. LES ER Table 4.13-1, Possible Radioactive Waste Processing/Disposal Facilities, summarizes the facilities that may be used to process or dispose of UUSA radioactive or mixed waste.

Radioactive waste will be shipped to any of the four listed radioactive waste processing disposal sites. Other offsite processing or disposal facilities may be used if appropriately licensed to accept UUSA waste types. Depleted UF_6 will be shipped to one of the UF_6 Conversion Facilities subsequent to temporary onsite storage. UUSA has signed an agreement with International Isotopes Fluorine Products, Inc. (IIFP) to accept UUSA depleted UF_6 for deconversion. International Isotopes Fluorine Products, Inc. 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 proposed IIFP facility design capacity is 3.4 million kilograms depleted UF_6 per year.

The radioactive depleted UO_2 waste from the deconversion process would be shipped from the deconversion facility to an offsite low-level radioactive waste (LLW) disposal facility licensed to accept depleted UO_2. Licensed facility potential options identified for LLW disposal include the EnergySolutions Clive, Utah facility and the WCS facility on the Texas-New Mexico border west of Andrews, Texas (immediately east of the UUSA facility) with less probable destinations being the U.S. Ecology Washington disposal facility on the Hanford Site near Richland, Washington and the Nevada National Security Site.

The anticipated volume of waste generated by the IIFP facility is up to about 2.8 million kilograms (kg) per year or 1,300 cubic meters depleted UO_2 generated compared to the Clive, Utah facility capacity of 3.1 million cubic meters. The NRC staff recently analyzed the potential impact of proposed IIFP depleted UO_2 disposal operations (which included depleted UO_2 deconverted from UUSA DUF_6) based on the Clive, Utah facility LLW disposal capacity in the IIFP Draft EIS and concluded the impacts would be SMALL.

UUSA calculated 7.8 million kg per year depleted UF_6 production rate (8,600 tons) prior to the proposed facility capacity expansion. Based on a peak projected annual depleted UF_6 cylinder generation of 1,250 cylinders and assuming the depleted UF_6 conversion rate is similar to that expressed in the IIFP DEIS, the annual depleted UO_2 generation rate would be approximately 13,100 tons or about 5,500 cubic meters depleted UO_2 per year. Based on a capacity of 3.1 million cubic meters for the Clive, Utah facility, this annual volume would be less than 0.2% of the facility capacity. The annual volume is low compared to the facility capacity, and therefore the impacts for depleted UO_2 on disposal facilities are considered to continue to be SMALL to MODERATE.

The potential environmental impacts from direct exposure are described in ER Section 4.12.6, Direct Radiation Impacts. For the purposes of the dose calculation in that section, the UBC Storage Pad will have a capacity of 25,000 UBCs, plus a quantity of empty feed and empty clean product cylinders for a total of 28,500 containers.

4.13.6 (*See SAR § 12.2.3)* Uranium Byproduct Cylinder (UBC) Storage

UUSA yields a depleted UF_6 stream that will be temporarily stored onsite in containers before transfer to the conversion facility and subsequent reuse or disposal. The storage of these cylinders was discussed in LES ER Section 4.13.3.1.1 and the increased storage from the proposed action will follow the same procedures; however, the pad area will be expanded and the cylinders have been proposed to be arranged in a triple stack configuration. UUSA will maintain an active cylinder management program to improve storage conditions in the cylinder yard, to monitor cylinder integrity by conducting routine inspections for breaches, and to perform cylinder maintenance and repairs to cylinders and the UBC Storage Pad, as needed. The UBC Storage Pad has been sited to minimize the potential environmental impact from external radiation exposure to the public at the site boundary. The concrete pad will be expanded in size as needed to store 28,500 total cylinders in a stacked arrangement. The dose equivalent rate from the UBC Storage Pad at the site boundary will be below the regulatory limits of 10 CFR 20 and 40 CFR 190. The direct dose equivalent comes from the gamma-emitting progeny within the uranium decay chain. In addition, neutrons are produced by spontaneous fission in uranium and by the ${}^{19}_{9}F$ (alpha, n) ${}^{22}_{11}Na$ reaction. Environmental Thermoluminescent Dosimeters (TLDs) are distributed along the site boundary fence line to monitor impact due to photons (see ER Section 6.1), and ensure that the estimated dose equivalent is not exceeded. See ER Section 4.12.6 *for more detailed information on the impact of external dose equivalents from* UBC Storage Pad.

4.13.7 Mitigation for Depleted UF_6 Storage

For the proposed facility capacity expansion, UUSA will maintain an active cylinder management program to maintain optimum storage conditions in the cylinder yard, to monitor cylinder integrity by conducting routine inspections for breaches, and to perform cylinder maintenance and repairs to cylinders and the storage yard, as needed. The handling and storage procedures and practices previously described in LES ER Section 4.13.3.1.2 to mitigate adverse events, by either reducing the probability of an adverse event or reducing the consequence should an adverse event occur will continue to be in place through the proposed facility capacity expansion.

4.13.8 Depleted UF_6 Disposition Alternatives

UUSA is committed to the temporary storage of UBCs as described in ER Section 4.13.4, Uranium Byproduct Cylinder (UBC) Storage. The preferred option for disposition of the UBCs is private sector conversion and disposal and was previously described in LES ER Section 4.13.3.1.8.

At this time, UUSA considers only Options 1 and 2 below to represent plausible strategies for the disposition of its UBCs.

Option 1 –U.S. Private Sector Conversion and Disposal (Preferred Plausible Strategy)

Transporting depleted UF_6 from UUSA to a private sector conversion or deconversion facility and byproduct disposal at a licensed commercial disposal facility is the preferred "plausible strategy" disposition option. UUSA has committed to the Governor of New Mexico (LES, 2003b) that: (1) there will be no long-term disposal or long-term storage (beyond the life of the plant) of UBCs in the State of New Mexico; (2) a disposal path outside the State of New Mexico is utilized as soon as possible; (3) UUSA will aggressively pursue economically viable paths for UBCs as soon as they become available; (4) UUSA will work with qualified vendors pursuing construction of private deconversion facilities by entering in good faith discussions to provide such vendor long-term UBC contracts to assist them in their financing efforts; and (5) UUSA will put in place a financial surety bonding mechanism that assures funding will be available in the event of any default by UUSA.

UUSA has recently signed an agreement with International Isotopes Fluorine Products, Inc. (IIFP) to accept UUSA depleted UF_6 for deconversion. International Isotopes Fluorine Products, Inc. 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 as evaluated in the EIS, 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.

Option 2 – DOE Conversion and Disposal (Plausible Strategy)

Transporting depleted UF_6 from UUSA to DOE conversion facilities for ultimate disposition is a plausible strategy. Pursuant to Section 3113 of the USEC Privatization Act, DOE is instructed to "accept for disposal" depleted UF_6, such as those that are generated by the NRC-licensed UUSA. To that end, DOE has constructed and contracted for the operation of two UF_6 conversion facilities located in Paducah, Kentucky and Portsmouth, Ohio. The Energy Department awarded a five-year contract for operations of the Depleted Uranium Hexaflouride facilities at both the Piketon site and one in Paducah, Ky. The contract was awarded to Babcock & Wilcox Conversion Services, of Lynchburg, Va. Under the terms of the contract, B&W will oversee the conversion of 700,000 metric ton inventory of DUF_6 to a stable chemical form that can be disposed of or re-used.

UUSA considers that given the NRC's earlier acceptance of this option, DOE's current acceptance, and DOE's existing contractual commitment to ensure operation of two depleted UF_6 conversion plants, the option to disposition its depleted UF_6 by way of DOE conversion and disposal remains plausible.

4.13.9 Water Quality Limits

All facility plant waste water effluents are contained on the UUSA site except sanitary waste and liquid radioactive wastes, which are solidified for offsite disposal. The LECTs system collects and manages the potentially impacted process waste water effluents. Sanitary wastewater is sent to the City of Eunice Wastewater Treatment Plant.

4.13.10 Waste Minimization

A high priority has been assigned to minimizing the generation of waste through reduction, reuse or recycling. UUSA will continue to incorporate several waste minimization systems in its operational procedures as previously described in LES ER Section 4.13.10. UUSA is designed to minimize the usage of natural and depletable resources. The proposed facility capacity expansion will utilize closed loop chillers for cooling purposes. Power usage will be minimized by efficient design of lighting systems, selection of high-efficiency motors, and use of proper insulation materials.

4.13.11 Control and Conservation

The features and systems described in LES ER Section 4.13.11 serve to limit, collect, confine, and treat wastes and effluents that result from the UF_6 enrichment process.

4.13.12 Reprocessing and Recovery Systems

Systems used to allow recovery, or reuse of materials, are described in LES ER Section 4.13.12.

4.13.13 Waste Cumulative Effects

The recent approval of the WCS facility for low level radioactive waste disposal will have cumulative impact on waste management resources as this facility and will provide an additional outlet and capacity for the low level waste generated at UUSA. The additional capacity of the WCS improves the ability of UUSA to access disposal facilities for their wastes.

The location of a deconversion facility (IIFP) to potentially manage depleted UF6 generated by the UUSA operation will have a cumulative impact with the UUSA proposed action. The additional depleted UF6 generated during the operation of the proposed expanded facility capacity to 10 MSWU may be processed at the IIFP, providing additional deconversion capacity and located a shorter transportation distance from the UUSA.

At the IIFP approximately 87,000 kg (191,800 lbs) of radiological and mixed waste would be generated annually, of which approximately 50 kg (110 lbs) would be mixed waste. When added to the wastes from other waste generators, such as the UUSA facility, the NRC staff found that the impacts and cumulative impacts of disposal of hazardous and solid (nonhazardous) wastes from preconstruction activities of the proposed IIFP facility would be small. Solid waste from

UUSA would be disposed of at the Lea County Landfill along with waste from the proposed IIFP facility. The solid waste generated by UUSA operating at a capacity of 10 MSWU would potentially increase the volume of wastes received at the landfill. That increase in combination with the highest IIFP annual solid waste generation rate (during Phase 1 and Phase 2 operations) would result in less than 0.1 percent change in the waste received by the Lea County Landfill. Hazardous waste generated by UUSA (less than 1, 814 kg [2 tons] per year) and the proposed IIFP facility (up to 154 tons/yr during Phase 1 operations) represents less than 0.02 percent of the hazardous waste managed in the state of New Mexico (more than 1 million tons in 2009). The NRC staff found that the combined impacts of managing the solid and hazardous wastes generated by the IIFP and the current 3MSWU capacity UUSA facilities on the available waste disposal capacity would be small. Due to the minimal increase in waste generation at UUSA as a result of the proposed action, the cumulative impact of these operations would continue to be small.

The cumulative LLW generation rate during combined Phase 1 and 2 operations would be about three times higher than from Phase 1 alone. Most of that increase would result from tripling the production of DUO2. The generation rate of other LLW streams (e.g., trash, waste drums and pallets) would also increase with the expanded Phase 2 facility. DUO2 and other radiological waste would be shipped offsite to licensed disposal facilities. Up to 9,168,009 kg (10,106 tons) per year of LLW could be sent for disposal each year. Most of the estimated annual LLW generation (approximately 99 percent) would be the DUO2 produced by the deconversion process. Assuming 450 kg (1,000 lbs) per oxide drum, Phase 1 and 2 operations would result in 8,700 to 20,000 drums of material being sent for disposal. This uranium oxide waste volume represents 3.1 percent to 7.2 percent of the annual commercial waste volume currently received at the EnergySolutions facility in Clive, Utah (NRC, 2010). The Clive facility accepts the majority of the United States' Class A waste and is estimated to have capacity to accept this waste at current volume levels for more than 20 years (GAO, 2004). The NRC staff found that the estimated generation of depleted uranium oxide and other LLW from the Phase 2 deconversion process would result in small impacts to LLW disposal capacity. The wastes generated during cumulative Phase 1 and 2 operations would be transferred offsite to licensed waste facilities with adequate disposal capacity for the estimated volumes. Thus, the NRC staff found during development of the IIFP EIS that the waste management impacts from cumulative operations of IIFP and the 3 MSWU UUSA would be small. The volume of LLW from the proposed action at UUSA will increase predominantly due to the solidification of previously evaluated liquid wastes. The cumulative impact of the increased UUSA generation with the new generation by the IIFP will continue to be small as there will be additional capacity for this waste at the WCS facility.

4.13.14 Comparative Waste Management Impacts of No Action Alternative Scenarios

ER Chapter 2, Alternatives, provides a discussion of possible alternatives to the capacity expansion construction and operation of UUSA, including an alternative of "no action," i.e., not expanding the current capacity. The following information provides comparative conclusions specific to the concerns addressed in this subsection for each of the three "no action" alternative scenarios addressed in ER Section 2.4, Table 2.4-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Alternative Scenarios.

Alternative Scenario B – No UUSA capacity expansion and no additional enrichment capacity is constructed by others. No additional waste impacts at the UUSA site or at otherpotential sites.

Alternative Scenario C – No UUSA capacity expansion, facility operates at 3.0 M SWU. Additional enrichment capacity is supplied by a combination of the construction and operation of

Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU) and GLE in Wilmington, NC (proposed capacity 6 MSWU). The waste impact may be increased due to construction and operation at two additional sites. The waste impacts for these two additional projects are evaluated in the individual environmental impact statements for the projects.

Alternative Scenario D – No UUSA capacity expansion, facility operates at 3.0 MSWU. ; Additional enrichment capacity is supplied by a combination of the construction and operation of Eagle Rock in Idaho Falls, ID (proposed capacity 6.6 MSWU), GLE in Wilmington, NC (proposed capacity 6 MSWU), and ACP in Piketon, OH (planned capacity 3.7 MSWU). The waste impact may be increased due to construction and operation at three additional sites. The waste impacts for these three additional projects are evaluated in the individual environmental impact statements for the projects.

4.13.15 Section 4.13 Tables

Table 4.13-1 Projected Annual Radiological Waste Generation by Proposed Phased Facility Capacity Expansion

Radiological Waste	Projection (lbs)				
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Activated carbon	343	796	1,248	1,700	2,151
Activated alumina	2,471	5,727	8,978	12,229	15,479
Assorted paper, rubber & cloth materials	2,402	5,569	8,729	11,890	15,050
Ventilation filters	35,160	81,471	127,711	173,951	220,192
Liquid Radiological Waste	12,500	23,500	36,200	48,200	64,300
Solidified Waste Water	368,400	689,000	1,059,800	1,410,900	1,881,200

Basis of estimated quantities is a proportional increase from the amounts cited in the License Based Documents associated with a 3 MSWU facility capacity. These quantities do not include waste volumes that may be generated during construction or decommissioning.

Table 4.13-2 Typical Quantities of Commodities Used, Consumed, or Stored at UUSA During Construction

Item Description	Quantity
Architectural Finishes, All Areas	77,588 m^2 (835,153 ft^2)
Asphalt Paving	79,767 m^2 (95,400 yd^2)
Chain Link Fence	15,011 m (49,250 ft)
Concrete (including embedded items)	59,196 m^3 (77,425 yd^3)
Concrete Paving	1,765 m^2 (2,111 yd^2)
Copper and Aluminum Wiring	361,898 m (1,187,328 ft)
Crushed Stone	287,544 m^2 (343,900 yd^2)
Electrical Conduit	120,633 m (395,776 ft)
Fence Gates	14 each
HVAC Units	109 each
Permanent Metal Structures	2 each
Piping (Carbon & Stainless Steel)	55,656 m (182,597 ft)
Roofing Materials	52,074 m^2 (560,515 ft^2)
Stainless & Carbon Steel Ductwork	515,125 kg (1,135,657 lbs)
Temporary Metal Structures	2 each

Table 4.13-3 Typical Quantities of Commodities Used, Consumed, or Stored at UUSA During Operation

Item	Quantity	Comments
Electrical Power	17 MVA	Separation Plant
Diesel Fuel	69,803 L (18,440 gal)	Quantity reflects the fuel to be stored onsite for the Diesel Fire Water Pump, CUB Diesel Generators, and the Security Diesel Generator.
Silicon Oil	50 L (13.2 gal)	--
Corrosion Inhibitor	8,000 kg (17,637 lb)	Contracted work on cooling water systems: consumed, not stored onsite
Growth Inhibitor	1,800 kg (3,968 lb)	Contracted work on cooling water systems: consumed, not stored onsite
pH Stabilizer(sulfuric acid)	7000 kg (15400 lb)	Contracted work on cooling water systems: consumed, not stored onsite

4.14 Pre-Construction and Construction-at-Risk Activities

4.14.1 Pre-Construction Activities

As noted in Section 1.3.5, Pre-Construction Activities, certain site preparation and other pre-construction activities 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, these 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 Q-3 structural steel
- Initiate procurement of Core/Non-Core Equipment – IROFS

In general, there will be minimal additional disturbance to the existing site features at the project site associated with the pre-construction activities to support the facility capacity expansion. Site disturbance associated with clearing and earthmoving activities is anticipated to be limited to the previously disturbed 394 acres. Excavated soils associated with necessary construction ground improvements will continue to be stockpiled on site to the northeast portion of the property. Site property outside the disturbed plant area will generally be left in its preconstruction condition or improved through stabilization as needed.

An existing construction access roadway off of New Mexico Highway 176 will be used to support the expansion, including the planned site preparation and other pre-construction activities. The materials delivery construction access road runs north off of New Mexico Highway 176 along the west side of the UUSA site. No additional access roads will be required to support the expansion of the proposed facility capacity, including pre-construction activities, and therefore, impacts due to access road construction will be negligible.

In addition, the planned site preparation and other pre-construction activities will not require the installation of additional water and electrical utility lines. Existing potable and sewer water connections exist to support the proposed facility capacity expansion.

Accordingly, the impacts from pre-construction activities will be negligible and are bounded by the impact analysis herein.

4.14.2 Construction-At-Risk Activities

As noted in Section 1.3.6, Construction-at-Risk Activities Subject to Notification, 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. The environmental impacts relating to construction-at-risk activities for SBM-1005 will not be significantly different from the impacts documented in the 2005 EIS.

Accordingly, the impacts from the construction-at-risk activities will be small to moderate, and are bounded by the impact analysis herein.

4.15 Summary of Environmental Impacts for the 10 MSWU Facility

Current operational metrics are provided in Section 1.2 Current Operational Information and Status.

4.15.1 Land Use

Land use impact has been characterized in ER Section 4.1, Land Use Impacts. No substantive impacts exist as related to the following:

- Land-use impact, and impact of any related Federal action that may have cumulatively significant impacts
- Area and location of land that will be disturbed on either a long-term or short-term basis.

Minor impacts related to erosion control on the site may occur, but are short-term and limited. Mitigation measures associated with these impacts are listed in ER Section 5.2.1, Land Use.

4.15.2 Transportation

Transportation impact has been characterized in ER Section 4.2, Transportation Impacts.

With respect to construction-related transportation, no substantive impacts exist as related to the following:

- Construction of the access roads to the facility. Existing access roads are available to support the ongoing construction at the site through installation of the final UBC Drainage Basins, which will require minor relocation of the existing access road.
- Transportation route and mode for conveying construction material to the facility
- Traffic pattern impacts (e.g., from any increase in traffic from heavy haul vehicles and construction worker commuting)
- Impacts of construction transportation such as fugitive dust, scenic quality, and noise.

Minor impacts related to construction traffic such as fugitive dust, noise, and emissions are discussed ER Section 4.2.4, Construction Transportation Impacts. Additional information on noise impacts is contained in ER Section 4.7.1, Predicted Noise Levels. Mitigation measures associated with transportation impacts are listed in ER Section 4.2.5, Transportation.

With respect to the transport of radioactive materials, no substantive impacts exist as related to the following activities:

- Transportation mode (i.e., truck), and routes from originating site to the destination
- Estimated transportation distance from the originating site to the destination
- Treatment and packaging procedure for radioactive wastes
- Radiological dose equivalents for incident-free scenarios to public and workers
- Impacts of operating transportation vehicles on the environment (e.g., fire from equipment sparking).

Impacts related to the transport of radioactive material are addressed in NUREG-1790 and ER Section 4.2.6, Radioactive Material Transportation. The materials that will be transported to and from the UUSA are well within the scope of the environmental impacts previously evaluated by the NRC. Because these impacts have been addressed in a previous NRC environmental impact statement (NUREG/CR-0170) (NRC, 1977a), no additional mitigation measures are proposed.

4.15.3 Geology and Soils

The potential impacts to the geology and soils have been characterized in NUREG 1790 and ER Section 4.3, Geology and Soils Impact. No substantive impacts exist as related to the following activities:

- Soil resuspension, erosion, and disruption of natural drainage
- Excavations to be conducted during construction of facility capacity expansion.

Impacts to geology and soils will be limited to surface runoff due to routine operation. Construction activities may cause some short-term increases in soil erosion at the site. Mitigation measures associated with these impacts are listed in NUREG 1790 and LES ER Section 5.2.3, Geology and Soils.

4.15.4 Water Resources

The potential impacts to the water resources have been characterized in NUREG 1790 and ER Section 4.4, Water Resources Impacts. No substantive impacts exists as related to the following:

- Impacts on surface water and groundwater quality
- Impacts of consumptive water uses (e.g., groundwater depletion) on other water users and adverse impacts on surface-oriented water users resulting from facility activities. Site groundwater will not be utilized for any reason, and therefore, should not be impacted by routine operations. UUSA water supply will be obtained from the town of Eunice, New Mexico. Current capacity for the Eunice municipal water supply system is 16,350 m^3/day (4.32 million gpd), respectively and current estimated usage is less than that from the initial ER. The usage rates listed in Section 3.4 are well within the capacity of the water system. The needs of the UUSA facility have been met by the municipal water system and as usage rates are not anticipated to increase significantly with the capacity expansion, impacts to water resources on site and in the vicinity of NEF are expected to be negligible.
- .Hydrological system alterations or impacts
- Withdrawals and returns of ground and surface water
- Cumulative effects on water resources.

UUSA will not obtain any water from onsite surface or groundwater resources. Process effluents will be solidified and disposed of off-site. Sanitary waste water will be sent to the City of Eunice Wastewater Treatment Plant for processing via a system of lift stations and 8-inch sewage lines. Stormwater from developed portions of the site will be collected in retention/detention basins, as described in ER Section 3.4, Water Resources. These include the Site Stormwater Detention Basin and the UBC Storage Pad Stormwater Retention Basins. Minor impacts to water resources are discussed in ER Section 4.4. Mitigation measures associated with these impacts are listed in ER Section 5.2, Water Resources.

4.15.5 Ecological Resources

The potential impacts to the ecological resources have been characterized in ER Section 4.5, Ecological Resources Impacts. No substantive impacts exist as related to the following:

- Total area of land to be disturbed
- Area of disturbance for each habitat type
- Use of chemical herbicides, roadway maintenance, and mechanical clearing
- Areas to be used on a short-term basis during construction
- Communities or habitats that have been defined as rare or unique or that support threatened and endangered species
- Impacts of elevated construction equipment or structures on species (e.g., bird collisions, nesting areas)
- Impact on important biota.

Impacts to ecological resources will be minimal. Mitigation measures associated with these impacts are listed in ER Section 5.3, Ecological Resources.

4.15.6 Air Quality

The potential impacts to the air quality have been characterized in ER Section 4.6, Air Quality Impacts. No substantive impacts exist as related to the following activities:

- Gaseous effluents
- Visibility impacts.

Impacts to air quality will continue to be minimal through the construction and operation of the proposed facility capacity expansion. Ongoing construction activities, including construction of the expansion, will continue to result in interim increases in hydrocarbons and particulate matter due to vehicle emissions and dust. Impacts due to plant operation consist of cooling tower plumes, small quantities of volatile organic components (VOC) emissions and trace amounts of HF, UO_2F_2, and other uranic compound effluents remaining in treated air emissions from plant ventilation systems. These effluents are significantly below regulatory limits. Mitigation measures associated with air quality impacts are listed in ER Section 5.4, Air Quality.

4.15.7 Noise

The potential impacts related to noise generated by the capacity expansion at the facility have been characterized in ER Section 4.7, Noise Impacts. No substantive impacts exists as related to the following activities:

- Predicted typical noise levels at facility perimeter
- Impacts to sensitive receptors (i.e., hospitals, schools, residences, wildlife).

During the construction of the proposed expansion, noise levels are likely to be as high as they are during the current construction. This level does not cause significant impact to nearby residents. The nearest residence is 4.3 km (2.63 mi) from the site. Mitigation measures associated with noise impacts are listed in LES ER Section 5.2.7, Noise.

4.15.8 Historical and Cultural Resources

The potential impacts to historical and cultural resources have been characterized in ER Section 4.8, Historical and Cultural Resources Impacts. Only minor impacts exist as related to the following activities:

- Construction, operation, or decommissioning
- Impact on historic properties
- Potential for human remains to be present in the project area
- Impact on archeological resources.

Impacts to Historical and Cultural Resources will be minimal. Discussions in 2012 with the NM SHPO confirmed mitigation of previously identified sites and that no further action would be required in light of proposed ongoing construction for the facility capacity expansion. Mitigation measures associated with these impacts, if required, are listed in LES ER Section 5.2.8, Historical and Cultural Resources.

4.15.9 Visual/Scenic Resources

The potential impacts to visual/scenic resources from the expansion have been characterized in ER Section 4.9, Visual/Scenic Resources Impacts. No substantive negative impacts exists as related to the following:

- The aesthetic and scenic quality of the site
- Impacts from physical structures
- Impacts on historical, archaeological or cultural properties of the site
- Impacts on the character of the site setting.

Mitigation measures associated with these impacts are listed in LES ER Section 5.2.9, Visual/Scenic Resources.

4.15.10 Socioeconomic

The potential socioeconomic impacts to the community have been characterized in ER Section 4.10, Socioeconomic Impacts. No substantive negative impacts exist as related to the following:

- Impacts to population characteristics (e.g., ethnic groups, and population density)
- Impacts to housing, health and social services, or educational and transportation resources
- Impacts to area's tax structure and distribution.

The anticipated socioeconomic impacts and cumulative socioeconomic impacts of the proposed expansion of UUSA are expected to be unchanged from current levels. See ER Section 4.10, Socioeconomic Impacts, for a detailed discussion on socioeconomic impacts.

4.15.11 Environmental Justice

The potential impacts with respect to environmental justice have been characterized in ER Section 4.11, Environmental Justice. No substantive impacts exist as related to the following:

- Disproportionate impact to minority or low-income population.

Based on the data analyzed and the NUREG-1748 guidance by which that analysis was conducted, UUSA determined that no further evaluation of potential Environmental Justice concerns was necessary, as no Census Block Group within the 6.4-km (4-mi) radius, i.e., 128 km^2 (50 mi^2), of the UUSA site contained a minority or low-income population exceeding the NUREG-1748 "20%" or "50%" criteria. See ER Section 4.11, Environmental Justice.

4.15.12 Public and Occupational Health

This section describes public and occupational health impacts from both nonradiological and radiological sources.

4.15.12.1 Nonradiological – Normal Operations

The potential impacts to public and occupational health for nonradiological sources have been characterized in ER Section 4.12.1, Nonradiological Impacts. No substantive impacts exist as related to the following:

- Impact to members of the public from nonradiological discharge of liquid or gaseous effluents to water or air
- Impact to facility workers as a result of occupational exposure to nonradiological chemicals, effluents, and wastes
- Cumulative impacts to public and occupational health.

Impacts to the public and workers from nonradiological gaseous and liquid effluents will be minimal. Mitigation measures associated with these impacts are listed in ER Section 5.5, Nonradiological – Normal Operations.

4.15.12.2 Radiological – Normal Operations

This subsection describes public and occupational health impacts from radiological sources. It provides a brief description of the methods used to assess the pathways for exposure and the potential impacts.

4.15.12.2.1 Pathway Assessment

The potential for exposure to radiological sources included an assessment of pathways that could convey radioactive material to members of the public. These are briefly summarized below.

Potential points or areas were characterized to identify:

- Nearest site boundary
- Nearest full time resident
- Location of average member of the critical group
- In addition, important ingestion pathways such as stored and fresh vegetables, milk and meat, assumed to be grown or raised at the nearest resident location have been analyzed.

4.15.12.2.2 Public and Occupational Exposure

The potential impacts to public and occupational health for radiological sources have been characterized in ER Section 4.12, Public and Occupational Health Impacts. No substantive impacts exist as related to the following:

- Impacts based on the average annual concentration of radioactive and hazardous materials in gaseous and liquid effluents
- Impacts to the public (as determined by the critical group)
- Impacts to the workforce based on radiological and chemical exposures
- Impacts based on reasonably foreseeable (i.e., credible) accidents with the potential to result in environmental releases.

Routine operations at UUSA create the potential for radiological and nonradiological public and occupational exposure. Radiation exposure is due to the plant's use of the isotopes or uranium and the presence of associated decay products. Chemical and radiological exposures are primarily from byproducts of UF_6; UO_2F_2, HF and related uranic compounds, that will form inside plant equipment and from reaction with components. These are the primary products of concern in gaseous effluents that will be released from the plant and liquid effluents that will be released to the onsite retention basin. Mitigation measures associated with these impacts are listed in LES ER Section 5.2.12, Public and Occupational Health.

4.15.12.3 Accidental Releases

All credible accident sequences were considered during the Integrated Safety Analysis (ISA) performed for the facility. Accidents evaluated fell into two general types: criticality events and UF_6 releases. Criticality events and some UF_6 release scenarios were shown to result in potential radiological and HF chemical exposures, respectively, to the public. Gaseous releases of UF_6 react quickly with moisture in the air to form HF and UO_2F_2. Consequence analyses showed that HF was the bounding consequence for all gaseous UF_6 releases to the environment. For some fire cases, uranic material in waste form or in chemical traps provided the bounding case. Accidents that produced unacceptable consequences to the public resulted in the identification of various design bases, design features, and administrative controls.

During the ISA process, evaluation of most accident sequences resulted in identification of design bases and design features that prevent a criticality event or HF release to the environment. LES ER Table 4.12-15, Accident Criteria Chemical Exposure Limits by Category, lists the accident criteria chemical exposure limits (HF) by category for an immediate consequence and high consequence categories.

Several accident sequences involving HF releases to the environment due to seismic or fire events were mitigated using design features to delay and reduce the UF_6 releases inside the buildings from reaching the outside environment. The seismic accident scenario considers an earthquake event of sufficient magnitude to fail portions of the UF_6 process piping and some UF_6 components resulting in a gaseous UF_6 release inside the buildings housing UF_6 process systems. The fire accident scenario considers a fire within the Cylinder Receipt and Dispatch Building (CRDB) that causes the release of uranic material from open waste containers and chemical traps during waste drum filling operations.

Potential adverse impacts for accident conditions are described in ER Section 4.12.10, Environmental Effects of Accidents. Mitigation measures associated with these impacts are listed in LES ER Section 5.2.12.3, Accidental Releases.

4.15.13 Waste Management

The potential impacts of waste generation and waste management have been characterized in ER Section 4.13, Waste Management Impacts. No substantive impacts exist as related to the following:

- Impact to the public due to the composition and disposal of solid, hazardous, radioactive and mixed wastes
- Impact to facility workers due to storage, processing, handling, and disposal of solid, hazardous, radioactive and mixed wastes
- Cumulative impacts of waste management.

Waste generated at UUSA will be comprised of industrial (nonhazardous), radioactive and mixed, and hazardous waste categories. In addition, radioactive and mixed waste will be further segregated according to the quantity of liquid that is not readily separable from the solid material. Gaseous and liquid effluent impacts are discussed in ER Section 4.12. Uranium Byproduct Cylinders (UBCs) are stored onsite at an outdoor storage area and will minimally impact the environment. See ER Section 4.13, Waste Management.

Mitigation measures associated with waste management are listed in ER Section 5.6, Waste Management.

4.15.14 Conclusion

In conclusion, analysis of the potential environmental impacts associated with the ongoing construction and operation of UUSA at a final facility capacity of 10 MSWU indicates that adverse impacts are small and are outweighed by the substantial socioeconomic benefits associated with additional plant construction and operation. Additionally, the UUSA expanded capacity will meet the underlying need for additional reliable and economical uranium enrichment capacity in the United States, thereby serving important energy and national security policy objectives. Accordingly, because the impacts of the proposed UUSA facility capacity expansion are minimal and acceptable, and the benefits are desirable, the no-action alternative may be rejected in favor of the proposed action. Significantly, UUSA has also completed a safety analysis of the proposed action supporting the associated license amendment request, in which demonstrates that the UUSA facility capacity expansion operation will be conducted in a safe and acceptable manner.

5 MITIGATION MEASURES

This chapter supplements the discussion of mitigation measures in Section 5.2 of the LES ER. UUSA is already performing the mitigation measures outlined in Section 5.2 of the LES ER at the UUSA site in order to reduce the adverse impacts that may result from the construction and operation of the UUSA facility. This chapter discusses only additional or updated mitigation measures. Where the mitigation measures have not changed since the LES ER, they are not discussed.

5.1 Land Use

The current area of disturbance on the UUSA site is approximately 394 acres of the total 543 acres for the property.

Land use mitigation measures employed during expansion-related construction by UUSA will not change as a result of the proposed facility capacity expansion with respect to the procedures and methods used at the UUSA site for earth leveling, revegetation, landscaping, cleanup and disposal of debris, erosion control structures, land management practices and stabilization of spoil piles. During construction of existing buildings SBM-1001 and SBM-1003, native soils were excavated from the footprint of the building (approximately 9,000 cubic yards per building) and moved to the northern portion of the site. The excavated soil was replaced with fill imported from the Wallach site, which is adjacent to the UUSA property to the North. The volume of imported backfill was approximately 48,000 cubic yards per building and it was compacted to provide suitable ground for the building and proposed activities. It is anticipated a similar amount of excavation and backfill will be required for construction of the other proposed buildings (SBM-1005, 1007, and 1009) and that the source will continue to be the Wallach facility across non-public roadways.

5.2 Water Resources

Mitigation measures are in place to minimize potential impacts on water resources. As discussed in LES ER Section 4.4.7, Control of Impacts to Water Quality, there is little potential to impact any groundwater or surface water resources. These mitigation measures prevent soil contamination, and include employing best management practices (BMPs) and the control of hazardous materials and fuels. In addition, the following controls have also been implemented:

- Construction equipment will be in good repair without visible leaks of oil, greases, or hydraulic fluids.
- Use of BMPs during construction and operations to prevent fuel oil spills and/or releases.
- Use of the BMPs will assure stormwater runoff related to these activities will not release runoff into nearby sensitive areas.
- BMPs will also be used for dust control associated with excavation and fill operations during construction.
- Silt fencing and/or sediment traps.
- External vehicle washing (water only and controlled to minimize use).
- Stone construction pads will be placed at entrance/exits if unpaved construction access adjoins a state road.
- All basins are arranged to provide for the prompt, systematic sampling of runoff in the event of any special needs.

- Water quality impacts will be controlled during construction by compliance with the National Pollution Discharge Elimination System – Construction General Permit requirements and by applying BMPs as detailed in the site Stormwater Pollution Prevention Plan (SWPPP).
- BMPs will be implemented for the facility to identify potential spill substances, sources and responsibilities.
- All above ground diesel storage tanks will be bermed.
- Any hazardous materials will be handled by approved methods and shipped offsite to approved disposal sites. Sanitary wastes generated during site construction will be sent to the City of Eunice Wastewater Treatment Plant for processing via a system of lift stations and 8-inch sewage lines.
- The facility's Liquid Effluent Collection and Treatment System provides a means to control liquid waste within the plant including the collection, analysis, and processing of liquid wastes for disposal.
- Liquid effluent will be solidified on site by a vendor and then disposed of off-site.
- Control of surface water runoff will be required for activities regulated by the New Mexico Environment Department. As a result, no impacts are expected to surface or groundwater bodies.

UUSA is designed to minimize the usage of natural and depletable resources as shown by the following measures:

- The use of low-water consumption landscaping versus conventional landscaping reduces water usage.
- The installation of low flow toilets, sinks and showers reduces water usage when compared to standard flow fixtures.
- Localized floor washing using mops and self-contained cleaning machines reduces water usage compared to conventional washing with a hose twice per week.
- The use of high efficiency closed cell cooling towers (water/air cooling) versus open cell design reduces water usage.
- Closed-loop cooling systems have been incorporated into the proposed facility expansion design to reduce water usage.

The UBC Storage Pad Stormwater Retention Basins, which serve the UBC Storage Pad and cooling tower blowdown water discharges, are lined to prevent infiltration. The basins are designed to retain a volume slightly more than twice that for the 24-hour, 100-year frequency storm at the UBC Storage Pads and an allowance for the cooling tower blowdown water. Designed for sampling and radiological testing of the contained water and sediment, this basin has no flow outlet. All discharge is through evaporation.

The Site Stormwater Detention Basin is designed with an outlet structure for drainage. Local terrain serves as the receiving area for this basin.

5.3 Ecological Resources

Mitigation measures are in place to minimize potential impact on ecological resources. These include the following items:

- Use of BMPs recommended by the State of New Mexico to minimize the construction footprint to the extent possible
- Use of detention and retention ponds
- Site stabilization practices to reduce the potential for erosion and sedimentation.

Proposed wildlife management practices include:

- 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 (i.e., low-water consuming plants) to revegetate disturbed areas to enhance wildlife habitat.
- The use of animal-friendly fencing around ponds or basins so that wildlife cannot be injured or entangled.
- Minimize the amount of open trenches at any given time and keep trenching and backfilling crews close together.
- Trench during the cooler months (when possible).
- Avoid leaving trenches open overnight. Escape ramps will be constructed at least every 90 m (295 ft). The slope of the ramps will be less than 45 degrees. Trenches that are left open overnight will be inspected and animals removed prior to backfilling.

In addition to the proposed wildlife management practices above, UUSA will consider all recommendations of appropriate state and federal agencies, including the United States Fish and Wildlife Service and the New Mexico Department of Game and Fish.

5.4 Air Quality

In addition to the mitigation measures already in place to minimize potential impacts on air quality, additional Pumped GEVS will be installed at the proposed additional SBMs to treat emissions associated with the operation.

5.5 Nonradiological – Normal Operations

In addition to the mitigation measures already in place that minimize the impact of nonradiological gaseous and liquid effluents to well below regulatory limits, liquid waste will be solidified on site by a vendor and then disposed off-site, rather than being routed to collection tanks and undergoing evaporation treatment techniques.

5.6 Waste Management

The mitigation measures previously described in LES ER Section 5.2.13 are in place to minimize both the generation and impact of facility wastes. However, with the expansion, the UBCs may be triple stacked on the UBC Storage Pad.

6 Environmental Measurements and Monitoring Programs

Chapter 6 of the LES ER describes the current UUSA environmental measurements and mitigation program. This discussion updates that description to reflect all current practices and the planned measurements and monitoring for the expansion.

6.1 Radiological Environmental Monitoring Program (REMP)

Monitoring and sampling activities, laboratory analyses, and reporting of facility-related radioactivity in the environment for current operations and the planned expansion are and will be conducted in accordance with industry-accepted and regulatory-approved methodologies and will also comply with UUSA's NMED Groundwater Discharge Permit DP-1481, future modifications to permit requirements, and additional state based regulatory requirements that may become applicable.

The Quality Control (QC) procedures used by the laboratories performing the UUSA facility's REMP will be adequate to validate the analytical results and will conform with the guidance provided in NRC Regulatory Guide 4.15. These QC procedures include the use of established standards such as those provided by the National Institute of Standards and Technology (NIST), as well as standard analytical procedures such as those established by the National Environmental Laboratory Accreditation Conference (NELAC).

Monitoring procedures will employ well-known acceptable analytical methods and instrumentation. The instrument maintenance and calibration program will be appropriate to the given instrumentation, in accordance with manufacturers' recommendations.

UUSA will ensure that the onsite laboratory and any contractor laboratory used to analyze site samples participates in third-party laboratory intercomparison programs appropriate to the media and analytes being measured. Examples of these third-party programs are: 1) Mixed Analyte Performance Evaluation Program (MAPEP) and the DOE Quality Assurance Program (DOEQAP) that are administered by the Department of Energy; and 2) Analytics Inc., Environmental Radiochemistry Cross-Check Program. UUSA will require that all radiological and non-radiological laboratory vendors are certified by the National Environmental Laboratory Accreditation Program (NELAP) or an equivalent state laboratory accreditation agency for the analytes being tested.

Reporting procedures will comply with the requirements of 10 CFR 70.59 and the guidance specified in NRC Regulatory Guide 4.16. Reports of the concentrations of principal radionuclides released to unrestricted areas in effluents will be provided and will include the Minimum Detectable Concentration (MDC) for the analysis and the error for each data point.

The REMP includes the collection of data during pre-operational years in order to establish baseline radiological information that will be used in determining and evaluating impacts from operations at the plant on the local environment. Data collected during the operational years will be compared to the baseline generated by the pre-operational data. Such comparisons provide a means of assessing the magnitude of potential radiological impacts on members of the public and in demonstrating compliance with applicable radiation protection standards.

During the course of facility operations, revisions to the REMP may be necessary and appropriate to assure reliable sampling and collection of environmental data. The rationale and actions behind such revisions to the program will be documented and reported to the appropriate regulatory agency, as required. REMP sampling focuses on locations within 4.8 km (3 mi) of the facility, but may also include distant locations as control sites. REMP sampling locations have been determined based on NRC guidance found in the document, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors" (NRC, 1991), meteorological information, and current land use. The sampling locations may be subject to change as determined from the results of periodic review of land use.

Atmospheric radioactivity monitoring is based on plant design data, demographic and geologic data, meteorological data, and land use data. Operational releases are anticipated to be very low and subject to rapid dilution via dispersion. Distinguishing plant-related uranium from background uranium already present in the site environment is a major challenge of the REMP. A characteristic of ground-level plumes is that plume concentrations decrease continually as the distance from the release point increases. It logically follows that the impact at locations close to the release point is greater than at more distant locations. The concentrations of radioactive material in gaseous effluent from the UUSA are expected to be very low concentrations of uranium because of process and effluent controls. Consequently, air samples collected at locations that are close to the plant would provide the best opportunity to detect and identify plant-related radioactivity in the ambient air. Therefore, air-monitoring activities concentrate on collection of data from locations that are relatively close to the plant, such as the plant perimeter fence or the plant property line. Air monitoring stations are situated along the site boundary locations of highest predicted atmospheric deposition, and at special interest locations, such as a nearby residential area and business.

A control sample location has been established beyond 8 km (5 mi) in an upwind sector (the sector with least prevalent wind direction). Refer to NUREG-1790, for information on meteorology and atmospheric dispersion. All environmental air samplers operate on a continuous basis with sample retrieval for a gross alpha and beta analysis occurring on a biweekly basis (or as required by dust loads).

During the operational years, vegetation and soil sampling will continue to be performed to document environmental conditions. Groundwater samples from onsite monitoring well(s) will be collected in accordance with DP-1481.

In addition to the current monitoring program, a background monitoring well and dry well point were installed to collect data on background conditions. This well pair is located in the NNW sector of the UUSA facility (see Figure 6.1-2). They are located up-gradient of the UUSA and cross-gradient from the WCS facility. This location is intended to avoid potential contamination from both facilities, i.e., UUSA and/or WCS. Monitoring at this location will occur in both the shallow sand and gravel layer on top of the red bed and in the 70-m (230-ft) groundwater zone.

The dry well or well point was installed here to monitor the zone directly above the aquitard: groundwater in the sand and gravel layer was not encountered at the UUSA facility during groundwater investigations, however this zone represents the most shallow layer where liquid/water would collect should there be a significant release.

The 70-m (230 ft) zone contains the first occurrence of groundwater beneath the site. Although not strictly meeting the definition of an aquifer, which requires that the unit be able to transit "significant quantities of water under ordinary hydraulic gradients," this layer will also be monitored.

Other surrounding industrial activities, the Wallach Quarry and the Sundance Services "produced water" lagoons north of the UUSA facility, have some potential to introduce contaminants that could reach the background monitoring well. The contaminants of concern for those facilities should be readily differentiated from potential contaminants from the site.

Sediment samples will be collected semiannually from both of the stormwater runoff retention/detention basins onsite to look for any buildup of uranic material being deposited. If no new sediment has been deposited, no sample will be taken.

Sanitary wastewater will be sent to the City of Eunice Wastewater Treatment Plant via a system of lift stations and 8 inch sewage lines. No plant process related effluents will be introduced into the sewage systems.

Because the offsite dose equivalent rate from stored UBCs is expected to be very low and difficult to distinguish from the variance in normal background radiation beyond the site boundary, demonstration of compliance will rely on a system that combines direct dose equivalent measurements and computer modeling to extrapolate the measurements. Environmental TLDs placed at the plant perimeter fence line or other location(s) close to the UBCs will estimate direct dose equivalent information. The direct dose equivalent at offsite locations will be estimated through extrapolation of the quarterly TLD data using the Monte Carlo N-Particle (MCNP) computer program (ORNL, 2000a) or a similar computer program.

The REMP may be enhanced during the operation of the facility as necessary to maintain the collection and reliability of environmental data based on changes to regulatory requirements or facility operations. The REMP includes monitored air effluent action levels (requiring further analysis) and reporting levels for radioactivity in other environmental samples.

The REMP falls under the oversight of the facility's QA program. Therefore, written procedures to ensure representative sampling, proper use of appropriate sampling methods and equipment, proper locations for sampling points, and proper handling, storage, transport, and analyses of effluent samples will be a key part of the program. In addition, written procedures ensure that sampling and measuring equipment, including ancillary equipment such as airflow meters, are properly maintained and calibrated at regular intervals. UUSA will conform with leak detection recommendations in NUREG-1520.

Within 60 days after January 1 and July 1 of each year, UUSA shall submit a Semi-Annual Radiological Effluent Release Report (SARERR) addressed to the attention of: Document Control Desk, Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, with a copy sent to the appropriate NRC Regional Office.

The SARERR shall specify the quantity of each of the principal radionuclides released to unrestricted areas in liquid and gaseous effluents during the previous six months of operation, and such other information as the Commission may require to estimate maximum potential annual radiation doses to the public resulting from effluent releases.

A section of the report shall assess performance relative to 10 CFR 20.1101.d, 10 CFR 20.1301 and 10 CFR 20.1302, as described in NRC Regulatory Guide 4.20. In addition, the report will summarize or reference environmental monitoring program changes.

If quantities of radioactive materials released during the reporting period are significantly above the licensee's design objectives previously reviewed as part of the licensing action, the report must cover this specifically.

6.1.1 Section 6.1 Tables

Table 6.1-1 Effluent Sampling Program

Effluent	Sample Location	Sample Type	Sample Frequency
Gaseous	Pumped Extract GEVS Stack CRDB GEVS Stack CRDB Local Extract Stack Centrifuge Test and Post Mortem Facilities Exhaust Filtration System Stack	Continuous Air Particulate Filter	Gross Alpha/Beta-Weekly +/- 25% Isotopic Analysis[a] - Quarterly
Liquid	UBC Basin	Liquid	As required by DP-1481
Solid	UBC Basin	Sediment	As required by DP-1481

[a] Isotopic analysis for ^{234}U, ^{235}U, and ^{238}U.

Table 6.1-2 Required Lower Level Of Detection For Effluent Sample Analyses

Effluent Type	Nuclide	MDC[a] in Bq/ml (μCi/ml)
Gaseous	^{234}U	$3x10^{-10}$ ($1.0x10^{-14}$)
	^{235}U	$3x10^{-10}$ ($1.0x10^{-14}$)
	^{238}U	$3x10^{-10}$ ($1.0x10^{-14}$)
	Gross Alpha	$3x10^{-10}$ ($1.0x10^{-14}$)
Liquid	^{234}U	$3x10^{-4}$ ($3.0x10^{-9}$)
	^{235}U	$3x10^{-4}$ ($3.0x10^{-9}$)
	^{238}U	$3x10^{-4}$ ($3.0x10^{-9}$)

[a] The gaseous MDCs are 1% of the limits in 10 CFR 20 Appendix B, Table 2 Effluent Concentrations.

The liquid and solid MDCs are less than 2% of the limits in 10 CFR 20 Appendix B, Table 2 Effluent Concentrations

Table 6.1-3 Radiological Environmental Monitoring Program

Sample Type	Number of Sample Locations[c]	Sampling and Collection Frequency	Type of Analysis
Continuous Airborne Particulate	6	Continuous operation of air sampler with sample collection as required by dust loading but at least biweekly. Quarterly composite samples by location.	Gross beta/gross alpha analysis for each filter change. Quarterly isotopic analysis on composite sample.
Basins	1 from each basin[b]	4-L (1.06-gal) water sample/1 to 2-kg (2.2 to 4.4-lb) sediment sample collected in accordance with DP-1481	Isotopic analysis[a]
Sewage System	1	500ml sample in accordance with DP-1481	Isotopic analysis[a]

a Isotopic analysis for ^{234}U, ^{235}U, and ^{238}U.

b Site Stormwater Detention Basin and UBC Storage Pad Stormwater Retention Basin when water available during scheduled sampling

c. Due to regional conditions, sample locations and numbers may vary.

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6.1.2 Section 6.1 Figures

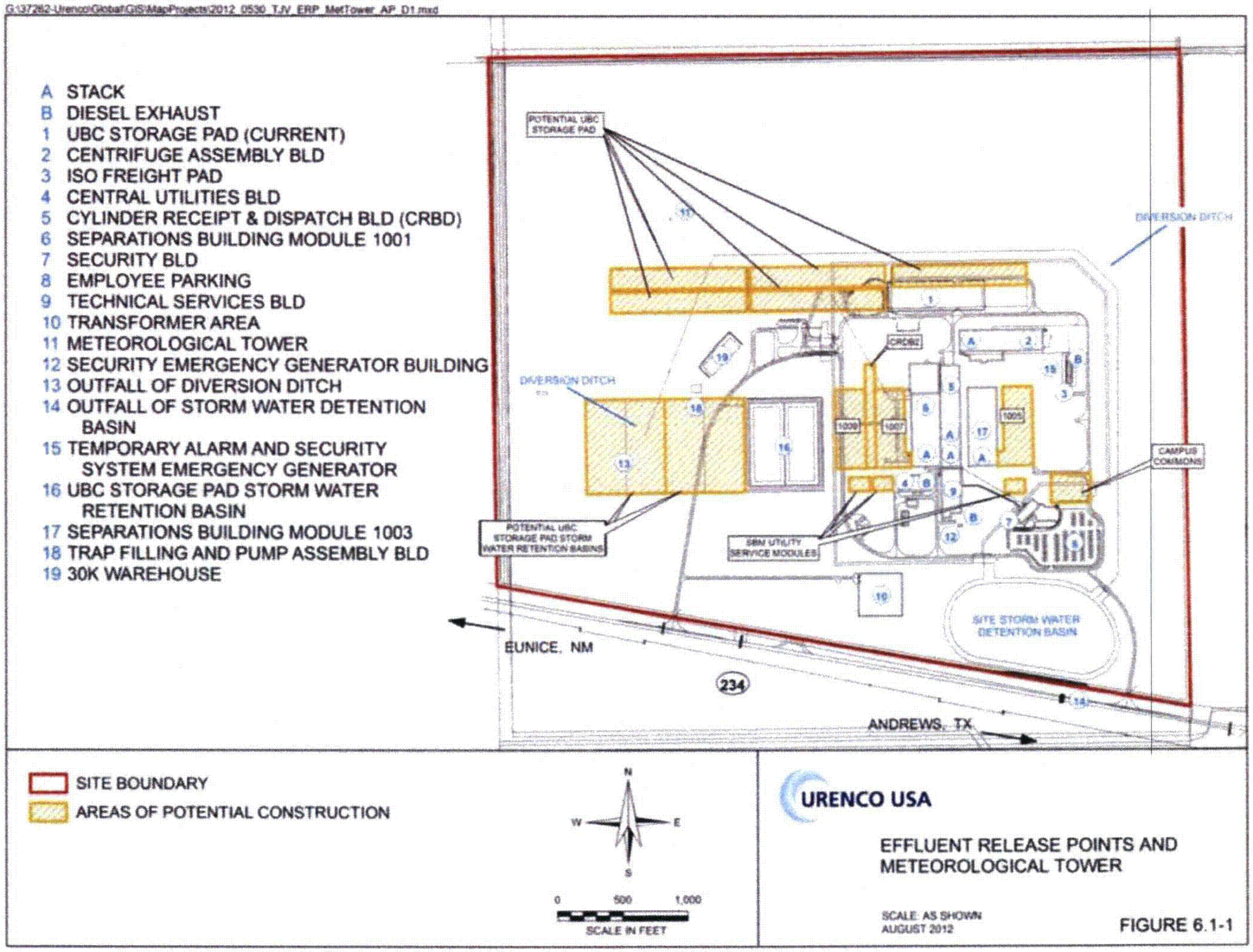

Figure 6.1-1 Effluent Release Points and Meteorological Tower

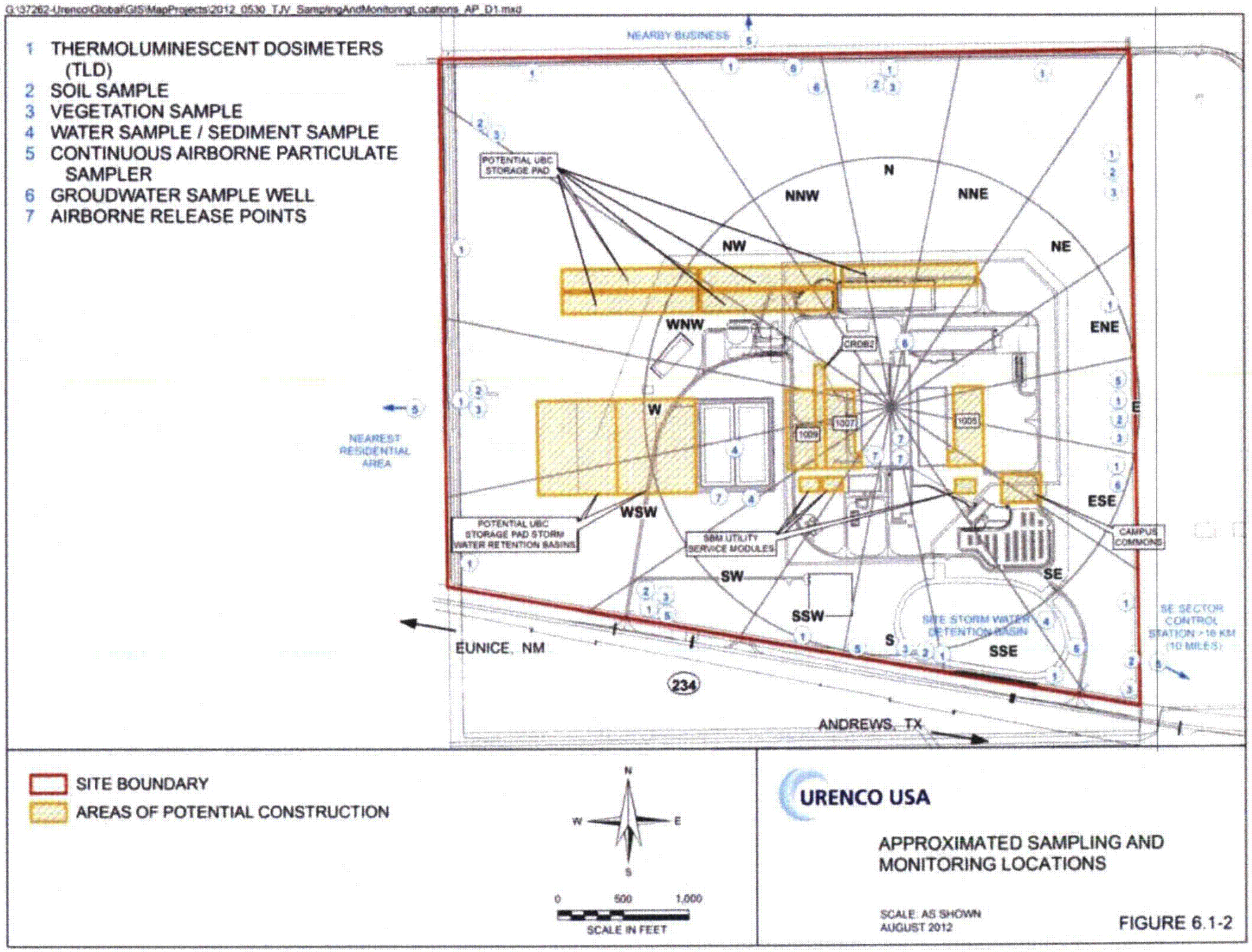

Figure 6.1-2 Approximated Sampling and Monitoring Locations

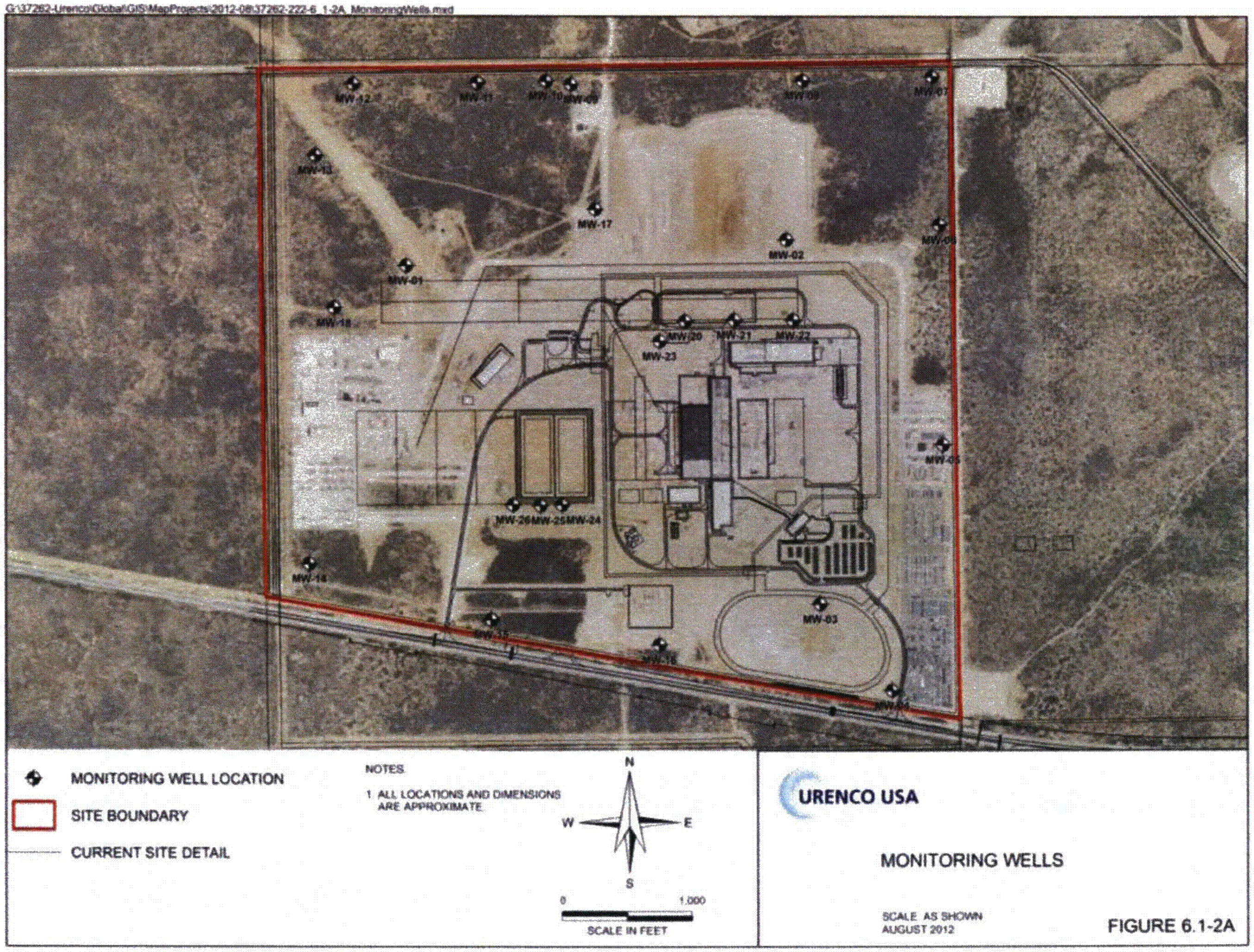

Figure 6.1-3 Monitoring Wells

6.2 Physiochemical Monitoring

The primary objective of physiochemical monitoring is to provide verification that the operations do not result in detrimental chemical impacts to the environment. Effluent controls, which are discussed in Supplemental ER Sections 3.12, Waste Management and 4.13, Waste Management Impacts, are in place to assure that chemical concentrations in gaseous and liquid effluents are maintained as low as reasonably achievable (ALARA). In addition, physiochemical monitoring provides data to confirm the effectiveness of effluent controls.

Administrative action levels will be implemented prior to facility operation to ensure that chemical discharges will remain below the limits specified in the facility discharge permits. The limits are specified by the New Mexico Water Quality Bureau (NMWQB) Groundwater Discharge Permit/Plan.

Specific information regarding the source and characteristics of all non-radiological plant effluents and wastes that will be collected and disposed of offsite, or discharged in various effluent streams, is provided in Supplemental ER Sections 3.12 and 4.13.

In conducting physiochemical monitoring, sampling protocols and emission/effluent monitoring are performed for routine operations with provisions for additional evaluation in response to potential accidental release.

The Chemistry Laboratory is located in the CRDB and used to perform analyses that include the following:

- Hazardous material presence in waste samples
- pH, oil and other contaminants in liquid effluents

The Environmental Monitoring Laboratory will be available to perform analyses on air, water, soil, flora, and fauna samples obtained from designated areas around the plant. In addition to its environmental and radiological capabilities, the Environmental Monitoring Laboratory is also capable of performing bioassay analyses when necessary. Currently the laboratory does not yet have these capabilities and UUSA contracts with commercial, offsite laboratories to perform these analyses. Once the laboratory is running, the offsite laboratories may continue to be used to supplement onsite capabilities.

Waste liquids, solids, and gases from enrichment-related processes and decontamination operations will be analyzed and/or monitored for chemical and radiological contamination to determine safe disposal methods and/or further treatment requirements.

6.2.1 Evaluation and Analysis of Samples

Samples of liquid effluents, solids, and gaseous effluents from plant processes will be analyzed by qualified laboratories. Results of process samples analyses are used to verify that process parameters are operating within expected performance ranges.

6.2.2 Effluent Monitoring

Chemical constituents that may be discharged to the environment in facility effluents will be below concentrations that have been established by state and federal regulatory agencies as protective of the public health and the natural environment. Under routine operating conditions, no significant quantities of contaminants will be released from the facility. This will be confirmed through monitoring and collection and analysis of environmental data. The facility does not directly discharge any industrial effluents to surface waters or grounds offsite. Except for sanitary waste reporting to the City of Eunice Wastewater Treatment plant from the site Sewage System, all liquid effluents are contained via collection tanks and retention basins.

Parameters for continuing environmental performance will be developed from the baseline data from additional preoperational sampling, and from those parameters required in the state issued Discharge Permit. Operational monitoring surveys will also be conducted using sampling sites and at frequencies established from baseline sampling data and as determined based on requirements contained in the NMWQB Groundwater Discharge Permit.

The frequency of some types of samples may be modified depending on baseline data for the parameters of concern. The monitoring program is designed to use the minimum percentage of allowable limits (lower limits of detection). As construction and operation of the enrichment plant proceeds, changing conditions (e.g., regulations, site characteristics, and technology) and new knowledge may require that the monitoring program be reviewed and updated. The monitoring program will be enhanced as appropriate to maintain the collection and reliability of environmental data. The specific location of monitoring points will be determined in detailed design.

During execution of the monitoring program, some samples may be collected in a different manner/method than specified herein. Examples of reasons for these deviations include severe weather events, changes in the length of the growing season, and changes in the number of plantings. Under these circumstances, documentation shall be prepared to describe how the samples were collected and the rationale for any deviations from normal monitoring program methods. If a sampling location has frequent unavailable samples or deviations from the schedule, then another location may be selected or other appropriate actions taken.

UUSA will submit a summary of the environmental sampling program and associated data to the proper regulatory authorities, as required. This summary will include the types, numbers, and frequencies of samples collected.

Physiochemical monitoring will be conducted via sampling of stormwater, soil, sediment, vegetation, and groundwater to confirm that discharges are below regulatory limits. There are no surface waters on the site, therefore no Surface Water Monitoring Program will be implemented; however soil sampling will include outfall areas such as the outfall at the UUSA site Stormwater Detention Basin. In the event of any off-site release of a regulated contaminant, these sampling protocols will be initiated immediately and on a continuing basis to document the extent/impact of the release until conditions have been abated and mitigated.

Sanitary sewage will be sampled as warranted, in accordance with the applicable discharge permit or treatment facility requirements.

6.2.3 Stormwater Monitoring Program

UUSA currently implements a stormwater monitoring program for ongoing construction of the facility, and it will continue to do so during the proposed expansion. Data collected from the program is used to evaluate the effectiveness of measures taken to prevent the contamination of stormwater and to retain sediments within property boundaries.

6.2.4 Environmental Monitoring

The purpose of this section is to describe the surveillance-monitoring program, which will be implemented to measure non-radiological chemical impacts upon the natural environment.

Non-radiological impact monitoring is regulated by the State of New Mexico through permitting. The ability to detect and contain any potentially adverse chemical releases from the facility to the environment will depend on chemistry data to be collected as part of the effluent and stormwater monitoring programs described in the preceding sections. Data acquisition from these programs encompasses both onsite and offsite sample collection locations and chemical element/compound analyses. Final constituent analysis requirements will be in accordance with permit mandates.

Sampling locations will be determined based on meteorological information and current land use. The sampling locations may be subject to change as determined from the results of any observed changes in land use.

The range of chemical surveillance incorporated into all the planned effluent monitoring programs for the facility are designed to be sufficient to predict any relevant chemical interactions in the environment related to plant operations.

Vegetation and soil sampling will be conducted. Vegetation samples will include grasses and local vegetation. Soil will be collected in the same vicinity as the vegetation sample. The samples are collected from both onsite and offsite locations in various sectors. Sectors are chosen based on air modeling. Sediment samples will be collected from discharge points to the different collection basins onsite. At this time, groundwater samples will be collected from a series of wells installed around the plant. The locations of the current groundwater sampling (monitoring) wells are as described in Section 6.1 and are shown in Figure 6.1-3.

Stormwater samples collected in the UBC Storage Pad Stormwater Retention Basins will be sampled to ensure no contaminants are present in the UBC Storage Pad runoff.

6.2.5 Meteorological Monitoring

Measurement instrumentation is currently be located at a height of approximately 10 meters (33 feet) from the finished grade of the nearest building structure and at 40 meters (130 feet) from the finished grade. This data assists in evaluating the potential locales on and off property that could be influenced by any emissions. The instrument tower is located at a site with approximately the same elevation as the finished facility grade and in an area where facility structures will have little or no influence on the meteorological measurements. An area approximately ten times the obstruction height around the tower towards the prevailing wind direction will be maintained in accordance with established standards for meteorological measurements. This practice will be used to avoid spurious measurements resulting from local building-caused turbulence. The program for instrument maintenance and servicing, combined with redundant data recorders, assures at least 90% data recovery.

The data this equipment provides is recorded in the Control Room and can be used for dispersion calculations. The equipment will also measure temperature and humidity.

6.2.6 Biota

The monitoring of radiological and physiochemical impacts to biota are detailed in Supplemental ER Section 6.3, Ecological Monitoring.

6.2.7 Quality Assurance

Quality assurance will be achieved by following a set of formalized and controlled procedures that UUSA will create, implement and periodically review for sample collection, lab analysis, chain of custody, reporting of results, and corrective actions. Corrective actions will be instituted when an action level is exceeded for any of the measured parameters. Action levels will be divided into three priorities: 1) if the sample parameter is reported at a concentration that exceeds an upper tolerance limit of the normal background level; 2) if the sample parameter is reported at a concentration that exceeds an administrative limit; or 3) if the sample parameter is reported at a concentration that exceeds a regulatory limit or concentration that is protective for public health and the environment. Corrective actions will be implemented to ensure that the cause for the action level exceedance can be identified and immediately corrected, applicable regulatory agencies are notified, if required, communications to address lessons learned are dispersed to appropriate personnel, and applicable procedures are revised accordingly if needed. All action plans will be commensurate to the severity of the exceedance.

UUSA will ensure that the onsite laboratory and any contractor laboratory used to analyze UUSA samples participates in third-party laboratory intercomparison programs appropriate to the media and analytes being measured. Examples of these third-party programs are the Mixed Analyte Performance Evaluation Program (MAPEP) and the DOE Quality Assurance Program (DOEQAP) that are administered by the Department of Energy. UUSA will require all radiological and non-radiological laboratory vendors to be certified by the National Environmental Laboratory Accreditation Conference (NELAC) or an equivalent state laboratory accreditation agency for the analytes being tested.

6.2.8 Lower Limits of Detection

Lower limits of detection for the parameters sampled for in the Stormwater Monitoring Program are listed in Table 6.2-2, Stormwater Monitoring Program. Lower limits of detection (LLD) for the nonradiological parameters shown in Table 6.2-1, Physiochemical Sampling, will be based on the results of the baseline surveys and the type of matrix (sample type).

6.2.9 Section 6.2 Tables

Table 6.2-1 Physiochemical Sampling[3]

Sample Type[3]	Sample Location[3]	Frequency[3]	Sampling and Collections[2,3]
Stormwater	Site Stormwater Detention Basin UBC Storage Pad Stormwater Retention Basin	Quarterly or as required by permit	Analytes as determined by baseline program
Vegetation	4 minimum[1]	Quarterly or as required by permit (growing seasons)	Fluoride uptake
Soil/Sediment	4 minimum[1]	Quarterly or as required by permit	Metals and fluoride uptake
Groundwater	All selected groundwater wells	Semiannually or a required by permit	Metals

Table 6.2-1 Physiochemical Sampling[3]

Sample Type[3]	Sample Location[3]	Frequency[3]	Sampling and Collections[2,3]

1 Location identified in site procedures and by applicable permits.

2 Analyses will meet EPA Lower Limits of Detection (LLD), as applicable, and will be based on the baseline surveys and the type of matrix (sample type).

3 All physiochemical sampling will be driven by permit

Table 6.2-2 Stormwater Monitoring Program

Stormwater Monitoring Program for Detention and Retention Basins* (See Figure 4.4-1)

Monitored Parameter	Monitoring Frequency	Sample Type	LLD
Oil & Grease	As required by permit	Grab	0.5 ppm
Total Suspended Solids	As required by permit	Grab	0.5 ppm
5-Day Biological Oxygen Demand (BOD)	As required by permit	Grab	2 ppm
Chemical Oxygen Demand (COD)	As required by permit	Grab	1 ppm
Total Phosphorus	As required by permit	Grab	0.1 ppm
Total Kjeldahl Nitrogen	As required by permit	Grab	0.1 ppm
pH	As required by permit	Grab	0.01 units
Nitrate plus Nitrite Nitrogen	As required by permit	Grab	0.2 ppm
Metals	As required by permit	Grab	Varies**

* Site Stormwater Detention Basin, UBC Storage Pad, Stormwater Detention Basin and any temporary basins used during construction.

** Analyses will meet EPA Lower Limits of Detection (LLD), as applicable, and will be based on the baseline surveys and the type of matrix (sample type).

Note: Radiological monitoring parameters are addressed separately

6.3 Ecological Monitoring

6.3.1 Maps

See Modified Site Features with Sampling Stations and Monitoring Locations, Figure 6.1-2.

6.3.2 Affected Important Ecological Resources

The existing natural habitats on the UUSA site and the region surrounding the site have been impacted by domestic livestock grazing, oil/gas pipeline right-of-ways and access roads. These current and historic land uses have resulted in a dominant habitat type, the Plains Sand Scrub. Hundreds of square kilometers (miles) of this habitat type occur in the area of the UUSA facility. The habitat type at the site does not support any rare, threatened, or endangered animal or plant species. The Plains Sand Scrub vegetation type is characterized by shinnery oak shrub, mesquite shrub, and short to mid-grass prairie with little or no overhead cover.

Based on ecological surveys that have been performed onsite, UUSA has concluded that there are no important ecological systems onsite that are especially vulnerable to change or that contain important species habitats, such as breeding areas, nursery, feeding, resting, and wintering areas, or other areas of seasonally high concentrations of individuals of important species. The species selected as important (the mule deer and scaled quail) are both highly mobile, generalist species and can be found throughout the site area. Wildlife species on the UUSA site typically occur at average population concentrations for the Plains Sand Scrub habitat type.

The nearest suitable habitat for species of concern are several kilometers (miles) from the UUSA site. The closest known populations of the Sand Dune Lizard occur approximately 4.8 km (3 mi) north of the site. A population of Lesser Prairie Chickens has been observed approximately 6.4 km (4 mi) north of the UUSA site. No Black-Tailed Prairie Dogs have been determined to be present at the UUSA site.

6.3.3 Monitoring Program Elements

Several elements were selected for the initial ecological monitoring program. These elements included vegetation, birds, mammals, and reptiles/amphibians. Currently there is no action or reporting level for each specific element. However, additional consultation with all appropriate agencies (New Mexico Department of Game & Fish, US Fish & Wildlife Service (USFWS)) will continue. Agency recommendations based on future consultation and monitoring program data will be considered when developing action and/or reporting levels for each element. In addition, UUSA will periodically monitor the site property and basin waters during construction and plant operations to ensure the risk to birds and wildlife is minimized. If needed, measures will be taken to release entrapped wildlife. The monitoring program will assess the effectiveness of the entry barriers and release features to ensure risk to wildlife is minimized.

6.3.4 Observations and Sampling Design

UUSA site observations included pre-construction and construction monitoring programs. The pre-construction monitoring program established the site baseline data. The procedures used to characterize the plant, bird, mammalian, and reptilian/amphibian communities at the UUSA site during pre-construction monitoring are considered appropriate and will be used for both construction monitoring programs. Based on the findings from the pre-construction and construction programs, monitoring for bird, mammalian, and reptilian/amphibian communities is not warranted. Additional monitoring will only be warranted if it is determined that a site-related release could adversely affect an indicator population.

These surveys were intended to be sufficient to characterize baseline conditions and identify if there are sensitive species that warrant additional continued monitoring. Based on the lack of threatened or endangered species, ongoing monitoring for fauna is not necessary to be completed in addition to the radiological and physiochemical monitoring required by the REMP, SARERR, and Groundwater Discharge Permit DP-1481 requirements. Vegetation sampling will continue as required by the regulation and permits noted above.

Additional monitoring will only be warranted if soil, groundwater, or vegetation samples, collected as part of the REMP, SARERR program, or the LES groundwater discharge permit indicates a site related release that could adversely affect the reptile population.

Vegetation

Vegetative sampling will be performed as required by permit and/or part of the REMP.

Birds

Site-specific avian surveys were conducted in both the wintering and breeding seasons to verify the presence of particular bird species at the UUSA facility. No endangered bird species were noted. Therefore, no further bird surveys are required. Refer to Section 3.9, Ecological Resources, of NUREG-1790, for more detail.

Mammals

The existing mammalian communities are described in Section 3.5 of the LES ER. General observations were compiled concurrently with other wildlife monitoring data and compared to information listed in LES ER Table 3.5-1, Mammals Potentially Using the UUSA Site. Surveys were conducted during pre-construction and construction activities, however because there are no identified threatened or endangered species at the facility, long term mammal studies are not warranted.

Reptiles and Amphibians

There are several groups of reptile and amphibian species (lizards, snakes, amphibians) that provide the biological characteristics (demographics, life history characteristics, site specificity, environmental sensitivity) for an informative environmental monitoring program. Approximately 13 species of lizards, 13 species of snakes, and 11 species of amphibians may occur on the UUSA site and in the area (LES ER Table 3.5-3). Because there are no identified threatened or endangered species at the facility, long term Reptile and Amphibian studies are not warranted.

6.3.5 Statistical Validity of Sampling Program

Any proposed sampling program will include descriptive statistics. These descriptive statistics will include the mean, standard deviation, standard error, and confidence interval for the mean. In each case the sampling size will be clearly indicated. The use of these standard descriptive statistics will be used to show the validity of the sampling program. A significance level of 5% will be used for the studies, which results in a 95% confidence level.

6.3.6 Sampling Equipment

Due to the type of ecological monitoring proposed for the UUSA, no specific sampling equipment is necessary.

6.3.7 Method of Chemical Analysis

Due to the type of monitoring proposed for the UUSA, no chemical analysis is proposed for ecological monitoring.

6.3.8 Data Analysis and Reporting Procedures

UUSA or its contractor will analyze the ecological data collected at the UUSA facility. Responsibility for the data analysis resides with the Environmental Compliance Officer.

A summary report will be prepared, which will include the types, numbers, and frequencies of samples collected.

6.3.9 Agency Consultation

Ecologically-focused consultation was performed with all appropriate federal and state agencies to the initial site construction and operation. A summary of consultations that have been conducted is provided in Table 1.4-1. Because of the limited impacts of the expansion, no new ecologically-focused consultations are needed.

6.3.10 Organizational Unit Responsible for Reviewing the Monitoring Program on an Ongoing Basis

As policy directives are developed, documentation of the environmental monitoring programs will occur. The person or organizational unit responsible for reviewing the program on an ongoing basis will be the Environmental Compliance Officer.

6.3.11 Established Criteria

The ecological monitoring program is conducted in accordance with generally accepted practices and the requirements of the New Mexico Department of Game and Fish. Data will be collected, recorded, stored, and analyzed. Actions will be taken as necessary to reconcile anomalous results.

6.3.12 Data Recording and Storage

Data relevant to the ecological monitoring program will be recorded in paper and/or electronic forms. This data will be kept on file for the life of the facility.

7 COST BENEFIT ANALYSIS

This chapter describes the economic and qualitative socioeconomic and environmental impacts of the expansion and the No-Action Alternative.

7.1 Economic Cost-Benefits, Plant Construction and Operation

The initial LES ER analyzed the economic impact of the construction of the UUSA facility in Lea County, New Mexico, and identified the direct impacts of eight years of construction and the plant itself on revenues of local businesses, on incomes accruing to households, on employment, and on the revenues of state and local government (see LES ER Section 7.1). Further, it explored the indirect impacts of the UUSA facility on local entities using a model showing the interaction of economic sectors in Lea County.

This capacity expansion will continue, but not expand, the economic impacts described in the LES ER from the construction. For example, staff levels are not anticipated to increase significantly with the expansion. Therefore the economic analysis conducted in the LES ER remains applicable and is incorporated by reference. Please reference the text and tables of Section 4.10 for updated information regarding economic impact of an expanded capacity facility.

7.2 Environmental Cost- Benefit for Plant EXPANSION

This section describes qualitatively the environmental costs and benefits of the UUSA capacity expansion in Lea County, New Mexico. Table 7.2-1, Qualitative Environmental Costs/Benefits of UUSA During Construction and Operation and for Expansion, summarizes the results.

7.2.1 Existing Site

There will be minimal additional disturbance to the existing site features at the project site associated with the ongoing construction activities to support the facility capacity expansion. Site disturbance associated with clearing and earthmoving activities is anticipated to be limited to the previously disturbed 394 areas. Excavated soils associated with necessary construction ground improvements will continue to be stockpiled on site to the northeast portion of the property. Site property outside the disturbed plant area will generally be left in its pre-construction condition or improved through stabilization as needed.

7.2.2 Land Conservation and Erosion Control Measures

UUSA anticipates there will be some short-term increases in soil erosion at the site due to expansion construction activities. Erosion impacts due to site clearing, excavation, if required, and grading will be mitigated by utilization of proper construction and erosion best management practices (BMPs). These practices include minimizing the construction footprint to the extent possible, mitigating discharge including stormwater runoff (i.e., the use of detention and retention ponds), the protection of all unused naturalized areas, and site stabilization practices to reduce the potential for erosion. Only about one-quarter of the site will be involved in construction activities at any one time. Cleared areas will be seeded as soon as practicable and watering will be used to control fugitive dust. Water conservation will be considered when deciding how often dust suppression sprays will be applied.

7.2.3 Aesthetic Changes

Visual and noise impacts due to the capacity expansion activities are anticipated to be minimal, due to the remote location of the site and the buffer zone along the outer perimeter of the property boundary. Some elevated and intermittent noise levels during construction may be discernible offsite but should not constitute an annoyance to nearby residences since the nearest resident is 4.3 km (2.63 mi) away. The visual intrusion of UUSA will only minimally change the current skyline that constitutes the plant now and should not be objectionable given the vegetative buffer around the site, current existing structures, and its remote location.

7.2.4 Ecological Resources

Pre-construction and construction activities at the site are not expected to have any significant adverse impact on vegetation and wildlife. UUSA anticipates that construction activities within the existing clear-cut area will remove some shrub vegetation and cause some small animal life to relocate on the site. No proposed activities will impact communities or habitats defined as rare or unique, or that support threatened and endangered species, since no such communities or habitats have been identified anywhere within the site.

7.2.5 Access Roads and Local Traffic

All traffic into and out of the site will be along New Mexico Highway 176 because Highway 176 is dedicated to heavy-duty use and built to industrial standards, it would be able to handle increased heavy-duty traffic adequately. Additionally, due to the already substantial truck traffic using these roads to access Andrews County, Texas there would be little additional effect on other road users.

7.2.6 Water Resources

Water quality impacts will be controlled during construction by compliance with the State of New Mexico's water quality regulations and the use of BMPs as detailed in the site Stormwater Pollution Prevention Plan (SWPPP). UUSA is exempt from the SPCC plan. However, BMPs will be implemented to minimize the possibility of spills of hazardous substances, minimize the environmental impact of any spills. Site procedures will be in place to ensure prompt and appropriate remediation, as warranted. Site procedures will also identify individuals and their responsibilities for implementation of the corrective actions and provide for prompt notifications of state and local authorities as needed.

7.2.7 Noise and Dust Control Measures

Objectionable construction noises are to be reduced to acceptable levels by use of noise control equipment on all powered equipment. Shrub and vegetation buffer areas, which will be left around the plant property, will combine to reduce noise. Since substantial truck traffic already exists along New Mexico State Highway 176, the temporarily increased noise levels along Highway 176 due to construction activities are not expected to adversely affect nearby residents.

Traffic areas during construction will be watered as necessary to prevent dust. Water conservation will be considered when deciding how often dust suppression sprays will be applied.

7.2.8 Socioeconomic

Construction of the UUSA facility expansion is expected to continue to result in the same socioeconomic impacts on the region created by the initial construction and operation of the UUSA facility. In the initial ER, the Regional Input-Output Modeling System (RIMS II) was used to estimate various indirect impacts associated with each of the expenditures related to the initial construction of the UUSA facility. According to the RIMS II analysis, the region's residents were expected to receive an annual impact of $53 million in increased economic activity for local businesses, $38 million in increased earnings by households, and an annual average of 1,102 new jobs during the 8-year initial construction period. The temporary influx of labor was not expected to overload local services and facilities within the Hobbs-Eunice, New Mexico area.

The expansion will continue these economic benefits through completion of construction in 2020.

7.2.9 Surface and Groundwater Quality

Liquid effluents at UUSA will include stormwater runoff, sanitary and industrial wastewater, and treated radiologically contaminated wastewater. Radiologically contaminated process water will be solidified and disposed of off-site. Site stormwater runoff from the Uranium Byproduct Cylinder (UBC) Storage Pad is routed to the UBC Storage Pad Stormwater Retention Basin. The general site runoff is routed to the Site Stormwater Detention Basin. Stormwater discharges will be regulated during construction and operation.

7.2.10 Terrestrial and Aquatic Environments

No communities or habitats defined as rare or unique or that support threatened and endangered species, have been identified anywhere on the UUSA site. Thus, no operation activities are expected to impact such communities or habitats.

7.2.11 Air Quality

No adverse air quality impacts to the environment, either on or offsite are anticipated to occur. Air emissions from the facility during normal facility operations will be limited to the plant ventilation air and gaseous effluent systems. All plant process/gaseous air effluents are to be filtered and monitored on a continuous basis for chemical and radiological contaminants, which could be derived from the UF_6 process system. If any UF_6 contaminants are detected in ambient in plant air systems, the air is treated by appropriate filtration methods prior to its venting to the environment. Two existing and three additional standby diesel generators and a security diesel generator will supply standby electrical power. These generators will operate only in the event of power interruptions and for routine testing and will have negligible health and environmental impacts.

7.2.12 Visual/Scenic

No impairments to local visual or scenic values will result due to the operation of the expanded UUSA facility. The facility and associated structures will be relatively compact, and are located in a rural location. No offensive noises or odors will be produced as a result of plant operations.

7.2.13 Socioeconomic

The socioeconomic impacts of the expansion are very similar to those of the initial construction. No significant impacts are expected to occur for any local area infrastructure (e.g., schools, housing, water, and sewer). Costs of operation should be diffused sufficiently throughout the Hobbs-Eunice, New Mexico area to be indistinguishable from normal economic growth. The primary difference is that the expansion will expand the length of those construction jobs, and subsequent other socioeconomic impacts, until approximately 2020.

7.2.14 Radiological Impacts

Potential radiological impacts from operation of the expanded UUSA facility would result from controlled releases of small quantities of UF_6 during normal operations and releases of UF_6 under hypothetical accident conditions.

The estimated maximum annual effective dose equivalent and maximum annual organ (lung) committed dose equivalents from gaseous effluent to an adult located at the plant site south boundary from previous evaluations were 1.7×10^{-4} mSv (1.7×10^{-2} mrem) and 1.4×10^{-3} mSv (1.4×10^{-1} mrem), respectively. The maximum effective dose equivalent and maximum annual organ (lung) dose equivalent from discharged gaseous effluent to the nearest resident (teenager) located 4.3 km (2.63 mi) in the west sector were expected to be less than 1.7×10^{-5} mSv (1.7×10^{-3} mrem) and 1.2×10^{-4} mSv (1.2×10^{-2} mrem), respectively.

For the initial site evaluation the estimated maximum annual effective dose equivalent and maximum annual organ (lung) committed dose equivalents from liquid effluent to an adult at the south site boundary are 1.7×10^{-5} mSv (1.7×10^{-3} mrem) and 1.5×10^{-4} mSv (1.5×10^{-2} mrem), respectively. The estimated maximum annual effective dose equivalent and maximum annual organ (lung) committed dose equivalents from liquid effluent to an individual (teenager) at the nearest residence are 1.7×10^{-6} mSv (1.7×10^{-4} mrem) and 1.3×10^{-5} mSv (1.3×10^{-3} mrem), respectively.

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 9.3×10^{-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. These values will continue to be accurate with the proposed expansion. See Supplement ER Section 4.15.12. 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.

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 US, and within regulatory limits.

7.2.15 Other Impacts of Plant Operation

UUSA water will be obtained from the Eunice, New Mexico municipal water system, and routine liquid effluent will be treated and discharged to evaporative pond(s), whereas sanitary wastes will be sent to the City of Eunice Wastewater Treatment Plant via a system of lift stations and 8 inch sewage lines. Facility water requirements are relatively low and well within the capacity of the Eunice water utility. The current capacity for the Eunice Potable water supply system is being met and is currently less than what was initially estimated in the initial LES ER. Non-hazardous and non-radioactive solid waste will be shipped offsite to a licensed landfill. The local Lea County landfill capacity is more than adequate to accept the non-hazardous waste.

7.2.16 Decommissioning

The plan for decommissioning is to decontaminate or remove all materials promptly from the site that prevent release of the facility for unrestricted use. This approach avoids the need for long-term storage and monitoring of wastes on site. Only building shells and the site infrastructure will remain. All remaining facilities, including site basins, will be decontaminated where needed to acceptable levels for unrestricted use. Excavations and berms will be leveled to restore the land to a natural contour.

Depleted UF_6, if not already sold or otherwise disposed of prior to decommissioning, will be disposed of in accordance with regulatory requirements. Radioactive wastes will be disposed of in licensed low-level radioactive waste disposal sites. Hazardous wastes will be treated or disposed of in licensed hazardous waste facilities. Neither conversion (if done), nor disposal of radioactive or hazardous material will occur at the plant site, but at licensed facilities located elsewhere.

Following decommissioning, all parts of the plant and site will be unrestricted to any specific type of use.

7.2.17 Section 7.2 Tables

Table 7.2-1 Qualitative Environmental Costs/Benefits of UUSA During Initial Construction/Operation and for Expansion

Qualitative Costs	Initial Construction/Operation	Expansion
Change in real estate values in areas/communities adjacent to the facility (e.g., land, homes, rental property etc.)	Potentially inflationary	No change from initial construction/operation
Traffic changes along local streets and highways	Some increases during shift changes	No change from initial construction/operation
Demand on local services, public utilities, schools, etc.	Some increased utilization expected, but within services capacity	No change from initial construction/operation
Impact to natural environmental components (e.g., ecology, water quality, air quality, etc.)	Minimal impacts	Minimal impacts
Alteration of aesthetic, scenic, historic, or archaeological areas or values	No measurable impact	No change from initial construction/operation
Change in local recreational potential	Not significant	No change from initial construction/operation
Qualitative Benefits		
Site soil stabilization and erosion reduction	Beneficial	No change from initial construction/operation
Incentive for development of other ancillary/support business development resulting from presence of LES facility	Beneficial	No change from initial construction/operation
Change in real estate values in areas/communities adjacent to the facility (e.g., land, homes, rental property etc.)	Potentially beneficial	No change from initial construction/operation
Increase in local employment opportunities	Beneficial	Little change from initial construction/operation
Impacts to local retail trade and services	Beneficial	Little change from initial construction/operation
Development of local workforce capabilities	Beneficial	Little change from initial construction/operation

7.3 No-Action Alternative Cost-Benefit

The no-action alternative would be to not increase capacity at UUSA. Under the no-action alternative, the NRC would deny the license amendment request for the plant, in which case the proposed site would continue to produce approximately 3.0 MSWU per year. Although the no-action alternative would avoid additional impacts to the area (except for the pre-construction and construction-at-risk activities described in Supplemental ER Sections 1.3.5 and 1.3.6 respectively, which will occur prior to when such a decision is made), it could lead to impacts at other locations.

Under the no-action alternative, for example, reactor licensees would still need uranium enrichment services. Many U.S. operators of nuclear power plants in the U.S., who are also the end users of uranium enrichment services in the U.S., view the present supply situation with concern. They see a world supply and requirements situation for economical uranium enrichment services that is presently in balance, exhibiting a potential for significant shortfall if plans that have been announced by some of the primary enrichers are not executed.

Not expanding the capacity at UUSA, therefore, could have the following consequences:

- The inability to meet important considerations of energy and national security policy, namely the need for the development of additional, secure, reliable, and economical domestic enrichment capacity.
- Restarting enrichment operations using the high-cost, power-intensive, and inefficient technology used previously at the aging Paducah gaseous diffusion plant, or, alternatively, reliance on the proposed ACP gas centrifuge technology that, at present, is still under development and has yet to be deployed on a commercial scale.
- Continued extensive reliance on uranium enriched in foreign countries.
- Dependence on other plants that have not yet been constructed (i.e., Eagle Rock and GLE).
- A possible uranium enrichment supply deficit with respect to the uranium enrichment requirements forecasts.

Supplemental ER Section 2.3, Comparison of the Predictive Environmental Impacts, describes the environmental impacts of the no-action alternatives and compares them to the proposed action. Table 2.3-1, Comparison of Potential Impacts for the Proposed Action and the No-Action Alternatives and Table 2.3-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Alternatives, summarize that comparison in tabular form for the 13 environmental categories, described in detail in Supplemental ER Chapter 4, Environmental Impacts. In sum, UUSA anticipates that many of the No-Action Scenarios fail to meet the purpose and need, and those that do meet the purpose and need will have effects to the environment greater than the proposed action.

The same types of impacts identified in the initial LES ER would be avoided in the Lea County area by the no-action alternative (*see* LES ER Table 7.2-1, Qualitative Environmental Costs/Benefits of NEF During Construction and Operation). For example, the no-action alternative would avoid the potential, short-term impacts of soil erosion and fugitive emissions from dust and construction equipment; disruption to ecological habitats; noise from equipment; and traffic from worker transportation and supply deliveries that may occur during construction of the facility expansion. These impacts, as discussed in Chapter 4, are temporary and limited in scope due to construction BMPs. During operation, the no-action alternative would avoid increased traffic due to feed/product deliveries and shipments and worker transportation;

increased demand on utility and waste services; and public and occupational exposure from effluent releases. These impacts, however, will be minimal because the area already has traffic from a nearby city and general trucking commerce; there is sufficient capacity of utility and waste services in the region; and effluent releases will be strictly controlled, maintained onsite, monitored, and maintained below regulatory limits.

While the no-action alternative would have no impact on the socioeconomic structure of the Lea County area, the proposed action would continue the moderate to significant beneficial socioeconomics effects created by the initial construction (*see* Supplemental ER Section 4.10). In the initial ER, UUSA estimated that construction payroll would total $122.2 million with an additional $21 million expended for employment benefits over the 8-year construction period, and that construction services purchased from third party firms within the region would add $265 million in direct benefits to the local economy during the UUSA construction. By continuing the expansion, construction benefits to the local economy would continue.

Based on the above information, the socioeconomic benefits of the expansion described in Section 4.10, Socioeconomic Impacts, and Section 7.2, Environmental Cost-Benefit, Plant Construction and Operation, and the minimal impacts to the affected environment demonstrated in Chapter 4, UUSA has concluded that the preferred alternative is the proposed action of a capacity expansion to 10 MSWU.

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