NATIONAL
ENRICHMENT
FACILITY

10 CFR 2.390
10 CFR 30.6
10 CFR 40.5
10 CFR 70.5

March 11, 2005

NEF#05-010

ATTN: Document Control Desk
Director
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Louisiana Energy Services, L. P.
National Enrichment Facility
NRC Docket No. 70-3103

Subject: Clarifying Information Related to Preparation of the Final Environmental Impact Statement for the National Enrichment Facility

References:

1. Letter NEF#03-003 dated December 12, 2003, from E. J. Ferland (Louisiana Energy Services, L. P.) to Directors, Office of Nuclear Material Safety and Safeguards and the Division of Facilities and Security (NRC) regarding "Applications for a Material License Under 10 CFR 70, Domestic licensing of special nuclear material, 10 CFR 40, Domestic licensing of source material, and 10 CFR 30, Rules of general applicability to domestic licensing of byproduct material, and for a Facility Clearance Under 10 CFR 95, Facility security clearance and safeguarding of national security information and restricted data"

2. Letter NEF#04-002 dated February 27, 2004, from R. M. Krich (Louisiana Energy Services, L. P.) to Director, Office of Nuclear Material Safety and Safeguards (NRC) regarding "Revision 1 to Applications for a Material License Under 10 CFR 70, "Domestic licensing of special nuclear material," 10 CFR 40, "Domestic licensing of source material," and 10 CFR 30, "Rules of general applicability to domestic licensing of byproduct material"

3. Letter NEF#04-029 dated July 30, 2004, from R. M. Krich (Louisiana Energy Services, L. P.) to Director, Office of Nuclear Material Safety and Safeguards (NRC) regarding "Revision to Applications for a Material License Under 10 CFR 70, "Domestic licensing of special nuclear material," 10 CFR 40, "Domestic licensing of source material," and 10 CFR 30, "Rules of general applicability to domestic licensing of byproduct material"

NMSS01

4. Letter NEF#04-037 dated September 30, 2004, from R. M. Krich (Louisiana Energy Services, L. P.) to Director, Office of Nuclear Material Safety and Safeguards (NRC) regarding "Revision to Applications for a Material License Under 10 CFR 70, "Domestic licensing of special nuclear material," 10 CFR 40, "Domestic licensing of source material," and 10 CFR 30, "Rules of general applicability to domestic licensing of byproduct material"

5. Letter NEF#05-004 dated February 11, 2005, from R. M. Krich (Louisiana Energy Services, L. P.) to Director, Office of Nuclear Material Safety and Safeguards (NRC) regarding "Response to NRC Request for Additional Information Related to Preparation of the Final Environmental Impact Statement for the National Enrichment Facility"

By letter dated December 12, 2003 (Reference 1), E. J. Ferland of Louisiana Energy Services (LES), L. P., submitted to the NRC applications for the licenses necessary to authorize construction and operation of a gas centrifuge uranium enrichment facility. Revision 1 to these applications was submitted to the NRC by letter dated February 27, 2004 (Reference 2). Subsequent revisions (i.e., revision 2 and revision 3) to these applications were submitted to the NRC by letters dated July 30, 2004 (Reference 3) and September 30, 2004 (Reference 4), respectively. The Reference 5 letter provided the LES responses to NRC requests for additional information and clarifications, needed to support preparation of the final environmental impact statement for the National Enrichment Facility (NEF).

In a February 24, 2005, conference call between LES and NRC representatives, the responses provided in Reference 5 letter were discussed. During this conference call, the NRC requested that additional clarification be provided to support preparation of the final environmental impact statement for the NEF. This clarifying information is provided in Attachment 1. Some of the associated updated License Application pages contain information that LES considers to be proprietary in accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," paragraph (d)(1). Accordingly, we request that the updated pages that contain proprietary information be withheld from public disclosure.

Attachment 2 provides the proprietary version of the updated License Application pages. The proprietary information is located on Safety Analysis Report Table 1.2-1 and Environmental Report page 4.12-15. Attachment 3 provides the non-proprietary version of the updated License Application pages. In the proprietary version, i.e., Attachment 2, the pages that contain proprietary information include the marking "Proprietary Information" consistent with 10 CFR 2.390 (d)(1). In the non-proprietary version, i.e., Attachment 3, the pages containing proprietary information are withheld.

These updated pages will be formally incorporated into the License Application in a future revision.

If you have any questions or need additional information, please contact me at 630-657-2813.

Respectfully,

Daniel G. Green for

R. M. Krich
Vice President – Licensing, Safety, and Nuclear Engineering

Attachments:

1. Clarifying Information Related to Preparation of the Final Environmental Impact Statement for the National Enrichment Facility
2. Updated License Application Pages (Proprietary Version)
3. Updated License Application Pages (Non-Proprietary Version)

cc: T.C. Johnson, NRC Project Manager (w/o Attachments)
M.C. Wong, NRC Environmental Project Manager

ATTACHMENT 1

Clarifying Information Related to Preparation of the Final Environmental Impact Statement for the National Enrichment Facility

Clarifying Information Related to
Preparation of the Final Environmental Impact Statement
for the National Enrichment Facility

1. Provide the basis for the 80 inches per year assumed for evaporation from the basins in the water balance calculation. A value of 65 inches per year is used in Chapter 3 of the Draft Environmental Impact Statement.

LES Response:

The value of 80 inches per year for evaporation from the basins is taken from the evaporation rate provided at the location of the National Enrichment Facility (NEF) site on a gross annual lake evaporation map of New Mexico. This map is available on the US Department of Agriculture (USDA), Natural Resources Conservation Service website. The map is labeled Gross Annual Lake Evaporation and is dated April 1972. This map may be found on the USDA website at the following address.

www.nm.nrcs.usda.gov/technical/fotg/section-1/maps.html

2. How was the buildup of salts in the basins accounted for in the basins water balance calculation?

LES Response:

The LES response to NRC Request for Additional Information (RAI) 4-2A in letter NEF#04-019, dated May 20, 2004, provided results of water balances for the three onsite basins. Subsequently, in letter NEF#04-029, dated July 30, 2004, LES indicated that an error in the original calculation was identified that impacted the results for the UBC Storage Pad Stormwater Retention Basin. The revised results showed that for the minimum scenario, outflow due to evaporation exceeded all inflows on a monthly basis. For the revised maximum scenario, the basin was estimated to have standing water for approximately ten months of the year.

The original water balance calculation did not take into account the buildup of salts over time in any of the basins. Salts could buildup over time in the Treated Effluent Evaporative Basin and the Uranium Byproduct Cylinder (UBC) Storage Pad Stormwater Retention basin due to the nature of the waters discharged to these basins and the fact that they are lined. LES has revised the water balance calculation to include the potential for salt buildup in these two basins and the resultant decrease in the evaporation rate.

The impact on the evaporation rate due to the buildup of salts over time in the two lined basins is estimated to reduce the evaporation rate by no more than 15%. This estimate is based on information from Idaho National Engineering and Environmental Laboratory Engineering Design File EDF-ER-271, "Evaporation Pond Sizing with Water Balance and Make-up Water Calculations," Revision 1, dated May 14, 2002 (INEEL) and U. S. Geological Survey Professional Paper 272-A, "The Effect of Salinity on Evaporation," by G. E. Harbeck, Jr., dated 1955 (USGS).

The referenced INEEL engineering design file recommends use of a salinity correction coefficient of 0.9. This is based on a practical maximum concentration for mixed salt salinity in a basin of around 17%, which would lower the vapor pressure of the water by about 10%. At the 17% salinity level, the reference USGS paper suggests the ratio of evaporation rates for a saline solution to that of water would be 0.85 or higher in the range of evaporation rates applicable to the New Mexico region. Based on these two references, a 15% reduction has been applied to the annual evaporation rate for water at the site of 203.2 cm (80 in) per year for the water balances for the two lined basins. Therefore, the net evaporation rate for the two basins with the potential for salt buildup is 172.7 cm (68 in) per year.

The revised water balance results are provided in Table 2.1a, "Water Balance for Treated Effluent Evaporative Basin (Minimum Scenario)," Table 2.1b, "Water Balance for Treated Effluent Evaporative Basin (Maximum Scenario)," Table 2.2a, "Water Balance for UBC Storage Pad Stormwater Retention Basin (Minimum Scenario)," Table 2.2b, "Water Balance for UBC Storage Pad Stormwater Retention Basin (Maximum Scenario)." In addition, Table 2.3a, "Water Balance for Site Stormwater Detention Basin (Minimum Scenario)," and Table 2.3b, "Water Balance for Site Stormwater Detention Basin (Maximum Scenario)," provide the water balance results for the Site Stormwater

Detention Basin. These water balance results tables are provided in the same format as the water balance results tables provided in the LES response to NRC RAI 4-2A. Changes from the tables provided in the response to NRC RAI 4-2A are identified with highlights on the revised water balance tables.

The results for the Treated Effluent Evaporative Basin, including the affect of salt buildup, show that the basin outflow due to evaporation will exceed all inflows on a monthly basis for the minimum scenario, with the exception of the months of October through February. For the months of October through February, the basin will have some standing water under the minimum scenario. Under the maximum scenario, the basin would have standing water in it for most of the year.

The results for the UBC Storage Pad Stormwater Retention Basin, including the affect of salt buildup, show that the basin outflow due to evaporation will exceed all inflows on a monthly basis for the minimum scenario. Under the maximum scenario, the basin would have standing water in it for approximately ten months of the year.

The results for the Site Stormwater Detention Basin, which does not have the potential for salt buildup, show that the basin outflow due to evaporation will exceed all inflows on a monthly basis under both the minimum and maximum scenarios. The results for the Site Stormwater Detention Basin are unchanged from those provided in the LES response to NRC RAI 4-2A and are included here for completeness.

3. What is the distance that the clay, used for the basins, will be transported to get the material to the NEF site.

LES Response:

An adequate and suitable source of clay for the Treated Effluent Evaporative Basin and the UBC Storage Pad Stormwater Retention Basin is available from the quarry that borders the NEF property to the north. It has been estimated that the transportation distance from the clay sources to the NEF site is 1 mile.

4. American Society for Testing and Materials (ASTM) C 787-96, Standard Specification for Uranium Hexafluoride for Enrichment, has been superceded by ASTM C 787-03. Evaluate changing the existing commitment to ASTM C 787-96 to the later version of the standard (i.e., ASTM C 787-03)

LES Response:

LES has reviewed ASTM C 787-03. As a result, the attached Safety Analysis Report (SAR) Table 1.2-1 has been revised to incorporate the later version of the standard (i.e., ASTM C 787-03). The attached revised SAR page will be formally incorporated into the License Application in a future revision.

5. Will LES perform cleaning and decontamination of empty cylinders?

LES Response:

Cleaning and decontamination of empty cylinders will be performed by the UF_6 supplier. The NEF design does not include the capability for cleaning and decontamination of empty cylinders.

6. For empty 48Y or 48X cylinders, what happens to these cylinders? Are they stored onsite or shipped back to the UF_6 supplier. If they are stored onsite are they left on the pad until decommissioning and then disposed of at a licensed disposal facility? If they are shipped back to the UF_6 supplier, how much additional truck travel is involved?

LES Response:

The majority of the empty 48Y cylinders will be filled with uranium byproduct and temporarily stored on the Uranium Byproduct Cylinder (UBC) Storage Pad. The remaining empty 48Y cylinders and the 48X cylinders will be stored onsite on the UBC Storage Pad until decommissioning and then disposed of at a licensed disposal facility.

7. The New Mexico Environment Department (NMED) has recommended the use of precipitation measurements from the meteorological station to trigger a visual inspection of the basins for high level (comment number 26 on page 5 of the NMED comments which states "[DEIS] Page 6-19, lines 20-37. From the meteorological station, the precipitation measurements may provide some additional means to verify the adequacy of stormwater designs and management in a timely fashion. For example, rainfall events above 0.25 inch would trigger and visual inspection for the proper functioning of the site stormwater systems and evaporation pond.")

LES Response:

In place of a condition-based (i.e., based on the existence of the condition of certain amount of precipitation) surveillance of the level of the basins, it is more appropriate to require routine periodic surveillance (i.e., periodic visual inspection) of the basins for high level. Condition-based surveillances have been shown to be more susceptible to being inadvertently not performed (i.e., missed) than routine periodic surveillances. As a result, the NEF Environmental Report (ER) has been revised to require the performance of routine periodic visual inspections of the NEF basins for high level to verify the proper functioning of the NEF basins. The visual inspections will be performed on a frequency that is sufficient to allow for identification of basin high water level conditions and implementation of corrective actions to restore water level of the associated basin(s) prior to overflowing. The attached revised ER page will be formally incorporated into the License Application in a future revision.

8. Clarification is needed regarding environmental and ecological monitoring. The NEF ER Section 6.3.4 indicates replicate samples will be collected for reptiles and amphibians. However, replicate samples are not required for other types of ecological media. Provide a basis for this difference.

LES Response:

The basis for selecting the use of replicate sample sites for reptiles and amphibians, and not the other types of ecological media, is due to the fact that these two species are very sensitive to climatic conditions, e.g., the amount of moisture an area receives in a given year. Since the climate in New Mexico is very diverse and can exhibit dramatic changes within a few miles, it was decided to make use of nearby replicate sampling locations for a more representative population sample in the vicinity of the NEF for reptiles and amphibians. Onsite sampling for other ecological media (i.e., vegetation, birds and mammals) is considered sufficient to characterize changes in the composition of these media associated with the operation of the plant.

9. It is NRC's understanding that the next revision to the ER will be submitted around the end of March 2005. Are there any significant changes in this revision?

LES Response:

Revision 4 to the ER incorporates LES responses to NRC requests for additional information and clarifications. This revision also includes various editorial and typographical error corrections. The associated revised ER pages are attached and will be formally incorporated into the License Application in a future revision.

Table 2.1a Water Balance for Treated Effluent Evaporative Basin (Minimum Scenario)

Month	Precipitation cm (in)	Total Precipitation Inflow to Basin m³ (gal)	Treated Effluent Inflow to Basin m³ (gal)	Total Inflow to Basin m³ (gal)	Evaporation per Month cm (in)	Potential Evaporation Outflow from Basin m³ (gal)	Balance Inflow – Outflow m³ (gal)	Net in Basin m³ (gal)
JAN	0.5 (0.2)	40 (10,508)	211 (55,824)	251 (66,332)	3.6 (1.4)	108 (28,640)	143 (37,692)	143 (37,692)
FEB	0.7 (0.3)	56 (14,711)	211 (55,824)	267 (70,535)	8.6 (3.4)	261 (68,909)	6 (1,626)	149 (39,318)
MAR	0.5 (0.2)	40 (10,508)	211 (55,824)	251 (66,332)	19.0 (7.5)	577 (152,398)	-326 (-86,066)	0 (0)
APR	0.8 (0.3)	64 (16,813)	211 (55,824)	275 (72,636)	23.8 (9.4)	723 (190,931)	-448 (-118,295)	0 (0)
MAY	2.6 (1.0)	207 (54,641)	211 (55,824)	418 (110,465)	20.8 (8.2)	631 (166,804)	-213 (-56,339)	0 (0)
JUN	2.0 (0.8)	159 (42,032)	211 (55,824)	370 (97,856)	19.9 (7.8)	604 (159,514)	-233 (-61,659)	0 (0)
JUL	2.4 (0.9)	191 (50,438)	211 (55,824)	402 (106,262)	18.8 (7.4)	570 (150,489)	-167 (-44,227)	0 (0)
AUG	2.5 (1.0)	199 (52,540)	211 (55,824)	410 (108,364)	17.6 (6.9)	534 (141,116)	-124 (-32,752)	0 (0)
SEP	3.0 (1.2)	247 (65,149)	211 (55,824)	458 (120,973)	16.9 (6.7)	514 (135,735)	-56 (-14,762)	0 (0)
OCT	1.4 (0.5)	111 (29,422)	211 (55,824)	323 (85,246)	10.4 (4.1)	315 (83,315)	7 (1,931)	7 (1,931)
NOV	0.9 (0.3)	72 (18,914)	211 (55,824)	283 (74,738)	7.5 (2.9)	227 (60,057)	56 (14,681)	63 (16,612)
DEC	0.7 (0.3)	56 (14,711)	211 (55,824)	267 (70,535)	5.8 (2.3)	177 (46,865)	90 (23,670)	152 (40,282)
Totals	17.8 (7.0)	1,440 (380,389)	2,536 (669,884)	3,975 (1,050,273)	172.7 (68.0)	5,242 (1,384,772)		

Table 2.1b Water Balance for Treated Effluent Evaporative Basin (Maximum Scenario)

Month	Precipitation cm (in)	Total Precipitation Inflow to Basin m³ (gal)	Treated Effluent Inflow to Basin m³ (gal)	Total Inflow to Basin m³ (gal)	Evaporation per Month cm (in)	Potential Evaporation Outflow from Basin m³ (gal)	Balance Inflow – Outflow m³ (gal)	Net In Basin m³ (gal)
JAN	2.0 (0.8)	163 (43,174)	211 (55,824)	375 (98,998)	3.6 (1.4)	108 (28,640)	266 (70,358)	266 (70,358)
FEB	2.8 (1.1)	229 (60,444)	211 (55,824)	440 (116,268)	8.6 (3.4)	261 (68,909)	179 (47,359)	446 (117,717)
MAR	2.0 (0.8)	163 (43,174)	211 (55,824)	375 (98,998)	19.0 (7.5)	577 (152,398)	-202 (-53,400)	243 (64,318)
APR	3.2 (1.3)	261 (69,079)	211 (55,824)	473 (124,903)	23.8 (9.4)	723 (190,931)	-250 (-66,029)	0 (0)
MAY	10.5 (4.1)	850 (224,507)	211 (55,824)	1,061 (280,331)	20.8 (8.2)	631 (166,804)	430 (113,526)	430 (113,526)
JUN	8.1 (3.2)	654 (172,698)	211 (55,824)	865 (228,521)	19.9 (7.8)	604 (159,514)	261 (69,007)	691 (182,533)
JUL	9.7 (3.8)	784 (207,237)	211 (55,824)	996 (263,061)	18.8 (7.4)	570 (150,489)	426 (112,572)	1,117 (295,105)
AUG	10.1 (4.0)	817 (215,872)	211 (55,824)	1,028 (271,696)	17.6 (6.9)	534 (141,116)	494 (130,580)	1,611 (425,686)
SEP	12.5 (4.9)	1,013 (267,681)	211 (55,824)	1,225 (323,505)	16.9 (6.7)	514 (135,735)	711 (187,770)	2,322 (613,456)
OCT	5.7 (2.2)	458 (120,888)	211 (55,824)	669 (176,712)	10.4 (4.1)	315 (83,315)	354 (93,397)	2,676 (706,853)
NOV	3.6 (1.4)	294 (77,714)	211 (55,824)	505 (133,538)	7.5 (2.9)	227 (60,057)	278 (73,481)	2,954 (780,334)
DEC	2.8 (1.1)	229 (60,444)	211 (55,824)	440 (116,268)	5.8 (2.3)	177 (46,865)	263 (69,403)	3,216 (849,737)
Totals	73.1 (28.8)	5,916 (1,562,914)	2,536 (669,884)	8,451 (2,232,798)	172.7 (68.0)	5,242 (1,384,772)		

Clarifying Information Related to Preparation of the Final Environmental Impact Statement for the National Enrichment Facility

Table 2.2a Water Balance for UBC Storage Pad Stormwater Retention Basin (Minimum Scenario)

Month	Precipitation cm (in)	Total Precipitation Inflow to Basin m^3 (gal)	Blowdown Inflow to Basin m^3 (gal)	Total Inflow to Basin m^3 (gal)	Evaporation per Month cm (in)	Potential Evaporation Outflow from Basin m^3 (gal)	Balance Inflow – Outflow m^3 (gal)	Net in Basin m^3 (gal)
JAN	0.5 (0.2)	855 (225,922)	1,604 (423,875)	2,460 (649,797)	3.6 (1.4)	2,602 (687,353)	-142 (-37,556)	0 (0)
FEB	0.7 (0.3)	1,197 (316,290)	1,604 (423,875)	2,802 (740,165)	8.6 (3.4)	6,260 (1,653,812)	-3,458 (-913,647)	0 (0)
MAR	0.5 (0.2)	855 (225,922)	1,604 (423,875)	2,460 (649,797)	19.0 (7.5)	13,844 (3,657,549)	-11,385 (-3,007,752)	0 (0)
APR	0.8 (0.3)	1,368 (361,474)	1,604 (423,875)	2,973 (785,349)	23.8 (9.4)	17,345 (4,582,350)	-14,372 (-3,797,001)	0 (0)
MAY	2.6 (1.0)	4,447 (1,174,792)	1,604 (423,875)	6,051 (1,598,667)	20.8 (8.2)	15,153 (4,003,308)	-9,102 (-2,404,641)	0 (0)
JUN	2.0 (0.8)	3,421 (903,686)	1,604 (423,875)	5,025 (1,327,561)	19.9 (7.8)	14,491 (3,828,345)	-9,466 (-2,500,784)	0 (0)
JUL	2.4 (0.9)	4,105 (1,084,423)	1,604 (423,875)	5,709 (1,508,298)	18.8 (7.4)	13,671 (3,611,725)	-7,962 (-2,103,427)	0 (0)
AUG	2.5 (1.0)	4,276 (1,129,608)	1,604 (423,875)	5,880 (1,553,483)	17.6 (6.9)	12,819 (3,386,774)	-6,939 (-1,833,291)	0 (0)
SEP	3.0 (1.2)	5,302 (1,400,714)	1,604 (423,875)	6,906 (1,824,589)	16.9 (6.7)	12,331 (3,257,635)	-5,424 (-1,433,046)	0 (0)
OCT	1.4 (0.5)	2,394 (632,580)	1,604 (423,875)	3,999 (1,056,455)	10.4 (4.1)	7,569 (1,999,571)	-3,570 (-943,116)	0 (0)
NOV	0.9 (0.3)	1,539 (406,659)	1,604 (423,875)	3,144 (830,534)	7.5 (2.9)	5,456 (1,441,357)	-2,312 (-610,824)	0 (0)
DEC	0.7 (0.3)	1,197 (316,290)	1,604 (423,875)	2,802 (740,165)	5.8 (2.3)	4,257 (1,124,759)	-1,456 (-384,594)	0 (0)
Totals	17.8 (7.0)	30,956 (8,178,360)	19,253 (5,086,500)	50,209 (13,264,860)	172.7 (68.0)	125,797 (33,234,538)		

Table 2.2b Water Balance for UBC Storage Pad Stormwater Retention Basin (Maximum Scenario)

Month	Precipitation cm (in)	Total Precipitation Inflow to Basin m^3 (gal)	Blowdown Inflow to Basin m^3 (gal)	Total Inflow to Basin m^3 (gal)	Evaporation per Month cm (in)	Potential Evaporation Outflow from Basin m^3 (gal)	Balance Inflow – Outflow m^3 (gal)	Net in Basin m^3 (gal)
JAN	2.0 (0.8)	3,513 (928,205)	1,604 (423,875)	5,118 (1,352,080)	3.6 (1.4)	2,602 (687,353)	2,516 (664,727)	2,516 (664,727)
FEB	2.8 (1.1)	4,919 (1,299,487)	1,604 (423,875)	6,523 (1,723,362)	8.6 (3.4)	6,260 (1,653,812)	263 (69,550)	2,779 (734,277)
MAR	2.0 (0.8)	3,513 (928,205)	1,604 (423,875)	5,118 (1,352,080)	19.0 (7.5)	13,844 (3,657,549)	-8,726 (-2,305,469)	0 (0)
APR	3.2 (1.3)	5,621 (1,485,128)	1,604 (423,875)	7,226 (1,909,003)	23.8 (9.4)	17,345 (4,582,350)	-10,119 (-2,673,348)	0 (0)
MAY	10.5 (4.1)	18,270 (4,826,665)	1,604 (423,875)	19,874 (5,250,540)	20.8 (8.2)	15,153 (4,003,308)	4,721 (1,247,232)	4,721 (1,247,232)
JUN	8.1 (3.2)	14,053 (3,712,819)	1,604 (423,875)	15,658 (4,136,694)	19.9 (7.8)	14,491 (3,828,345)	1,167 (308,349)	5,888 (1,555,581)
JUL	9.7 (3.8)	16,864 (4,455,383)	1,604 (423,875)	18,469 (4,879,258)	18.8 (7.4)	13,671 (3,611,725)	4,798 (1,267,533)	10,686 (2,823,113)
AUG	10.1 (4.0)	17,567 (4,641,024)	1,604 (423,875)	19,171 (5,064,899)	17.6 (6.9)	12,819 (3,386,774)	6,352 (1,678,125)	17,038 (4,501,239)
SEP	12.5 (4.9)	21,783 (5,754,870)	1,604 (423,875)	23,387 (6,178,745)	16.9 (6.7)	12,331 (3,257,635)	11,057 (2,921,110)	28,094 (7,422,349)
OCT	5.7 (2.2)	9,837 (2,598,973)	1,604 (423,875)	11,442 (3,022,848)	10.4 (4.1)	7,569 (1,999,571)	3,873 (1,023,277)	31,968 (8,445,626)
NOV	3.6 (1.4)	6,324 (1,670,769)	1,604 (423,875)	7,928 (2,094,644)	7.5 (2.9)	5,456 (1,441,357)	2,473 (653,286)	34,440 (9,098,913)
DEC	2.8 (1.1)	4,919 (1,299,487)	1,604 (423,875)	6,523 (1,723,362)	5.8 (2.3)	4,257 (1,124,759)	2,266 (598,603)	36,706 (9,697,516)
<u>Totals</u>	73.1 (28.8)	127,184 (33,601,014)	19,253 (5,086,500)	146,437 (38,687,514)	172.7 (68.0)	125,797 (33,234,538)		

Table 2.3a Water Balance for the Site Stormwater Detention Basin (Minimum Scenario)

Month	Precipitation cm (in)	Total Precipitation Inflow to Basin m³ (gal)	Evaporation + Infiltration per Month cm (in)	Potential Evaporation Outflow from Basin m³ (gal)	Balance Inflow – Outflow m³ (gal)	Net in Basin m³ (gal)
JAN	0.5 (0.2)	2,376 (627,763)	65.2 (25.7)	47,460 (12,538,487)	-45,084 (-11,910,723)	0 (0)
FEB	0.8 (0.3)	3,564 (941,645)	71.1 (28.0)	51,763 (13,675,498)	-48,199 (-12,733,853)	0 (0)
MAR	0.5 (0.2)	2,376 (627,763)	83.3 (32.8)	60,686 (16,032,835)	-58,310 (-15,405,072)	0 (0)
APR	0.8 (0.3)	3,564 (941,645)	89.0 (35.0)	64,804 (17,120,837)	-61,240 (-16,179,192)	0 (0)
MAY	2.5 (1.0)	11,881 (3,138,817)	85.4 (33.6)	62,226 (16,439,611)	-50,345 (-13,300,793)	0 (0)
JUN	2.0 (0.8)	9,505 (2,511,054)	84.4 (33.2)	61,447 (16,233,773)	-51,942 (-13,722,719)	0 (0)
JUL	2.3 (0.9)	10,693 (2,824,936)	83.0 (32.7)	60,482 (15,978,925)	-49,789 (-13,153,990)	0 (0)
AUG	2.5 (1.0)	11,881 (3,138,817)	81.7 (32.2)	59,480 (15,714,276)	-47,600 (-12,575,459)	0 (0)
SEP	3.0 (1.2)	14,257 (3,766,581)	80.9 (31.8)	58,905 (15,562,348)	-44,648 (-11,795,767)	0 (0)
OCT	1.3 (0.5)	5,940 (1,569,409)	73.2 (28.8)	53,303 (14,082,273)	-47,363 (-12,512,865)	0 (0)
NOV	0.8 (0.3)	3,564 (941,645)	69.8 (27.5	50,817 (13,425,551)	-47,253 (-12,483,906)	0 (0)
DEC	0.8 (0.3)	3,564 (941,645)	67.8 (26.7)	49,407 (13,053,082)	-45,843 (-12,111,437)	0 (0)
Totals	17.8 (7.0)	83,166 (21,971,722)	934.7 (368.0)	680,782 (179,857,498)		

Table 2.3b Water Balance for the Site Stormwater Detention Basin
(Maximum Scenario)

Month	Precipitation cm (in)	Total Precipitation Inflow to Basin m³ (gal)	Evaporation + Infiltration per Month cm (in)	Potential Evaporation Outflow from Basin m³ (gal)	Balance Inflow – Outflow m³ (gal)	Net in Basin m³ (gal)
JAN	2.0 (0.8)	9,445 (2,495,360)	65.2 (25.7)	47,460 (12,538,487)	-38,014 (-10,043,127)	0 (0)
FEB	2.8 (1.1)	13,223 (3,493,504)	71.1 (28.0)	51,763 (13,675,498)	-38,540 (-10,181,994)	0 (0)
MAR	2.0 (0.8)	9,445 (2,495,360)	83.3 (32.8)	60,686 (16,032,835)	-51,241 (-13,537,475)	0 (0)
APR	3.2 (1.3)	15,112 (3,992,576)	89.0 (35.0)	64,804 (17,120,837)	-49,692 (-13,128,261)	0 (0)
MAY	10.5 (4.1)	49,115 (12,975,871)	85.4 (33.6)	62,226 (16,439,611)	-13,111 (-3,463,740)	0 (0)
JUN	8.1 (3.2)	37,781 (9,981,439)	84.4 (33.2)	61,447 (16,233,773)	-23,666 (-6,252,333)	0 (0)
JUL	9.7 (3.8)	45,337 (11,977,727)	83.0 (32.7)	60,482 (15,978,925)	-15,145 (-4,001,198)	0 (0)
AUG	10.1 (4.0)	47,226 (12,476,799)	81.7 (32.2)	59,480 (15,714,276)	-12,254 (-3,237,477)	0 (0)
SEP	12.5 (4.9)	58,560 (15,471,231)	80.9 (31.8)	58,905 (15,562,348)	-345 (-91,117)	0 (0)
OCT	5.7 (2.2)	26,447 (6,987,008)	73.2 (28.8)	53,303 (14,082,273)	-26,856 (-7,095,266)	0 (0)
NOV	3.6 (1.4)	17,001 (4,491,648)	69.8 (27.5)	50,817 (13,425,551)	-33,816 (-8,933,904)	0 (0)
DEC	2.8 (1.1)	13,223 (3,493,504)	67.8 (26.7)	49,407 (13,053,082)	-36,184 (-9,559,579)	0 (0)
Totals	73.1 (28.8)	341,918 (90,332,027)	934.7 (368.0)	680,782 (179,857,498)		

ATTACHMENT 3

Updated License Application Pages

(Non-Proprietary Version)

The following pages, in their entirety, contain proprietary information in accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," paragraph (d)(1) and have been withheld.

NEF SAR – Revision 4	Page
Table 1.2-1	1 of 1

NEF ER – Revision 4	Page
Section 4.12	4.12-15

Updated Safety Analysis Report Pages

(Page Containing Proprietary Information Has Been Withheld)

Table 1.1-3 Estimated Annual Liquid Effluent
Page 1 of 1

Effluent	Typical Annual Quantities	Typical Uranic Content
Contaminated Liquid Process Effluents:	m^3 (gal)	kg (lb)
Laboratory Effluent/Floor Washings/Miscellaneous Condensates	23.14 (6,112)	16 (35)[1]
Degreaser Water	3.71 (980)	18.5 (41)[1]
Spent Citric Acid	2.72 (719)	22 (49)[1]
Laundry Effluent	405.8 (107,213)	0.2 (0.44)[2]
Hand Wash and Showers	2,100 (554,802)	None
Total Contaminated Effluent :	2,535 (669,884)	56.7 (125)[3]
Cooling Tower Blowdown:	19,123 (5,051,845)	None
Heating Boiler Blowdown:	138 (36,500)	None
Sanitary:	7,253 (1,916,250)	None
Stormwater Discharge:		
Gross Discharge[4]	174,100 (46 E+06)	None

[1]Uranic quantities are before treatment, values for degreaser water and spent citric acid include process tank sludge.
[2] Laundry uranic content is a conservative estimate.
[3] Uranic quantity is before treatment. After treatment approximately 1% or 0.57 kg (1.26 lb) of uranic material is expected to be discharged into the Treated Effluent Evaporative Basin.
[4]Maximum gross discharge is based on total annual rainfall on the site runoff areas contributing runoff to the Site Stormwater Detention Basin and the UBC Storage Pad Retention Basin neglecting evaporation and infiltration.

The technical data on which the LLNL report is based is principally the May 1997 Engineering Analysis Report (UCRL-AR-124080, Volumes 1 and 2) (Dubrin, 1997).

When the LLNL report was prepared in 1997, more than six years ago, the cost estimates in it were based on an inventory of 560,000 MT of DUF_6, or 378,600 MTU after applying the 0.676 mass fraction multiplier. This amount corresponds to an annual throughput rate of 28,000 MT of UF6 or about 19,000 MTU of depleted uranium. The costs in the LLNL report are based on the 20 year life-cycle quantity of 378,600 MTU. The LLNL annual DUF_6 quantities are about 3.6 times the annual production rate of the proposed NEF.

The LLNL cost analyses assumed that the DUF_6 would be converted to DU_3O_8, the DOE's preferred disposal form, using one of two dry process conversion options. The first — the anhydrous hydrogen fluoride (AHF) option — upgrades the hydrogen fluoride (HF) product to anhydrous HF (< 1.0% water). In the second option — the HF neutralization option — the hydrofluoric acid would be neutralized with lime to produce calcium fluoride (CaF_2). The LLNL cost analyses assumed that the AHF and CaF_2 conversion products are of sufficient purity that they could be sold for unrestricted use (negligible uranium contamination). LES will not use a deconversion facility that employs a process that results in the production of anhydrous HF.

The costs in Table 10.3-1, represent the LLNL-estimated life-cycle capital, operating, and regulatory costs, in 2002 dollars, for conversion of 378,600 MTU over 20 years, of DUF_6 to DU_3O_8 by anhydrous hydrogen fluoride (HF) processing, followed by DU_3O_8 long-term storage disposal in a concrete vault, or in an exhausted underground uranium mine in the western United States, at or below the same cost. An independent new underground mine production cost analysis confirmed that the LLNL concrete vault alternative costs represent an upper bound for under ground mine disposal. The discounted 1996 dollar costs in the LLNL report were undiscounted and escalated to 2002 dollars. The LLNL life-cycle costs in 1996 dollars were converted to per kgU costs and adjusted to 2002 dollars using the Gross Domestic Product (GDP) Implicit Price Deflator (IPD). The escalation adjustment resulted in the 1996 costs being escalated by 11%.

On August 29, 2002, the DOE announced the competitive selection of Uranium Disposition Services, LLC to design, construct, and operate conversion facilities near the DOE enrichment plants at Paducah, Kentucky and Portsmouth, Ohio. UDS will operate these facilities for the first five years, beginning in 2005. The UDS contract runs from August 29, 2002 to August 3, 2010. UDS will also be responsible for maintaining the depleted uranium and product inventories and transporting depleted uranium from Oak Ridge East Tennessee Technology Park (ETTP) to the Portsmouth site for conversion. The DOE-UDS contract scope includes packaging, transporting and disposing of the conversion product DU_3O_8.

UDS is a consortium formed by Framatome ANP Inc., Duratek Federal Services Inc., and Burns and Roe Enterprises Inc. The DOE-estimated value of the cost reimbursement contract is $558 million (DOE Press Release, August 29, 2002) (DOE, 2002). Design, construction and operation of the facilities will be subject to appropriations of funds from Congress. On December 19, 2002, the White House confirmed that funding for both conversion facilities will be included in President Bush's 2004 budget. However, the Office of Management and Budget has not yet indicated how much funding will be allocated. The UDS contract quantities and costs are given in Table 10.3-2, DOE-UDS August 29, 2002, Contract Quantities and Costs.

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requirements savings associated with recycling of commercial and military plutonium are in the range of 2% and 3% over the long term.

Table 1.1-3, World Average Annual Uranium Enrichment Requirements Forecast After Adjustment for Plutonium Recycle in MOX Fuel (Million SWU) provides a forecast of average annual enrichment services requirements by world region that must be supplied from world sources of uranium enrichment services. These requirements reflect adjustment for the use of recycled plutonium in mixed oxide (MOX) fuel. It should be recognized that on a year to year basis, there can be both upward and downward annual fluctuations that reflect the various combinations of nominal 12-month, 18-month and 24-month operating/refueling cycles that occur at nuclear power plants throughout the world. Therefore, interval averages are provided in this table.

As shown in Table 1.1-3, World Average Annual Uranium Enrichment Requirements Forecast After Adjustment for Plutonium Recycle in MOX Fuel (Million SWU), during the 2003 to 2005 period, world annual enrichment services requirements are forecast to be 40.2 million separative work units (SWU), which is a 3.3% increase over the estimated 2002 value of 38.9 million SWU. LES forecasts that annual enrichment services requirements will rise very gradually with the average annual requirements during the 2006 to 2010 period reaching 41.6 million SWU, an increase of 3.5% over the prior five year period. Annual requirements for enrichment services are forecast to be virtually flat thereafter, averaging 41.5 million SWU per year throughout the period 2011 through 2020.

These LES forecasts of uranium enrichment requirements in the U.S. and world are generally consistent with the most recently published forecasts by both the EIA and WNA (WNA, 2003; DOE, 2001g; DOE, 2003c). Figure 1.1-4, Comparison of Forecast of World Average Annual Uranium Enrichment Requirements Forecasts, Unadjusted for Plutonium Recycle in MOX Fuel and Figure 1.1-5, Comparison of Forecast of U.S. Average Annual Uranium Enrichment Requirements Forecast, Unadjusted for Plutonium Recycle in MOX Fuel, provide comparisons of the LES forecasts with those published by these two organizations for world and U.S. requirements. Since both EIA and WNA present their uranium enrichment requirements forecasts prior to adjustment for the use of recycled plutonium in MOX fuel, LES has presented its forecasts in the same manner.

Since the EIA does not publish a forecast of plutonium recycle in MOX fuel, LES has compared its forecast of plutonium recycle in MOX fuel, which is developed based in part on published information (NEA 2003), against that of WNA (WNA, 2003) and finds the forecasts to be in general agreement. LES's assumptions, as reflected in Table 1.1-3, for the adjustment to uranium enrichment requirements associated with the utilization of commercial and military plutonium recycle in MOX fuel are summarized in Table 1.1-4.

In the context of the analysis that is presented in subsequent sections of this report, it may be useful to note that LES's uranium enrichment requirements forecasts, which are presented in Table 1.1-3, suggest U.S. requirements for uranium enrichment services (Figure 1.1-5) that are 14.6% lower than the average of the EIA and WNA forecasts during the period 2011 through 2020 and 8.5% lower worldwide than the average of the EIA and WNA forecasts (Figure 1.1-4) during this same period. If the higher EIA or WNA forecasts for uranium enrichment requirements were used by LES in the analysis that is presented in this report, then an even greater need would be forecast for newly constructed uranium enrichment capability.

The Central Utilities Building (CUB) provides a central location for the utility services for the process buildings. The CUB also contains the two standby diesel powered electric generators that provide power to protect selected equipment in the unlikely event of loss of offsite supplied power. The building also contains electrical rooms, an air compression room, a boiler room, and cooling water facility.

The Cylinder Receipt and Dispatch Building (CRDB) is used to receive, inspect, weigh and temporarily store cylinders of natural UF_6 sent to the plant and ship cylinders of enriched UF_6 to customers. Additionally, clean, empty product and UBC are received, inspected, weighed, and temporarily stored prior to their being filled in the Separations Building.

The UBC Storage Pad is a series of concrete pads designed to store up to 15,727 UBCs. A single-lined UBC Storage Pad Stormwater Retention Basin will be used specifically to retain runoff from the UBC Storage Pad during heavy rainfalls. This basin will also receive cooling tower blowdown and heating boiler blowdown. The unlined Site Stormwater Detention basin will receive rainfall runoff from the balance of the developed plant site. Liquid effluent from plant process systems will be discharged to the double-lined Treated Effluent Evaporative Basin provided with a leak detection system.

1.2.4 Schedule of Major Steps Associated with the Proposed Action

The NEF will be constructed in six phases corresponding to the successive completion of six centrifuge Cascade Halls. All construction will be completed in 2013. Each phase will result in an additional nominal 0.5 million SWU, with the first unit beginning operation prior to the completion of the remaining phases. Like the Claiborne Enrichment Center (LES, 1991a), the NEF is designed for at least 30 years of operation. A review of the centrifuge replacement options will be conducted late in the second decade of 2000. Decommissioning is expected to take approximately nine (9) years.

The anticipated schedule for licensing, construction, operation and decommissioning is as follows:

Milestone	Estimated Date
• Submit Facility License Application	December 2003
• Initiate Facility Construction	April 2006
• Start First Cascade	June 2008
• Achieve Full Nominal Production Output	June 2013
• Submit License Termination Plan to NRC	April 2025
• Complete Construction of D&D Facility	April 2027
• D&D Completed	April 2036

NMAC. LES has notified the NMED/RCB (LES, 2004) that they will register NEF X-Ray equipment prior to use when the equipment specifications become available.

New Mexico State Historic Preservation Office (NMSHPO) (NMAC, 2001b):

Class III Cultural Survey: *Cultural properties, including prehistoric and historic archaeological* sites, historic buildings and other structures, and traditional cultural properties located on state land in New Mexico are protected by the Cultural Properties Act. It is unlawful for any person to excavate, injure, destroy, or remove any cultural property or artifact on state land without a permit. It is also unlawful for any person to intentionally excavate any unmarked human burial, and any material object or artifact interred with the remains, located on any non-federal or non-Indian land in New Mexico without a permit. LES retained a subcontractor that obtained a permit to conduct an archaeological survey. The survey was conducted during September and October of 2003.

A Class III Cultural Resource Inventory and Palentological Survey was conducted on the site. The survey for the cultural resources (archaeological, historical and palentological) consisted of the following: 1) File search and records check; 2) Class III field inventory; and 3) Class III inventory report for the project. The tasks described in this scope are those necessary to complete a Class III survey and National Register of Historic Places evaluations of all cultural resources within the project area and approval by the New Mexico State Historic Preservation Office. Results of the survey are provided in ER Section 3.8, Historic and Cultural Resources, and Section 4.8, Historic and Cultural Resource Impacts.

1.3.3 Local Agencies

Plans for construction and operation of the proposed NEF are being communicated to and coordinated with local organizations. Officials in Lea and Andrews Counties have been contacted regarding the locations of roads and water lines which traverse the site. The Eunice and Hobbs municipal water system operators have been contacted to obtain compliance information for the potable water supplies received from these cities.

Emergency support services 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 LES 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 Office of Emergency Management. Copies of the Memoranda of Understanding with the agencies that have agreed to support the LES project for construction

Detailed information concerning water resources and the use of potable water supplies is discussed in ER Section 3.4, Water Resources, and the impacts from these water resources are discussed in ER Section 4.4, Water Resources Impacts. A discussion of impacts related to utilities that will be provided is included in ER Section 4.1, Land Use Impacts.

2.1.2.6 Chemicals Used at NEF

The NEF uses various types and quantities of non-hazardous and hazardous chemical materials. Table 2.1-1, Chemicals and Their Properties, lists the chemicals associated with the NEF operation and their associated hazards. Tables 2.1-2 through 2.1-5 summarize the chemicals in use and storage, categorized by building. These tables also include the physical state and the expected quantity of chemical materials.

2.1.2.7 Monitoring Stations

The NEF will monitor both non-radiological and radiological parameters. Descriptions of the monitoring stations and the parameters measured are described in other sections of this ER as follows:

- Meteorology (ER Chapter 3, Section 3.6)
- Water Resources (ER Chapter 3, Section 3.4)
- Radiological Effluents (ER Chapter 6, Section 6.1)
- Physiochemical (ER Chapter 6, Section 6.2)
- Ecological (ER Chapter 6, Section 6.3)

2.1.2.8 Summary of Potential Environmental Impacts

Following is a summary of impacts from undertaking the proposed action and measures used to mitigate impacts. Table 2.1-6, Summary of Environmental Impacts for the Proposed Action, summarizes the impact by environment resource and provides a pointer to the corresponding section in ER Chapter 4, Environmental Impacts, that includes a detailed description of the impact. Detailed discussions of proposed mitigation measures and environmental monitoring programs are provided in ER Chapter 5, Mitigation Measures and Chapter 6, Environmental Measurements And Monitoring Programs, respectively.

Operation of the NEF would result in the production of gaseous, liquid, and solid waste streams. Each stream could contain small amounts of hazardous and radioactive compounds either alone or in a mixed form.

Gaseous effluents for both non-radiological and radiological sources will be below regulatory limits as specified in permits issued by the New Mexico Air Quality Bureau (NMAQB) and release limits by NRC (CFR, 2003q; NMAC, 2002a). This will result in minimal potential impacts to members of the public and workers.

Liquid effluents include stormwater runoff, sanitary waste water, cooling tower blowdown water, heating boiler blowdown and treated liquid effluents. All proposed liquid effluents, except sanitary waste water, will be discharged onsite to evaporative detention or retention basins.

General site stormwater runoff is collected and released untreated to a site stormwater detention basin. A single-lined retention basin will collect stormwater runoff from the Uranium Byproduct Cylinder (UBC) Storage Pad, cooling tower blowdown water and heating boiler blowdown water. All stormwater discharges will be regulated, as required, by a National Pollutant Discharge Elimination System (NPDES) Stormwater Permit. LES will also need to obtain a New Mexico Groundwater Quality Bureau (WQB) Groundwater Discharge Permit/Plan prior to operation for its onsite discharges of stormwater, treated effluent water, cooling tower blowdown water, heating boiler blowdown water and sanitary water. Approximately 174,100 m^3 (46 million gal) of stormwater from the site is expected to be released annually to the onsite retention/detention basins.

NEF liquid effluent discharge rates are relatively low, for example, NEF process waste water flow rate from all sources is expected to be about 28,900 m^3/yr (7.64 million gal/yr). This includes waste water from the liquid effluent treatment system, domestic sewerage, cooling tower blowdown water and heating boiler blowdown water . Only the former source can be expected to contain minute amounts of uranic material. The liquid effluent treatment system and shower/hand wash/laundry effluents will be discharged onsite to a double-lined evaporative basin; whereas the cooling tower blowdown water, heating boiler blowdown water and UBC pad stormwater run-off will be discharged onsite to a single-lined retention basin. Domestic sewerage will be discharged to onsite septic tanks and leach fields.

The NEF water supply will be obtained from the city of Eunice, Mew Mexico and the city of Hobbs, New Mexico. Current capacities for the Eunice and Hobbs, New Mexico municipal water supply systems are 16,350 m^3/day (4.32 million gpd) and 75,700 m^3/day (20 million gpd), respectively and current usages are 5,600 m^3/day (1.48 million gpd) and 23,450 m^3/day (6.2 million gpd), respectively. Average and peak potable water requirements for operation of the NEF are expected to be approximately 240 m^3/day (63,423 gpd) and 85 m^3/hr (378 gpm), respectively. These usage rates are well within the capacities of both water systems.

Solid waste that will be generated at the NEF, which falls into the non-hazardous, radioactive, hazardous, and mixed waste categories, will be collected and transferred to authorized treatment or disposal facilities offsite as follows. All solid radioactive waste generated will be Class A low-level waste as defined in 10 CFR 61 (CFR, 2003r). Approximately 86,950 kg (191,800 lbs) of low-level waste will be generated annually. In addition, annual hazardous and mixed wastes generated are expected to be about 1,770 kg (3,930 lbs) and 50 kg (110 lbs), respectively. As a result, the NEF will be a small quantity generator (SQG) of hazardous waste and dispose of the waste by licensed contractors. LES does not plan to treat hazardous waste or store quantities longer than 90 days. Non-hazardous waste, expected to be approximately 172,500 kg (380,400 lbs) annually, will be collected and disposed of by a County licensed solid waste disposal contractor. The non-hazardous wastes will be disposed of in the new Lea Country landfill which has more than adequate capacity to accept NEF 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 on the NEF site. 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.

Noise generated by the operation of the NEF will be primarily limited to truck movements on the road. The noise at the nearest residence will probably increase; however, it may not be above the Central Basin Platform that divides the Permian Basin into the Midland and Delaware sub-basins, as shown in Figure 3.3-2, Regional Geology of the Permian Basin. The base of the Permian basin sediments extends about 1,525 m (5,000 ft) deep beneath the NEF site.

The top of the Permian deposits are approximately 434 m (1,425 ft) below ground surface. Overlying the Permian are the sedimentary rocks of the Triassic Age Dockum Group. The upper formation of the Dockum Group is the Chinle. Locally, the Chinle Formation consists of red, purple and greenish micaceous claystone and siltstone with interbedded fine-grained sandstone. The Chinle is regionally extensive with outcrops as far away as the Grand Canyon region in Arizona (WBG, 1998). Locally overlying the Chinle Formation in the Permian Basin is either the Tertiary Ogallala, Gatuña or Antlers Formations, or Quaternary alluvium. The Tertiary Ogallala Formation underlies all of the High Plains (to the east) and mantles several ridges in Lea County. Unconsolidated sediments northeast of the NEF site are recognized as the Ogallala and deposits west of the NEF site are mapped as the Gatuña or Antlers Formations. This sediment is described as alluvium (WBG, 1998) and is mined as sand and gravel in the NEF site area.

As shown in Table 3.3-1, Geological Units Exposed At, Near, or Underlying the Site, the uppermost 340 m (1,115 ft) of the subsurface in the NEF site vicinity can include up to 0.6 m (2 ft) of silty fine sand, about 3 m (10 ft) of dune sand, 6 m (20 ft) of caliche, and 16 m (54 ft) of 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 NEF 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.

Recent deposits at the site and in the site area are primarily dune sands derived from Permian and Triassic rocks of the Permian Basin. These so-called Mescalero Sands cover approximately 80% of Lea County, locally as active sand dunes.

Information from recent borings done on the NEF site is consistent with the data shown on the profile in Figure 3.3-5, Site Boring Plan and Profile. This includes a thin layer of loose sand at the surface; about 12 m (40 ft) of high blow count alluvial silty sand and sand and gravel locally cemented with caliche; and the Chinle clay at a depth of about 12 m (40 ft) below the ground surface. No sandy clay layers were reported in the clay.

The boring logs for the NEF site geotechnical borings (Borings B-1 through B-5) are provided in the Integrated Safety Analysis Summary Figures 3.2-10 through 3.2-15.

Two types of faulting were associated with early Permian deformation. Most of the faults were long, high-angle reverse faults with well over a hundred meters (several hundred feet) of vertical displacement that often involved the Precambrian basement rocks. The second type of faulting is found along the western margin of the platform where long strike-slip faults, with displacements of tens of kilometers (miles), are found. The closest fault to the site as defined by the New Mexico Bureau of Geology and Mineral Resources (NMIMT, 2003) is over 161 km (100 mi) to the west and is associated with the deeper portions of the Permian Basin (Machette, 1998).

The large structural features of the Permian Basin are reflected only indirectly in the Mesozoic and Cenozoic rocks, as there has been virtually no tectonic movement within the basin since the Permian period. Figure 3.3-2, Regional Geology of the Permian Basin, shows the structure that

Nine boreholes oriented on a three-by-three grid were drilled to the top of the Chinle red beds (Figure 3.4-6). Only one of the borings produced cuttings that were slightly moist at 1.8 to 4.2 m (6 to 14 ft) below ground surface; other cuttings were very dry. Left open for at least a day, no groundwater was observed to enter any of these holes. No samples could be collected for water quality analysis at the time of well construction. One groundwater sample has since been collected due to limited water occurrence, as discussed in ER Section 3.4.15.6, Interactions Among Different Aquifers.

The land surface elevation was surveyed at each of the nine borehole locations and the elevation of the top of the red beds was computed. This information was combined with similar information from the WCS facility to produce an elevation map of the top of the red beds (see Figure 3.4-6). The dry nature of the soils from each of these borings supports a conclusion that there is no recharge from the ground surface at the site (Walvoord, 2002).

The three monitoring wells were installed at the end of September 2003 (Figures 3.3-5 and 3.4-6). Through the first month of monitoring only one well, MW-2, located at the northeast corner of the site, produced water. Several water samples have been taken from that well. It is anticipated that the other two wells may provide water over lengthy time periods, based on information from the WCS site. Groundwater quality is discussed in ER Section 3.4.2, Water Quality Characteristics.

Another factor to consider relative to hydrologic conditions at the NEF site is the presence of the Triassic Chinle Formation red bed clay. This clay unit is approximately 323 to 333 m (1,060 to 1,092 ft) thick beneath the site. With an estimated hydraulic conductivity on the order of 2×10^{-8} cm/s (7.9×10^{-9} in/s), the unit is very tight (Table 3.3-2, Measured Permeabilities on the NEF Site). This permeability is of the same order prescribed for engineered landfill liner materials. One would expect vertical travel times through this clay unit to be on the order of thousands of years, based on this permeability and the thickness of the unit.

The first presence of saturated porous media beneath the site appears to be within the Chinle red bed clay where there exists a low-permeability silty sandstone or siltstone. Borings and monitor wells at the WCS facility directly to the east of the NEF site have encountered this zone *approximately 61 to 91 m (200 to 300 ft) below land surface. Wells completed in this unit are* very slow to produce water. This makes sampling quite difficult. It is arguable whether this zone constitutes an aquifer, given the low permeability of the unit. Similarly, there is a 30.5-meter (100-foot) thick water-bearing layer at about 183 m (600 ft) below ground surface (CJI, 2004). As discussed above, three monitoring wells were installed on the NEF site in September 2003 with screened intervals within this siltstone unit. These wells are approximately 73 m (240 ft) deep.

The first occurrence of a well-defined aquifer is approximately 340 m (1,115 ft) below land surface, within the Santa Rosa formation (CJI, 2004). Because of the depth below land surface to this unit, and the fact that the thick Chinle clay unit would limit any potential migration to depth, this aquifer has not been investigated. No impacts are expected to the Santa Rosa aquifer.

Figure 3.4-7, Water and Oil Wells in the Vicinity of the NEF Site, is a map of wells and surface water features in the vicinity of the NEF plant site. The figure also includes oil wells. No water wells are located within 1.6 km (1 mi) of the site boundary.

3.4.1.2 Facility Withdrawals and/or Discharges to Hydrologic Systems

The NEF plant will receive its water supply from one or more municipal water systems and thus no water will be drawn from either surface water or groundwater sources at the NEF site. Supply of nearby groundwater users will thus not be affected by operation of the NEF. NEF water supply requirements are discussed in ER Section 4.4, Water Resources Impact.

The NEF design precludes operational process discharges from the plant to surface or groundwater at the site other than into engineered basins. Discharge of routine plant liquid effluents will be to the Treated Effluent Evaporative Basin on the site. The Treated Effluent Evaporative Basin is utilized for the collection and containment of waste water discharge from the Liquid Effluent Collection and Treatment System. The ultimate disposal of waste water will be through evaporation of water and impoundment of the residual dry solids byproduct of evaporation. Total annual discharge to that basin will be approximately 2,535 m^3 per year (669,844 gal/yr). The location of the basin is shown in Figure 4.12-2, Site Layout for NEF. Evaporation will provide the only means of liquid disposal from this basin. The Treated Effluent Evaporative Basin will include a double membrane liner and a leak detection system. A summary of liquid wastes volumes accumulated at the NEF is provided in Table 3.4-1, Summary of Potentially Contaminated Liquid Wastes for the NEF. Of the wastes listed in Table 3.4-1, only uncontaminated liquid wastes are released to the Treated Effluent Evaporative Basin for evaporation without treatment. Contaminated liquid waste is neutralized and treated for removal of uranium, as required. Effluents unsuitable for the evaporative disposal will be removed off-site by a licensed contractor in accordance with US EPA and State of New Mexico regulatory requirements. The State of New Mexico has adopted the US EPA hazardous waste regulations (40 CFR Parts 260 through 266, 268 and 270) (CFR, 2003cc; CFR, 2003p; CFR, 2003dd; CFR, 2003ee; CFR, 2003v; CFR, 2003ff; CFR, 2003gg; CFR, 2003hh; CFR, 2003ii) governing the generation, handling, storage, transportation, and disposal of hazardous materials. These regulations are found in 20.4.1 NMAC, "Hazardous Waste Management" (NMAC, 2000).

Stormwater from parts of the site will be collected in a retention or detention basin. The design for this system includes two basins as shown in Figure 4.12-2, Site Layout for NEF. The Site Stormwater Detention Basin at the south side of the site will collect runoff from various developed parts of the site including roads, parking areas and building roofs. It is unlined and will have an outlet structure to control discharges above the design level. The normal discharge will be 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 will have approximately 123,350 m^3 (100 acre-ft) of storage capacity. Area served includes about 39 ha (96 acres) with the majority of that area being the developed portion of the 220 ha (543 acres) NEF site. In addition, the basin has 0.6 m (2 ft) of freeboard beyond the design capacity. It will also be 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 three sources: (1) cooling tower blowdown discharges, (2) heating boiler blowdown discharges and (3) stormwater runoff from the UBC Storage Pad. The ultimate disposal of basin water will be 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 plus an allowance for cooling tower blowdown water and heating boiler blowdown water. The 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 basin includes 9.2 ha (22.8 acres), the total area of the UBC Storage Pad. This basin is designed with a membrane lining to minimize any infiltration into the ground.

A standard septic system is planned to dispose of sanitary wastes at the site, as described in ER Section 4.1.2, Utilities Impacts.

3.4.2 Water Quality Characteristics

As discussed in ER Section 3.4.1.1, Major Surface and Subsurface Hydrological Systems, water resources in the area of the NEF site are minimal. Runoff from precipitation at the site is effectively collected and contained by detention/retention basins and through evapotranspiration. It is highly unlikely that any groundwater recharge occurs at the site.

The first occurrence of groundwater beneath the NEF site is in a silty sandstone or siltstone horizon in the Chinle Formation, approximately 67 m (220 ft) below the surface. This unit is low in permeability and does not yield water readily. Groundwater quality in monitoring wells in the Chinle Formation, the most shallow saturated zone, is poor due to natural conditions. Samples from monitoring wells within this horizon on the WCS facility have routinely been analyzed with Total Dissolved Solids (TDS) concentrations between about 2,880 and 6,650 mg/L. Table 3.4-2, Groundwater Chemistry, contains a summary of metal analyses from four background monitoring wells at the WCS site for 1997-2000. Essentially all results are below maximum contaminant limits (MCL) for EPA drinking water standards. The tightness of the formation, the limited thickness of saturation, and the poor water quality, support the argument that this zone does not constitute an aquifer.

Three monitoring wells have been drilled and installed on the NEF site, i.e., MW-1, MW-2, and MW-3 shown on Figure 3.3-5, Site Boring Plan and Profile and Figure 3.4-6, Dockum Group (Chinle Formation) Surface Contour, and yield several water quality samples. The results of the water quality analyses are summarized in Table 3.4-3, Chemical Analyses of NEF Site Groundwater. Water quality characteristics are similar to those for WCS site samples. No local groundwater well sites and, as a result, groundwater data are available with the exception of groundwater well sites on the WCS site and those that have been installed on the NEF site. Additional groundwater sampling and analysis of the onsite monitoring wells will be conducted on a frequency needed to establish a baseline.

Table 3.4-3 presents a summary of results from analyses of a groundwater sample from NEF monitoring well MW-2 which is adjacent to the location of NEF groundwater exploration of boring B-9 on the NEF site (Figure 3.4-6). Standard protocols (ASTM, 1992) were used for sampling.

The data listed for ^{238}U and below in Table 3.4-3 is from the analysis of site ground water for radionuclides. Some of the radionuclide results given in Table 3.4-3 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 NEF site follows the recommendations given by the EPA in the report "Upgrading Environmental Radiation Data;

3.4.6 Water Rights and Resources

The NEF site will obtain water for operational purposes from one or more municipal water systems. Memoranda of Understanding (HNM, 2003; LG, 2004) have been signed with the City of Eunice, New Mexico, and the City of Hobbs, New Mexico, for the supply of water to NEF. Any water rights potentially required for this arrangement will be negotiated with the municipalities. A description of the available municipal water supply systems, the source of plant water, is provided in ER Section 4.1.2.

3.4.7 Quantitative Description of Water Use

No subsurface or surface water use, such as withdrawals and consumption are made at the site by the NEF. All water used at the facility will be provided through the Eunice and Hobbs Municipal Water Supply Systems, as described in ER Section 4.1.2. Those systems obtain water from groundwater sources in or near the city of Hobbs, approximately 32 km (20 mi) north of the site. Water use by the facility is shown in Table 3.4-4, Anticipated Normal Plant Water Consumption and Table 3.4-5, Anticipated Peak Plant Water Consumption. Water supply is sufficient for operation and maintenance of the NEF. See ER Section 4.4.5, Ground and Surface Water Use, for detailed information concerning the capacities of the Hobbs and Eunice, New Mexico water supply systems and the expected NEF average and peak usage.

3.4.8 Non-Consumptive Water Use

The NEF makes no non-consumptive use of water. Non-consumptive water use is water that is used and returned to its source and made available for other uses. An example is a once-through cooling system.

3.4.9 Contaminant Sources

There will be no discharges to natural surface waters or groundwaters from the NEF. The EPA reports (EPA, 2003a) that no Superfund (CERCLA) sites exist in the area near the NEF site in either Lea County, New Mexico or Andrews County, Texas.

Water intake for the NEF plant will be made from one or more municipal supply systems. There is sufficient capacity available to provide water supply for the NEF, as discussed in ER Section 4.4.

Stormwater runoff from the NEF site will be controlled during construction and operation. Appropriate stormwater construction runoff permits for construction activities will be obtained before construction begins. Design of stormwater run-off controls for the operating plant are described in Section 4.4. Appropriate routine erosion control measures best management practices (BMPs), will be implemented, as is normally required by such permits.

During operation stormwater will be collected from appropriate site areas and routed to detention/retention basins. These basins and the site stormwater system are described in ER Section 3.4.1.2.

3.4.10 Description of Wetlands

An evaluation of the site and of available wetlands information has been used to determine that the site does not contain jurisdictional wetlands.

3.4.11 Federal and State Regulations

ER Section 1.3 describes all applicable regulatory requirements and permits. 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: The NEF is eligible to claim the "No Exposure" exclusion for industrial activity of the NPDES storm water Phase II regulations. As such, the LES would submit a No Exposure Certification immediately prior to initiating operational activities at the NEF site. LES also has the option of filing for coverage under the Multi-Section General Permit (MSGP) because the NEF is one of the 11 eligible industry categories. If this option is chosen, LES will file a Notice of Intent (NOI) with the EPA, Washington, D.C., at least two days prior to the initiation of NEF operations. A decision regarding which option is appropriate for the NEF will be made in the future.
- NPDES: Construction General Permit for stormwater discharge is required because construction of the NEF 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 have also been covered under this general permit. LES construction contractors will be clearing approximately 81 ha (200 acres) during the construction phase of the project. LES will develop a Storm Water Pollution Prevention Plan (SWPPP) and file a Notice of Intent (NOI) with the EPA, Washington, D.C., at least two days prior to the commencement of construction activities.
- 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. NEF will discharge treated process water, stormwater, cooling tower blowdown water and heating boiler blowdown water to surface impoundments, as well as domestic septic wastes.

3.4.12 Surface Water Characteristics for Relevant Water Bodies

No offsite surface water runoff will occur from the NEF site. There are no drainage features that would transport surface water offsite. Precipitation onsite is either subject to infiltration, natural evapotranspiration, or facility system collection and evaporation.

3.4.12.1 Freshwater Streams, Lakes, Impoundments

The NEF site includes no freshwater streams or lakes. Impoundments to contain stormwater runoff and process water will be constructed as part of the facility. These components are described in ER Section 3.4.1.2 Facility Withdrawals and/or Discharges to Hydrologic Systems.

3.4.12.2 Flood Frequency Distributions, Including Levee Failures

Site grade will be above the elevation of the 100-year and the 500-year flood elevations (WBG, 1998; FEMA, 1978).

Table 3.4-3 Chemical Analyses of NEF Site Groundwater
Page 1 of 3

		Existing Regulatory Standards	
PARAMETER	**NEF Sample (mg/L, or as noted)**	**NEW MEXICO (mg/L, or as noted)**	**EPA MCL (mg/L, or as noted)**
General Properties			
Total Dissolved Solids (TDS)	**2500 (k)**	1000	500 (a)
Total Suspended Solids	6.2	NS	NS
Specific Conductivity	6800 (µmhos/L)	NS	NS
Inorganic Constituents			
Aluminum	0.480 (c)	5.0 (i)	0.05 – 0.2 (a)
Antimony	<0.0036	NS	0.006
Arsenic	<0.0049	0.1	0.05
Barium	0.021	1	2
Beryllium	<0.00041	NS	0.004
Boron	**1.6**	0.75 (i)	NS
Cadmium	<0.00027	0.01	0.005
Chloride	**1600**	250	250 (a)
Chromium	0.043	0.05	0.1
Cobalt	<0.00067	0.05 (i)	NS
Copper	0.0086	NS	1.3 (al)
Cyanide	<0.0039	0.2	0.2
Fluoride	<0.5	1.6	4
Iron	0.51	1	0.3 (a)
Lead	<0.0021	0.05	0.015 (al)
Manganese	**1.0**	0.2	0.05 (a)
Mercury	<0.000054	0.002	0.002
Molybdenum	0.04	1.0 (i)	NS
Nickel	0.034	0.2 (i)	0.1
Nitrate	<0.25	10	10
Nitrite	<1	NS	1
Selenium	<0.0046	0.05	0.05
Silver	<0.0007	0.05	0.05
Sulfate	**2200**	600 (a)	250 (a)
Thallium	<0.0081	NS	0.002
Zinc	0.016	10	5 (a)

Table 3.4-3 Chemical Analyses of NEF Site Groundwater

		Existing Regulatory Standards	
PARAMETER	NEF Sample (mg/L, or as noted)	NEW MEXICO (mg/L, or as noted)	EPA MCL (mg/L, or as noted)
Miscellaneous Constituents			
Other VOCs and Pesticides	<MDLs	Various	Various
Semi-Volatile Organic Compounds (SOCs)	<MDLs	Various	Various
Polychlorinated biphenyls, PCBs	<MDLs	0.001	0.0005

Notes:

Highlighted values exceed a regulatory standard

(a): EPA Secondary Drinking Water Standard

(al): Action Level requiring treatment

(c): Results of lab or field-contaminated sample

(i): Crop irrigation standard

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

(k) Reported TDS sample value of 2,500 mg/L is likely inaccurate since three subsequent samples produced TDS values from 6,000 mg/L to 6,400 mg/L

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

** This standard excludes ^{228}Ra 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

**** *Minimum Detection Level*

NS: No standard or goal has been defined

MCL: Maximum Contaminant Level

MDL: Minimum Detection Limit

Tornadoes occur infrequently in the vicinity of the NEF. Only two significant tornadoes (i.e., F2 or greater) were reported in Lea County, New Mexico, (Grazulis, 1993) from 1880-1989. Across the state line, only one significant tornado was reported in Andrews County, Texas, (Grazulis, 1993) from 1880-1989.

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 two tornadoes reported in Lea County were estimated to be F2 tornadoes (Grazulis, 1993).

Hurricanes, or tropical cyclones, are low-pressure weather systems that develop over the tropical oceans. These storms are classified during their life cycle according to their intensity:

- Tropical depression – wind speeds less than 63 km/hr (39 mi/hr)
- Tropical storm – wind speed between 63 and 118 km/hr (39 and 73 mi/hr)
- Hurricane – wind speeds greater than 118 km/hr (73 mi/hr)

Hurricanes are fueled by the relatively warm tropical ocean water and lose their intensity quickly once they make landfall. Since the NEF is sited about 805 km (500 mi) from the coast, it is most likely that any hurricane that tracked towards it would have dissipated to the tropical depression stage, that is, wind speeds less than 63 km/hr (39 mi/hr), before it reached the NEF.

3.6.1.7 Mixing Heights

Mixing height is defined as the height above the earth's surface through which relatively strong vertical mixing of the atmosphere occurs. Holzworth developed mean annual morning and afternoon mixing heights for the contiguous United States (EPA, 1972). This information is presented in Figure 3.6-8, Annual Average Morning Mixing Heights and Figure 3.6-9, Annual Average Afternoon Mixing Heights. From these figures, the mean annual morning and afternoon mixing heights for the NEF are approximately 450 m (1,476 ft) and 2,300 m (7,544 ft), respectively.

3.6.1.8 Sandstorms

Blowing sand or dust may occur occasionally in the area due to the combination of strong winds, sparse vegetation, and the semi-arid climate. High winds associated with thunderstorms are frequently a source of localized blowing dust. Dust storms that cover an extensive region are rare, and those that reduce visibility to less than 1.6 km (1 mi) occur only with the strongest pressure gradients such as those associated with intense extratropical cyclones which occasionally form in the area during winter and early spring (DOE, 2003d).

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

The United States Environmental Protection Agency (EPA) uses six criteria pollutants as indicators of air quality. Maximum concentrations, above which adverse effects on human health may occur, have been set. These concentrations are referred to as the National Ambient Air Quality Standards (NAAQS). Areas either meet the national primary or secondary air quality standards for the criteria pollutants (attainment) or do not meet the national primary or

Table 3.6-22 Wind Frequency Distribution

	WCS Data		Midland-Odessa Data	
Compass Sector	**Hours**	**Percent Frequency**	**Hours**	**Percent Frequency**
North (N)	549	3.2	2,388	5.6
North-Northeast (NNE)	788	4.5	1,692	4.0
Northeast (NE)	1,005	5.8	2,103	4.9
East-Northeast (ENE)	1,031	5.9	2,094	4.9
East (E)	1,158	6.7	2,691	6.3
East-Southeast (ESE)	1,071	6.2	2,366	5.5
Southeast (SE)	1,902	11.0	3,237	7.6
South-Southeast (SSE)	2,327	13.4	4,648	10.9
South (S)	2,038	11.8	8,784	20.6
South-Southwest (SSW)	1,280	7.4	3,136	7.3
Southwest (SW)	990	5.7	2,345	5.5
West-Southwest (WSW)	779	4.5	1,997	4.7
West (W)	768	4.4	1,887	4.4
West-Northwest (WNW)	624	3.6	997	2.3
Northwest (NW)	609	3.5	1,104	2.6
North-Northwest (NNW)	417	2.4	1,272	3.0
Total	17,336	100	42,741	100.1[(1)]

[(1)] The percent frequency total is greater than 100% due to round off.

- Prefilter
- High Efficiency Particulate Air (HEPA) Filter
- Activated carbon filter (impregnated with potassium carbonate)
- Centrifugal Fan
- Monitoring and controls
- Automatically controlled inlet and outlet isolation dampers
- Discharge stack

The GEVS serving the TSB consists of a duct network that serves all of the UF_6 processing systems and operates at negative pressure. The ductwork is connected to one filter station and vents through one fan. Both the filter station and the fan can handle 100% of the effluent. There is no standby filter station or fan. Operations that require the GEVS to be operational will be shut down if the system shuts down. The system capacity is estimated to be 18,700 m^3/hr (11,000 cfm). A differential pressure controller controls the fan speed and maintains negative pressure in front of the filter station.

Gases from the UF_6 processing systems pass through an 85% efficient prefilter. The prefilter removes dust particles and thereby prolongs the useful life of the HEPA filter. Gases then flow through a 99.97% efficient HEPA filter. The HEPA filter removes uranium aerosols which consist of UO_2F_2 particles. Finally, the gases pass through a 99% efficient activated charcoal for removal of HF. The cleaned gases pass through the fan, which maintains the negative pressure upstream of the filter stations. The cleaned gases are then discharged through the vent stack.

One Separation Building GEVS serves the entire Separations Building. It consists of a duct network that serves all of the uranium processing systems and operates at negative pressure. It is sized to handle the flow from all permanently ducted process locations, as well as up to 13 noncorrugated flexible duct exhaust points at one time. The flexible duct is used for cylinder connection/disconnection or maintenance procedures.

The ductwork is connected to two parallel filter stations. Each is capable of handling 100% of the effluent. One is online and the other is a standby. Each station consists of an 85% efficient prefilter, a 99.97% efficient HEPA filter and a 99% efficient activated charcoal filter for removal of HF. The leg of the distribution system securing the exhaust of the vacuum pump/trap set outlets is routed through an electrostatic filter. Electrostatic filters have an efficiency of 97%. The filter stations vent through one of two fans. Each fan is capable of handling 100% of the effluent. One fan is online, and the other is a standby. A switch between the operational and standby systems can be made using automatically controlled dampers. The system total airflow capacity is estimated to be 11,000 m^3/hr (6,474 cfm). A differential pressure controller controls the fan speed and maintains negative pressure upstream of the filter station.

Gases from the UF_6 processing systems pass through the prefilter which removes dust and protects the HEPA filter, then through the HEPA filter which removes uranium aerosols (mainly UO_2F_2 particles), then through the potassium carbonate impregnated activated carbon filters which captures HF. The remaining clean gases pass through the fan, which maintains the negative pressure upstream of the filter stations. Finally, the clean gases are discharged

Gases from the associated areas pass through the 85% efficient prefilter which removes dust and protects downstream filters, then through the 99% efficient activated charcoal filter that captures HF. Remaining uranic particles, (mainly UO_2F_2) are treated by a 99.7% efficient HEPA filter. After filtration, the clean gases pass through a fan, which maintains the negative pressure upstream of the filter station. The clean gases are then discharged through the monitored (alpha and HF) stack on the Centrifuge Assembly Building.

3.12.1.3 Liquid Effluent System

Quantities of radiologically contaminated, potentially radiologically contaminated, and nonradiologically contaminated aqueous liquid effluents are generated in a variety of operations and processes in the TSB and in the Separations Building. The majority of all potentially radiologically contaminated aqueous liquid effluents are generated in the TSB. All aqueous liquid effluents are collected in tanks that are located in the Liquid Effluent Collection and Treatment System in the TSB. The collected effluent is sampled and analyzed.

3.12.1.3.1 Effluent Sources and Generation Rates

Numerous types of aqueous and non-aqueous liquid wastes are generated in the plant. These effluents may be significantly radiologically contaminated, potentially contaminated with low amounts of contamination, or non-contaminated. Effluents include:

- Hydrolyzed uranium hexafluoride and aqueous laboratory effluent

  These hydrolyzed uranium hexafluoride solutions and the aqueous effluents are generated during laboratory analysis operations and require further processing for uranium recovery.

- Degreaser Water

  This is water, which has been used for degreasing contaminated pump and plant components coated in Fomblin oil. The oil, which is heavier than water will be separated from the water via gravity separation, and the suspended solids filtered, prior to routing for uranium recovery. Most of the soluble uranium components dissolve in the degreaser water.

- Citric Acid

  The decontamination process removes a variety of uranic material from the surfaces of components using citric acid. The citric acid tank contents comprise a suspension, a solution and solids, which are strongly uranic and need processing. The solids fall to the bottom of the citric acid tank and are separated, in the form of sludge, from the citric acid using gravity separation. The other sources of citric acid is from the UF_6 Sample Bottles cleaning rig and flexible hose decontamination cabinet. Part of the cleaning process involves rinsing them in 5-10% by volume citric acid.

- Laundry Effluent

  This is water that has arisen from the washing of the plant personnel laundry including clothes and towels. The main constituents of this wastewater are detergents, bleach and very low levels of dissolved uranium based contaminants. This water is routed into a collection tank, monitored and neutralized as required. The effluent is contained and treated on the NEF site.

circulation through a small filter press. The material removed by the filter press is deposited in a container and sent for off-site low-level radioactive waste disposal.

The clean effluent is re-circulated back to the Precipitation Treatment Tank. Depending on the characteristics of the effluent, the effluent may have to be circulated through the filter press numerous times to obtain the percent of solids removal required. A sample of the effluent is taken to determine when the correct percent solids have been removed. When it is determined that the correct amount of solids have been removed, the effluent is transferred to the Contaminated Effluent Hold Tank.

The effluent in the Contaminated Effluent Hold Tank is then transferred to the agitated Evaporator/Dryer Feed Tank. Acid is added via a small chemical addition unit to reduce the pH back down to 7 or 8. This is necessary to help minimize corrosion in the Evaporator/Dryer.

From the Evaporator/Dryer Feed Tank, the effluent is pumped to the Evaporator/Dryer. The Evaporator/Dryer is an agitated thin film type that separates out the solids in the effluent. The Evaporator/Dryer is heated by steam in a jacket or from an electric coil. As the effluent enters the Evaporator/Dryer, the effluent is heated and vaporized. The Evaporator/Dryer discharges a "dry" concentrate into a container located at the bottom of the Evaporator/Dryer. Container contents are monitored for criticality, labeled, and stored in the radioactive waste storage area. When full, the container is sent for shipment offsite to a low-level radioactive waste disposal facility. Liquid vapor exits the evaporator and is condensed in the Evaporator/Dryer Condenser, which is cooled with chilled water.

The condensate from the Evaporator/Dryer Condenser is collected in the Distillate Tank before being transferred to one of the Treated Effluent Monitor Tanks. The effluent in these tanks is sampled and tested for pH and uranic content to ensure compliance with administrative guidelines prior to release to the double-lined Treated Effluent Evaporative Basin with leak detection. If the lab tests show the effluent does not meet administrative guidelines, the effluent can be further treated. Depending on what conditions the lab testing show, the effluent is either directed back to the Evaporator/Dryer Feed Tank for another pass through the Evaporator/Dryer, or it can be directed through the Mixed Bed Demineralizers. After either option, the effluent is transferred back to a Treated Effluent Monitor Tank where it is again tested. When the lab tests are acceptable, the effluent is released to the Treated Effluent Evaporative Basin.

The Citric Acid Tank in the Decontamination Workshop is drained, all the effluent is transferred to the Spent Citric Acid Collection Tank in the Liquid Effluent Collection and Treatment Room. A "sludge" remains in the bottom of the Citric Acid Tank. This "sludge" consists primarily of uranium and metal particles. This sludge is flushed out with deionized water (DI). The combination of the sludge and the DI water also goes to the Spent Citric Acid Collection Tank. The spent citric acid effluent/sludge contains the wastes from the Sample Bottle and Flexible Hose Decontamination Cabinets, which are manually transferred to the Citric Acid Tank in the Main Decontamination System. The contents of the Spent Citric Acid Collection Tank are constantly agitated to keep all solids in suspension and to provide a homogeneous solution. This is necessary to prevent build-up of uranic material in the bottom of the tank.

The Degreaser Tank in the Decontamination Workshop is drained, and the effluent is transferred to the Degreaser Water Collection Tank in the Liquid Effluent Collection and Treatment Room. A "sludge" remains in the bottom of the Degreaser Tank after the degreasing water is drained. This "sludge" consists primarily of Fomblin oil and uranium. This sludge is

Hand Wash and Shower Effluents are not treated. These effluents are discharged to the same Treated Effluent Evaporative Basin as for the Decontamination, Laboratory and Miscellaneous Effluents. Laundry Effluent is treated if necessary and discharged to this basin as well.

Cooling Tower Blowdown Effluent is discharged to a separate on-site 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 and heating boiler blowdown water. A third unlined basin is used for the collection and monitoring of general site stormwater runoff.

Six septic systems are planned for the NEF site. Each septic system will consist of a septic tank with one or more leachfields. Figure 3.12-1, Planned Septic Tank System Locations, shows the planned location of the six septic tank systems.

The six septic systems are capable of handling approximately 40,125 liters per day (10,600 gallons per day) based on a design number of employees of approximately 420. Based on the actual number of employees, 210, the overall system will receive approximately 20,063 liters per day (5,300 gallons per day). Total annual design discharge will be approximately 14.6 million liters per year (3.87 million gallons per year). Actual flows will be approximately 50 percent of the design values.

The septic tanks will meet manufacturer specifications. Utilizing the percolation rate of approximately 3 minutes per centimeter (8 minutes per inch) established by actual test on the site, and allowing for 76 to 114 liters (20 to 30 gallons) per person per day, each person will require 2.7 linear meters (9 linear feet) of trench utilizing a 91.4-centimeter (36-inch) wide trench filled with 61 centimeters (24 inches) of open graded crushed stone. As indicated above, although the site population during operation is expected to be 210 persons, the building facilities are designed by architectural code analysis to accommodate up to 420 persons. Therefore, a total of approximately 975 linear meters (3,200 linear feet) of percolation drain field will be required. The combined area of the leachfields will be approximately 892 square meters (9,600 square feet).

3.12.2 Solid Waste Management

Solid waste generated at the NEF will be grouped into industrial (nonhazardous), radioactive and mixed, and hazardous waste categories. In addition, solid radioactive and mixed waste will be further segregated according to the quantity of liquid that is not readily separable from the solid material. The solid waste management systems will be a set of facilities, administrative procedures, and practices that provide for the collection, temporary storage, (no solid waste processing is planned), and disposal of categorized solid waste in accordance with regulatory requirements. All solid radioactive wastes generated will be Class A low-level wastes (LLW) as defined in 10 CFR 61 (CFR, 2003r).

Industrial waste, including miscellaneous trash, vehicle air filters, empty cutting oil cans, miscellaneous scrap metal, and paper will be shipped offsite for minimization and then sent to a licensed waste landfill. The NEF is expected to produce approximately 172,500 kg (380,400 lbs) of this normal trash annually. Table 3.12-2, Estimated Annual Non-Radiological Wastes, describes normal waste streams and quantities.

Radioactive waste will be collected in labeled containers in each Restricted Area and transferred to the Radioactive Waste Storage Area for inspection. Suitable waste will be volume-reduced and all radioactive waste disposed of at a licensed low-level waste (LLW) disposal facility.

The waste and effluent estimates were developed specifically for the NEF. Each system was analyzed to determine the wastes and effluents generated during operation. These values were analyzed and a waste disposal path was developed for each. LES considered the facility site, facility operation, applicable URENCO experience, applicable regulations, and the existing U.S. waste processing/disposal infrastructure in developing the paths. The Liquid Waste and the Solid Waste Collection Systems were designed in accordance with these considerations.

Applicable experience was derived from each of the existing three URENCO enrichment facilities. The majority of the wastes and effluents from the facility are from auxiliary systems and activities and not from the enrichment process itself. Waste and effluent quantities of specific individual activities instead of scaled site values were used in the development of NEF estimates. An example is the NEF laboratory waste and effluent estimate which was developed by determining which analyses would be performed at the NEF, and using URENCO experience to perform that analysis, determine the resulting expected wastes and effluents. The cumulative waste and effluent values were then compiled.

The customs of URENCO as compared to LES also affect the resultant wastes and effluents. For example, in Europe, employers typically provide work clothes such as coveralls and lab coats for their employees. These are typically washed onsite with the resulting effluent sent to the municipal sewage treatment system. LES provides only protective clothing for employees, and the small volume of effluent that results has a higher quantity of contaminants which must be treated onsite.

Each of the URENCO facilities produces different wastes and effluents depending on the specific site activities, the type of auxiliary equipment installed, and the country-specific regulations. Each of the URENCO facilities is located either in an industrial or municipal area so that the facility water supply and sewage treatment are obtained and performed by municipal systems. The proposed NEF site will use municipal water supplies. However, all liquid effluents will be contained on the NEF site. Unlike other URENCO facilities, LES does not perform any interior cylinder washing activities. Thus, the generation of significant quantities of uranic wastewater is precluded.

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

Typical construction commodities are used, consumed, or stored at the site during the construction phase. Construction commodities are typically used immediately after being brought to the site. Some materials are stored for a short duration until they are used or installed. Table 3.12-5, Commodities Used, Consumed or Stored at the NEF During Construction, summarizes the resources and materials used during the 3-year period of site preparation and major building construction.

Tables 3.12-1, Estimated Annual Radiological and Mixed Wastes, 3.12-2, Estimated Annual Non-Radiological Wastes, and 3.12-3, Estimated Annual Gaseous Effluent, provide listings of materials and resources that are expected to be used, consumed, or stored on site during plant operation. The resources and materials provided in Table 3.12-6, Commodities Used, Consumed, Or Stored at the NEF During Operation, are also expected to be used, consumed, or stored on an annual basis at the NEF during operation.

Table 3.12-4 Estimated Annual Liquid Effluent
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Effluent	Typical Annual Quantities	Typical Uranic Content
Contaminated Liquid Process Effluents:	**m^3 (gal)**	**kg (lb)**
Laboratory Effluent/Floor Washings/Miscellaneous Condensates	23.14 (6,112)	16 (35)[1]
Degreaser Water	3.71 (980)	18.5 (41)[1]
Spent Citric Acid	2.72 (719)	22 (49)[1]
Laundry Effluent	405.8 (107,213)	0.2 (0.44)[2]
Hand Wash and Showers	2,100 (554,820)	None
Total Contaminated Effluent :	2,535 (669,884)	56.7 (125)[3]
Cooling Tower Blowdown:	19,123 (5,051,845)	None
Heating Boiler Blowdown:	138 (36,500)	None
Sanitary:	7,253 (1,916,250)	None
Stormwater Discharge:		
Gross Discharge[4]	174,100 (46 E+06)	None

[1] Uranic quantities are before treatment, volumes for degreaser water and spent citric acid include process tank sludge.
[2] Laundry uranic content is a conservative estimate.
[3] Uranic quantity is before treatment. After treatment approximately 1% or 0.57 kg (1.26 lb) of uranic material is expected to be discharged into the Treated Effluent Evaporative Basin.
[4] Maximum gross discharge is based on total annual rainfall on the site runoff areas, contributing runoff to the Site Stormwater Detention Basin and the UBC Storage Pad Stormwater Retention Basin, neglecting evaporation and infiltration.

4.4 WATER RESOURCES IMPACTS

Water resources at the site are virtually nonexistent. There are no surface waters on the site and appreciable groundwater resources are only at depths greater than approximately 340 m (1,115 ft). The site region has semi-arid climate, with low precipitation rates and minimal surface water occurrence. Thus, the potential for negative impacts on those water resources are very low due to lack of water presence and formidable natural barriers to any surface or subsurface water occurrences. Groundwater at the site would not likely be impacted by any potential releases. The pathways for planned and potential releases are discussed below.

Permits related to water must be obtained for site construction and NEF operation are described in ER Section 1.3, Applicable Regulatory Requirements, Permits and Required Consultation. The purpose of these permits is to address the various potential impacts on water and provide mitigation as needed to maintain state water quality standards and avoid any degradation to water resources at or near the site. These include:

- *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). The NEF is eligible to claim the "No Exposure" exclusion for industrial activity of the NPDES storm water Phase II regulations. As such, the LES would submit a No Exposure Certification immediately prior to initiating operational activities at the NEF site. LES also has the option of filing for coverage under the Multi-Section General Permit (MSGP) because the NEF is one of the 11 eligible industry categories. If this option is chosen, LES will file a Notice of Intent (NOI) with the EPA, Washington, D.C., at least two days prior to the initiation of NEF operations. A decision regarding which option is appropriate for the NEF will be made in the future.
- *NPDES General Permit for Construction Stormwater:* Because construction of the NEF will involve the disturbance of more than 0.4 ha (1 acre) of land (disturbance of about 81 ha (200 acres) will be required for the construction phase of the project), an NPDES Construction General Permit from the EPA Region 6 and an oversight review by the New Mexico Water Quality Bureau (NMWQB) are required. LES will develop a Storm Water Pollution Prevention Plan (SWPPP) and file a NOI with the EPA, Washington, D.C., at least two days prior to the commencement o construction activities.
- *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. NEF will discharge treated process water, stormwater, cooling tower blowdown water and heating boiler blowdown water to surface impoundments, as well as domestic septic wastes. A groundwater discharge permit/plan will be required under 20.6.2.3104 NMAC (NMAC, 2002a). Section 20.6.2.3.3104 NMAC (NMAC, 2002a) 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*: 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 LES of its determination that there are no USAEC jurisdictional waters at the NEF site and for this reason the project does not require a 404 permit (USACE, 2004). As a result, a Section 401 certification is not required.

NEF site design addresses:

- Discharge of stormwater and waste water to site retention/detention basins
- Septic system design and construction
- General construction activities
- Potential for filling or alteration of an arroyo, should one be identified on the site

Discharge of operations waste water will be made exclusively to the Treated Effluent Evaporative Basin for only those liquids that meet physical and chemical criteria per prescribed standards. That basin, described in ER Section 3.4.1.2, is double-lined to prevent infiltration, provided with leak detection, and open to allow evaporation. An annual volume of about 2,535 m^3/yr (669,844 gal/yr) will be discharged to the Treated Effluent Evaporative Basin for evaporation.

Collection and discharge of stormwater runoff will be made to two basins, the Site Stormwater Detention Basin and the Uranium Byproduct Cylinder (UBC) Storage Pad Stormwater Retention Basin. These basins are described in ER Section 3.4.1.2. The Site Stormwater Detention Basin will allow infiltration into the ground as well as evaporation and it has an outlet structure to allow its drainage. The UBC Storage Pad Stormwater Retention Basin is single-lined and will not have an outfall. For an average annual rainfall at the site of 35.94 cm/yr (14.15 in/yr) the potential runoff volumes (before evapotranspiration) are about 33,160 m^3/yr (8,760,000 gal/yr), 139,600 m^3/yr (36,880,000 gal/yr) and 617,000 m^3/yr (163,000,000 gal/yr) for the UBC Storage Pad Stormwater Retention Basin area, the Site Stormwater Detention Basin area, and the balance (i.e., undeveloped) of the site area, respectively.

Industrial construction for the NEF site will provide a short-term risk with regard to a variety of operations and constituents used in construction activities. These will be controlled by employing BMPs including control of hazardous materials and fuels. BMPs will assure stormwater runoff related to construction activities will be detained prior to release to the surrounding land surface. BMPs will also be used for dust control associated with excavation and fill operations during construction. See ER Section 4.1, Land Use Impacts, for more information on construction BMPs. Impact from stormwater runoff generated during plant operations is not expected to differ significantly from impacts currently experienced at the site.

The water quality of the discharge from the site stormwater detention basin will be typical of runoff from building roofs and paved areas from any industrial facility. Except for small amounts of oil and grease typically found in runoff from paved roadways and parking areas, the discharge is not expected to contain contaminants. Other potential sources for runoff contamination during plant operation include an outdoor storage pad containing UBCs of depleted uranium. Although a highly unlikely occurrence, this pad is a potential source of low-level radioactivity that could enter runoff. The engineering of cylinder storage systems (high-grade sealed cylinders as described in ER Section 2.1.2, Proposed Action) and environmental monitoring of the UBC Storage Pad Stormwater Retention Basin, combine to make the potential for contamination release through this system extremely low. An initial analysis of maximum potential levels of radioactivity in rainwater runoff due to surface contamination of UBCs shows that any potential levels of radioactivity in discharges will be well below (two orders of magnitude or more) the effluent discharge limits of 10 CFR 20, Appendix B (CFR, 2003q). The UBC Storage Pad Stormwater Retention Basin is also the discharge location for cooling tower blowdown water and heating boiler blowdown water.

4.4.1 Receiving Waters

The NEF will not obtain any water or discharge any process effluents onto the site or into surface waters other than into engineered basins. Sanitary waste water discharges will be made through site septic systems. Rain runoff from developed portions of the site will be 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.

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

Discharge from the double-lined Treated Effluent Evaporative Basin, with leak detection, will be by evaporation only. NEF effluent flow rates providing input to this basin are relatively low, as described in ER Section 3.4.1.2.

The NEF 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 ER Section 3.4.1.1.1, Site Groundwater Investigations.

Due to high evapotranspiration rates for the area, it is not anticipated that there will be any receiving waters for runoff derived from the NEF 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 ER Section 3.4.1.1, Major Surface and Subsurface Hydrological Systems. That natural process will remove 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 chemistry for about 39 ha (96 acres) of the NEF site plus an additional 9.2 ha (22.8 acres) of the UBC Storage Pad. These areas represent a combined 48.2 ha (118.8 acres) of the 220 ha (543 acre) total NEF site area.

The UBC Storage Pad Stormwater Retention Basin, which will exclusively serve that paved, outdoor storage area, will be lined to prevent any infiltration, and designed to retain a volume (77,700 m^3 (63 acre-ft)) slightly more than twice that for the 24-hour duration, 100-year frequency storm plus an allowance for cooling tower blowdown and heating boiler blowdown.

The basin configuration will allow for radiological testing of water and sediment (see ER Section 4.4.2, Impacts on Surface Water and Groundwater Quality), but the basin will contain no flow outlet. All discharge for the UBC Storage Pad Retention Basin will be through evaporation. The UBC Storage Pad will be constructed of reinforced concrete with a minimal number of construction joints, and pad joints will be provided with joint sealer and water stops as a leak-prevention measure. The ground surface around the UBC Storage Pad will be contoured to prevent rainfall in the area surrounding the pad from entering the pad drainage system.

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

4.4.2 Impacts on Surface Water and Groundwater Quality

Although quantities are severely limited, local shallow groundwater is of a minimally suitable quality to provide sources of potable water. Water for most domestic and industrial uses should contain less than 1,000 mg/L Total Dissolved Solids (TDS) (Davis, 1966), and this compares with a EPA secondary standard of 500 mg/L TDS (CFR, 2003h). The nearby Waste Control Specialists (WCS) facility wells have routinely been analyzed with TDS concentrations between about 2,880 and 6,650 mg/L.

The NEF will not obtain any water from the site or discharge process effluents to groundwater and surface waters other than to the double-lined Treated Effluent Evaporative Basin with leak detection. Therefore, no impacts on natural water systems quality due to facility water use are expected.

Control of surface water runoff will be required for NEF 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 NEF operation, stormwater from the site will be collected in a collection system that includes runoff detention/retention basins, as described in ER Section 4.4.1, Receiving Waters and shown in ER Figure 4.4-1, Site Plan with Stormwater Detention/Retention Basins.

No wastes from facility operational systems will be discharged to stormwater. In addition, stormwater discharges during plant operation will be controlled by a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP will meet the requirements of U.S. EPA Construction General Permit (CGP) Section 3. The SWPPP will identify all potential sources of pollution that may reasonably be exspected to affect the quality of stormwater discharge from the site, describe the practices used to reduce pollutants in stormwater, and assure compliance with the terms and conditions of the CGP.

The UBC Storage Pad Stormwater Retention Basin will collect the runoff water from the UBC Storage Pad. This water runoff has the extremely remote potential to contain low-level radioactivity from cylinder surfaces or leaks. Runoff from the pad will be 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) plus an allowance for cooling tower blowdown and heating boiler blowdown. The drainage system will include precast catch basins and concrete trench drains; piping will be reinforced concrete with rubber gasketed joints to preclude leakage. An assessment was made by LES 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 (CFR, 2003q).

The UBC Storage Pad Stormwater Retention Basin will be 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.

4.4.3 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 will occur due to facility construction. Referring to ER Section 3.4.12, 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 will be used during site preparation and will likely be 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 on-site 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.

4.4.4 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 NEF site, no significant impacts are expected for the site's hydrologic systems.

Control of surface water runoff will be required for NEF 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 4.4.7, Control of Impacts to Water Quality.

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.

4.4.5 Ground and Surface Water Use

The NEF will 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 NEF will be obtained from the Eunice and/or Hobbs, New Mexico, municipal water systems. Wells serving these systems are about 32 km (20 mi) from the site. Anticipated normal plant water consumption and peak plant water requirements are provided in Table 3.4-4, Anticipated Normal Plant Water Consumption, and Table 3.4-5, Anticipated Peak Plant Water Consumption, respectively.

Site groundwater will not be utilized for any reason, and therefore, should not be impacted by routine NEF operations. The NEF water supply will be obtained from the city of Eunice, New Mexico and the city of Hobbs, New Mexico. Current capacities for the Eunice and Hobbs, New Mexico municipal water supply system are 16,350 m^3/day (4.32 million gpd) and 75,700 m^3/day (20 million gpd), respectively and current usages are 5,600 m^3/day (1.48 million gpd) and 23,450 m^3/day (6.2 million gpd), respectively. Average and peak potable water requirements for operation of the NEF are expected to be approximately 240 m^3/day (63,423 gpd) and 85 m^3/hr (378 gpm), respectively. These usage rates are well within the capacities of both water systems.

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

4.4.6 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 3.4-7, Water and Oil Wells in the Vicinity of the NEF 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, 2003b). No producing supply water wells are within 1.6 km (1 mi) of the boundaries of the NEF site as shown on Figure 3.4-7. 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 NEF site will prevent 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 will be controlled in a way that will also prevent 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.

4.4.7 Control of Impacts to Water Quality

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

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 will be handled by portable systems until such time that the site septic systems are available for use.

The need to level the site for construction will require some soil excavation as well as soil fill. Fill placed on the site will provide the same characteristics as the existing natural soils thus providing the same runoff characteristics as currently exist due to the presence of natural soils on the site.

During operation, the NEF's stormwater runoff detention/retention system will provide a means to allow controlled release of site runoff from the Site Stormwater Detention Basin only. Stormwater discharge will be periodically monitored in accordance with state and/or federal permits. This system will also be used for routine sampling of runoff as described in ER Section 6.1.1.2, Liquid Effluent Monitoring. A Spill Prevention Control and Countermeasure (SPCC) plan will be implemented for the facility to identify potential spill substances, sources and responsibilities. A SWPP will also be implemented for the NEF to assure that runoff released to the environment will be of suitable quality. These plans are described in ER Section 4.1, Land Use Impacts.

Water discharged to the NEF site septic systems will meet required levels for all contaminants stipulated in any permit or license required for that activity, including the 10 CFR 20 (CFR, 2003q) and a Groundwater Discharge Permit/Plan. The facility's Liquid Effluent Collection and Treatment System provides a means to control liquid waste within the plant. The system provides for collection, treatment, analysis, and processing of liquid wastes for disposal. Effluents unsuitable for release to the Treated Effluent Evaporative Basin are processed onsite or disposed of offsite in a suitable manner in conformance with U.S. EPA and State of New Mexico regulatory requirements. The State of New Mexico has adopted the U.S. EPA hazardous water regulations (40 CFR Parts 260 through 266, 268 and 270) (CFR, 2003cc; CFR, 2003p; CFR, 2003dd; CFR, 2003ee; CFR, 2003v; CFR, 2003ff; CFR, 2003gg; CFR, 2003hh; CFR, 2003ii) governing the generation, handling, storage, transportation, and disposal of hazardous materials. These regulations are found in 20.4.l NMAC, "Hazardous Waste Management" (NMAC, 2000).

The UBC Storage Pad Stormwater Retention Basin, which exclusively serves the UBC Storage Pad, cooling tower blowdown water and heating boiler blowdown water discharges, 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 plus an allowance for cooling tower blowdown and heating boiler blowdown. 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. 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 will also receive 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 NEF around the east and west sides of the NEF structures during extreme precipitation events. There is no retention or attenuation of flow associated with this feature. The east side will divert 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 will divert surface runoff around the site where it will continue on as overland flow. Since there are is determined by LES to be a waste and not a resource, it meets the 10 CFR 61 definition of low-level radioactive waste.

Disposition of the UBCs has several potential impacts that depend on the particular approach taken. Currently, the preferred options are short-term onsite storage followed by conversion and underground burial (Option 1 below) or transportation of the UBCs to a DOE conversion facility (Option 2 below). LES considered several other options in addition to the preferred options that could have implications on the number of UBCs stored at the NEF and the length of storage for the cylinders. All of these options are discussed below along with some of their impacts. However, at this time, LES 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 the NEF to a private sector conversion facility and depleted U_3O_8 permanent disposal in a western U.S. exhausted underground uranium mine is the preferred "plausible strategy" disposition option. The NRC repeatedly affirmed its acceptance of this option during its licensing review of the previous LES license application. In Section 4.2.2.8 of its final environmental impact statement (FEIS) for that application, the NRC staff noted that "it is plausible to assume that depleted UF_6 converted into U_3O_8 may be disposed by emplacement in near surface or deep geological disposal units" (NRC, 1994a). And during the subsequent adjudicatory hearing on that application, an NRC Atomic Safety and Licensing Board held that "[LES] has presented a plausible disposal strategy. [Its] plan to convert depleted UF_6 to U_3O_8 at an offsite facility in the United States and then ship that material as waste to a final site for deeper than surface burial is a reasonable and credible plan for depleted UF_6 disposal (NRC, 1997).

LES 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) LES will aggressively pursue economically viable paths for UBCs as soon as they become available; (4) LES 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) LES will put in place as part of the NRC license a financial surety bonding mechanism that assures funding will be available in the event of any default by LES.

ConverDyn, a company that is engaged in converting U_3O_8 material to UF_6 for enrichment, has the technical capability to construct and operate a depleted UF_6 to depleted U_3O_8 facility at its facility in Metropolis, Illinois in the future if there is an assured market. One of the two ConverDyn partners, General Atomics, may have access to an exhausted uranium mine (the Cotter Mines in Colorado) where depleted U_3O_8 could be disposed. Furthermore, discussions have recently been held with Cogema concerning a private conversion facility. Cogema has experience with such a facility currently processing depleted UF_6 in France. These factors support LES's position that this option is the preferred "plausible strategy" option.

Any deconversion facility used by NEF will not be located in the State of New Mexico.

Option 2 – DOE Conversion and Disposal (Plausible Strategy)

Transporting depleted UF_6 from the NEF to DOE conversion facilities for ultimate disposition is a plausible disposition option. Pursuant to Section 3113 of the USEC Privatization Act, DOE is instructed to "accept for disposal" depleted UF_6, such as those that will be generated by the NRC-licensed NEF. To that end, DOE has recently contracted for the construction and

The LLNL cost analyses assumed that the depleted UF_6 would be converted to depleted U_3O_8, the DOE's preferred disposal form, using one of two dry process conversion alternatives. The first alternative, the AHF option, upgrades the hydrogen fluoride (HF) product to anhydrous HF (<1.0% water). In the second option, the HF neutralization alternative, the HF would be neutralized with lime to produce calcium fluoride (CaF_2). The LLNL cost analyses assumed that the AHF and CaF_2 conversion products' would have negligible uranium contamination and could be sold for unrestricted use. LES will not use a deconversion facility that employs a process that results in the production of anhydrous HF.

Table 4.13-2, LLNL Estimated Life-Cycle Costs for DOE Depleted UF_6 to Depleted U_3O_8 Conversion, presents the LLNL-estimated life-cycle capital, operating, and regulatory discounted costs in 1996 dollars, for conversion of 378,600 MTU (417,335 tons uranium) over 20 years, of depleted UF_6 to depleted U_3O_8 by anhydrous hydrogen fluoride (AHF) and HF neutralization processing. The costs were extracted from Table 4.8 in the LLNL report. The discounted LLNL life-cycle costs in 1996 dollars were undiscounted and converted to per kg unit costs and adjusted to 2002 dollars using the Gross Domestic Product (GDP) Implicit Price Deflator (IPD), as shown in the table. The escalation adjustment resulted in the 1996 costs being increased by 11%.

The anhydrous hydrogen fluoride (AHF) conversion option for which LLNL provides a cost estimate assumes that the AHF by-product is saleable, and that total sales revenues over the 20 years of operation would amount to $77.32 million, in discounted dollars. LLNL also assumed that the life-cycle sale of CaF_2 obtained from neutralizing HF with lime would result in discounted revenues of $11.02 million.

The cost estimates for the conversion facility assumed that all major buildings are to be structural steel frame construction, except for the process building which is a two story reinforced concrete structure. Most of this building is assumed to be "special construction" with 0.3-m (1-ft) thick concrete perimeter walls and ceilings, 8-in concrete interior walls, and 0.6-m (2-ft) thick concrete floor mat. The "standard construction" area walls were taken to be 8-in thick concrete with 15-cm (6-in) elevated floors and 20 cm (8-in) concrete floors slabs on grade.

Table 4.13-3, Summary of LLNL Estimated Capital, Operating and Regulatory Unit Costs for DOE depleted UF_6 to Depleted U_3O_8 Conversion, presents a summary of estimated capital, operating and regulatory costs for depleted UF_6 to depleted U_3O_8 conversion on a dollars per kgU basis, in both 1996 and 2002 dollars, undiscounted. It can be seen that in either case the conversion process is operations and maintenance intensive.

Table 4.13-4, LLNL Estimated Life Cycle Costs for DOE Depleted UF_6 Disposal Alternatives, presents LLNL-estimated life-cycle costs for the waste form preparation and disposal of DOE depleted U_3O_8 produced by conversion of depleted UF_6. The table presents estimated costs for two depleted U_3O_8 disposal alternatives: shallow earthen structures (engineered "trenches") and concrete vaults. The waste form preparation for each alternative consists primarily of loading, compacting, and sealing the depleted U_3O_8 into 208-L (55-gal) steel drums.

The LLNL-estimated life-cycle costs for depleted U_3O_8 disposal range from $86 million, in discounted 1996 dollars, for the engineered trench alternative to $180 million for depleted U_3O_8 disposal in a concrete vault. The disposal unit costs range from $1.46 per kgU to $2.17 per kgU, in 2002 dollars. As discussed later in this section, the LLNL-estimated concrete vault costs are higher than those that would be required to either sink a new underground mine or to refurbish and operate an existing exhausted mine, an alternative that the NRC has indicated to be acceptable (ORNL, 1995). For example, the capital cost for the concrete vault alternative of

Alternatives for the concrete vault alternative, represents an upper bound cost estimate for depleted U_3O_8 disposal. For example, the capital cost of the concrete vault alternative, which may be obtained by undiscounting the LLNL estimate costs presented in Table 4.13-4, is $350 million in 2002 dollars, or 28 times the capital cost of the 200 MT (220 tons) mine discussed above.

The four sets of cost estimates obtained are presented in Table 4.13-7 in 2002 dollars per kgU. Note that the Claiborne Enrichment Center cost had a greater uncertainty associated with it. The UDS contract does not allow the component costs for conversion, disposal and transportation to be estimated. The costs in the table indicate that $5.50 per kgU ($2.50 per lb U) is a conservative and, therefore, prudent estimate of total depleted UF_6 disposition cost for the LES NEF. That is, the historical estimates from LLNL and CEC and the more recent actual costs from the UDS contract were used to inform the LES cost estimate. Urenco has reviewed this estimate and, based on its current cost for UBC disposal, finds this figure to be prudent.

Based on information from corresponding vendors, the value of $5.50 per kgU (2002 dollars), which is equal to $5.70 per kgU when escalated to 2004 dollars, was revised in January 2005 to $4.68 per kgU (2004 dollars) (with no contingency applied). The value of $4.68 per kgU was derived from the estimates of costs from the three components that make up the total disposition cost of DUF_6 (i.e., deconversion, disposal, and transportation).

4.13.3.2 Water Quality Limits

All plant effluents are contained on the NEF site. A series of evaporation retention/detention basins, and septic systems are used to contain the plant effluents. There will be no discharges to a Publicly Owned Treatment Works (POTW). Contaminated water is treated to the limits in 10 CFR 20.2003, 10 CFR 20, Appendix B, Table 3 and to administrative levels recommended by Regulatory Guide 8.37 (CFR, 2003q; NRC, 1993). Refer to ER Section 4.4, Water Resource Impacts, for additional water quality standards and permits for the NEF. ER Section 3.12, Waste Management, also contains information on the NEF systems and procedures to ensure water quality.

4.13.4 Waste Minimization

The highest priority has been assigned to minimizing the generation of waste through reduction, reuse or recycling. The NEF incorporates several waste minimization systems in its operational procedures that aim at conserving materials and recycling important compounds. For example, all Fomblin Oil will be recovered where practical. Fomblin Oil is an expensive, highly fluorinated, inert oil selected specifically for use in UF_6 systems to avoid reactions with UF_6. The NEF will also have in place a Decontamination Workshop designed to remove radioactive contamination from equipment and allow some equipment to be reused rather than treated as waste.

In addition, the NEF process systems that handle UF_6, other than the Product Liquid Sampling System, will operate entirely at subatmospheric pressure to prevent outward leakage of UF_6. Cylinders, initially containing liquid UF_6, will be transported only after being cooled, so that the UF_6 is in solid form, to minimize the potential risk of accidental releases due to mishandling.

The NEF is designed to minimize the usage of natural and depletable resources. Closed-loop cooling systems have been incorporated in the designs to reduce water usage. Power usage will be minimized by efficient design of lighting systems, selection of high-efficiency motors, and use of proper insulation materials.

ALARA controls will be maintained during facility operation to account for standard waste minimization practices as directed in 10 CFR 20 (CFR, 2003q). The outer packaging associated with consumables will be removed prior to use in a contaminated area. The use of glove boxes will minimize the spread of contamination and waste generation.

Collected waste such as trash, compressible dry waste, scrap metals, and other candidate wastes will be volume reduced at a centralized waste processing facility. This facility could be operated by a commercial vendor such as GTS Duratek. This facility would further reduce generated waste to a minimum quantity prior to final disposal at a land disposal facility or potential reuse.

4.13.4.1 Control and Conservation

The features and systems described below serve to limit, collect, confine, and treat wastes and effluents that result from the UF_6 enrichment process. A number of chemicals and processes are used in fulfilling these functions. As with any chemical/industrial facility, a wide variety of waste types will be produced. Waste and effluent control is addressed below as well as the features and systems used to conserve resources.

4.13.4.1.1 Mitigating Effluent Releases

The equipment and design features incorporated in the NEF are selected to keep the release of gaseous and liquid effluent contaminants as low as practicable, and within regulatory limits. They are also selected to minimize the use of depletable resources. Equipment and design features for limiting effluent releases during normal operation are described below:

The process systems that handle UF_6 operate almost entirely at sub-atmospheric pressures. Such operation results in no outward leakage of UF_6 to any effluent stream.

- The one location where UF_6 pressure is raised above atmospheric pressure is in the piping and cylinders inside the sampling autoclave. The piping and cylinders inside the autoclave confine the UF_6. In the event of leakage, the sampling autoclave provides secondary containment of UF_6.
- Cylinders of UF_6 are transported only when cool and when the UF_6 is in solid form. This minimizes risk of inadvertent releases due to mishandling.
- Process off-gas, from UF_6 purification and other operations, is discharged through desublimers to solidify and reclaim as much UF_6 as possible. Remaining gases are discharged through high-efficiency filters and chemical adsorbent beds. The filters and adsorbents remove HF and uranium compounds left in the gaseous effluent stream.
- Liquids and solids in the process systems collect uranium compounds. When these liquids and solids (e.g., oils, damaged piping, or equipment) are removed for cleaning or maintenance, portions end up in wastes and effluent. Different processes are employed to separate uranium compounds and other materials (such as various heavy metals) from the resulting wastes and effluent. These processes are described in ER Section 4.13.4.2 below.

- Processes used to clean up wastes and effluent create their own wastes and effluent as well. Control of these is also accomplished by liquid and solid waste handling systems and techniques, which are described in detail in the Sections below. In general, careful applications of basic principles for waste handling are followed in all of the systems and processes. Different waste types are collected in separate containers to minimize contamination of one waste type with another. Materials that can cause airborne contamination are carefully packaged; ventilation and filtration of the air in the area is provided as necessary. Liquid wastes are confined to piping, tanks, and other containers; curbing, pits, and sumps are used to collect and contain leaks and spills. Hazardous wastes are stored in designated areas in carefully labeled containers; mixed wastes are also contained and stored separately. Strong acids and caustics are neutralized before entering an effluent stream. Radioactively contaminated wastes are decontaminated insofar as possible to reduce waste volume.
- Following handling and treatment processes to limit wastes and effluent, sampling and monitoring is performed to assure regulatory and administrative limits are met. Gaseous effluent is monitored for HF and is sampled for radioactive contamination before release; liquid effluent is sampled and/or monitored in liquid waste systems; solid wastes are sampled and/or monitored prior to offsite treatment and disposal. Samples are returned to their source where feasible to minimize input to waste streams.

4.13.4.1.2 Conserving Depletable Resources

The NEF design serves to minimize the use of depletable resources. Water is the primary depletable resource used at the facility. Electric power usage also depletes fuel sources used in the production of the power. Other depletable resources are used only in small quantities. Chemical usage is minimized not only to conserve resources, but also to preclude excessive waste production. Recyclable materials are used and recycled wherever practicable.

The main feature incorporated in the NEF to limit water consumption is the use of closed-loop cooling systems.

The NEF 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 washing machines compared to standard machines reduces water usage.
- 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 to reduce water usage.

Power usage is minimized by efficient design of lighting systems, selection of high-efficiency motors, use of appropriate building insulation materials, and other good engineering practices.

The demand for power in the process systems is a major portion of plant operating cost; efficient design of components is incorporated throughout process systems.

4.13.4.1.3 Prevention and Control of Oil Spills

The NEF will implement a spill control program for accidental oil spills. The purpose of the spill control program will be to reduce the potential for the occurrence of spills, reduce the risk of injury in case of a spill occurs, minimize the impact of a spill, and provide a procedure for the cleanup and reporting of spills. The oil spill control program will be established to comply with the requirements of 40 CFR 112 (CFR, 2003aa), Oil Pollution Prevention. As required by Part 112 , a Spill Prevention, Control, and Countermeasure (SPCC) plan will be prepared prior to either the start of facility operation of the facility or prior to the storage of oil onsite in excess of the de minimis quantities established in 40 CFR 112.1(d) (CFR, 2003aa). The SPCC Plan will be reviewed and certified by a Professional Engineer and will be maintained onsite.

As a minimum the SPCC Plan will contain the following information:

- Identification of potential significant sources of spills and a prediction of the direction and quantity of flow that would result from a spill from each such source;
- Identification the use of containment or diversionary structures such as dikes, berms, culverts, booms, sumps, and diversion ponds to be used at the facility where appropriate to prevent discharged oil from reaching navigable waters;
- Procedures for inspection of potential sources of spills and spill containment/diversion structures; and
- Assigned responsibilities for implementing the plan, inspections, and reporting.

In addition to preparation and implementation of the SPCC Plan, the facility will comply with the specific spill prevention and control guidelines contained in 40 CFR 112.7(e) (CFR, 2003aa), such as drainage of rain water from diked areas, containment of oil in bulk storage tanks, above ground tank integrity testing, and oil transfer operational safeguards.

4.13.4.2 Reprocessing and Recovery Systems

Systems used to allow recovery or reuse of materials are described below.

4.13.4.2.1 Fomblin Oil Recovery System

Fomblin oil is an expensive, highly fluorinated, inert oil selected specifically for use in UF_6 systems to avoid reaction with UF_6. The Fomblin Oil Recovery System recovers used Fomblin oil from pumps used in UF_6 systems. All Fomblin oil is recovered; none is normally released as waste or effluent.

Used Fomblin oil is recovered by removing impurities that inhibit the oil's lubrication properties. The impurities collected are primarily uranyl fluoride (UO_2F_2) and uranium tetrafluoride (UF_4) particles. The recovery process also removes trace amounts of hydrocarbons, which if left in the oil would react with UF_6. The Fomblin Oil Recovery System components are located in the Decontaminated Workshop in the Technical Services Building (TSB). The total annual volume of oil to be processed in this system is approximately 535 L (141 gal).

The Fomblin oil recovery process consists of oil collection, uranium precipitation, trace hydrocarbon removal, oil sampling, and storage of cleaned oil for reuse. Each step is performed manually.

Fomblin oil is collected in the Vacuum Pump Rebuild Workshop as part of the pump disassembly process. The oil is the transferred for processing to the Decontamination Workshop in plastic containers. The containers are labeled so each can be tracked through the process. Used oil awaiting processing is stored in the used oil storage receipt array to eliminate the possibility of accidental criticality.

Uranium compounds are removed from the Fomblin oil in the Fomblin oil fume hood to minimize personnel exposure to airborne contamination. Dissolved uranium compounds are removed by the addition of anhydrous sodium carbonate (Na_2CO_3) to the oil container which causes the uranium compounds to precipitate into sodium uranyl carbonate $Na_4UO_2(CO_3)_3$. The mixture is agitated and then filtered through a coarse screen to remove metal particles and small parts such as screws and nuts. These are transferred to the Solid Waste Collection System. The oil is then heated to 90°C (194°F) and stirred for 90 minutes to speed the reaction. The oil is then centrifuged to remove UF_4, sodium uranyl carbonate, and various metallic fluorides. The particulate removed from the oil is collected and transferred to the Solid Waste Collection Room for disposal.

Trace amounts of hydrocarbons are next removed in the Fomblin oil fume hood next by adding activated carbon to the Fomblin oil and heating the mixture at 100°C (212°F) for two hours. The activated carbon absorbs the hydrocarbons, and the carbon in turn is removed by filtration through a bed celite. The resulting sludge is transferred to the Solid Waste Disposal Collection Room for disposal.

Recovered Fomblin oil is sampled. Oil that meets the criteria can be reused in the system while oil that does not meet the criteria will be reprocessed. The following limits have been set for evaluating recovered Fomblin oil purity for reuse in the plant:

- Uranium - 50 ppm by volume
- Hydrocarbons - 3 ppm by volume

Recovered Fomblin oil is stored in plastic containers in the Chemical Storage Area.

Failure of this system will not endanger the health and safety of the public. Nevertheless, design and operating features are included that contribute to the safety of plant workers. Containment of waste is provided by components, designated containers, and air filtration systems. Criticality is precluded through the control of geometry, mass, and the selection of appropriate storage containers. To minimize worker exposure, airborne radiological contamination resulting from dismantling is extracted. Where necessary, air suits and portable ventilation units are available for further worker protection.

4.13.4.2.2 Decontamination System

The Contaminated Workshop and Decontamination System are located in the same room in the TSB. This room is called the Decontamination Workshop. The Decontamination Workshop in the TSB will contain the area to break down and strip contaminated equipment and to decontaminate that equipment and its components. The decontamination systems in the workshop are designed to remove radioactive contamination from contaminated materials and equipment. The only significant forms of radioactive contamination found in the plant are uranium hexafluoride (UF_6), uranium tetrafluoride (UF_4) and uranyl fluoride (UO_2F_2).

One of the functions of the Decontamination Workshop is to provide a maintenance facility for both UF_6 pumps and vacuum pumps. The workshop will be used for the temporary storage and subsequent dismantling of failed pumps. The dismantling area will be in physical proximity to the decontamination train, in which the dismantled pump components will be processed. Full maintenance records for each pump will be kept.

The process carried out within the Decontamination Workshop begins with receipt and storage of contaminated pumps, out-gassing, Fomblin oil removal and storage, and pump stripping. Activities for the dismantling and maintenance of other plant components are also carried out. Other components commonly decontaminated besides pumps include valves, piping, instruments, sample bottles, tools, and scrap metal. Personnel entry into the facility will be via a sub-change facility. This area has the required contamination controls, washing and monitoring facilities.

The decontamination part of the process consists of a series of steps following equipment disassembly including degreasing, decontamination, drying, and inspection. Items from uranium hexafluoride systems, waste handling systems, and miscellaneous other items are decontaminated in this system. The decontamination process for most plant components is described below, with a typical cycle time of one hour. For smaller components the decontamination process time is slightly less, about 50 minutes. Sample bottles and flexible hoses are handled under special procedures due to the difficulty of handling the specific shapes. Sample bottle decontamination and decontamination of flexible hoses are addressed separately below.

Criticality is precluded through the control of geometry, mass, and the selection of appropriate storage containers. Administrative measures are applied to uranium concentrations in the Citric Acid Tank and Degreaser Tank to maintain these controls. To minimize worker exposure, airborne radiological contamination resulting from dismantling is extracted. Air suits and portable ventilation units are available for further worker protection.

Containment of chemicals and wastes is provided by components, designated containers, and air filtration systems. All pipe work and vessels in the Decontamination Workshop are provided with design measures to protect against spillage or leakage. Hazardous wastes and materials are contained in tanks and other appropriate containers, and are strictly controlled by administrative procedures. Chemical reaction accidents are prevented by strict control on chemical handling.

4.13.4.2.3 General Decontamination

Prior to removal from the plant, the pump goes through an isolation and de-gas process. This removes the majority of UF_6 from the pump. The pump flanges are then sealed prior to movement to the Decontamination Workshop. The pumps are labeled so each can be tracked through the process. Pumps enter the Decontamination Workshop through airlock doors. The internal and external doors are electrically interlocked such that only one door can be opened at a given time. Pumps may enter the workshop individually or in pairs. Valves, pipework, flexible hoses, and general plant components are accepted into the room either within plastic bags or with the ends blinded.

Pumps waiting to be processed are stored in the pump storage array to eliminate the possibility of accidental criticality. The array maintains a minimum edge spacing of 600 mm (2 ft). Pumps are not accepted if there are no vacancies in the array.

Before being broken down and stripped, all pumps are placed in the Outgas Area and the local ventilation hose is positioned close to the pump flange. The flange cover is then removed. HF and UF_6 fumes from the pump are extracted via the exhaust hose, typically over a period of several hours...While in the Outgas Area, the oil will be drained from the pumps and the first stage roots pumps will be separated from the second stage roots pumps. The oil is drained into 5-L (1.3 gal) plastic containers that are labeled so each can be tracked through the process.

Prior to transfer from the Outgas Area, the outside of the bins, the pump frames, and the oil bottles are all monitored for radiological contamination. The various items will then be taken to the decontamination system or Fomblin oil storage array as appropriate.

Oil waiting to be processed is stored in the Fomblin oil storage array to eliminate the possibility of accidental criticality. The array maintains a minimum edge spacing of about 600 mm (2 ft) between containers. When ready for processing, the oil is transferred to the Fomblin Oil Recovery System where the uranics and hydrocarbon contaminants can be separated prior to reuse of the oil.

After out-gassing, individual pumps are removed from the Outgas Area and placed on either of the two hydraulic stripping tables. An overhead crane is utilized to aid the movement of pumps and tools over the stripping table. The tables can be height-adjusted and the pump can be moved and positioned on the table. Hydraulic stripping tools are then placed on the stripping tables using the overhead crane or mobile jig truck. The pump and motor are stripped to component level using various hydraulic and hand tools. Using the overhead crane or mobile jig truck, the components are placed in bins ready for transportation to the General Decontamination Cabinet.

Degreasing is performed following disassembly of equipment. Degreasing takes place in the hot water Degreaser Tank of the decontamination facility system. The degreased components are inspected and then transferred to the next decontamination tank..

Following disassembly and degreasing, decontamination is accomplished by immersing the contaminated component in a citric acid bath with ultrasonic agitation. After 15 minutes, the component is removed, and is rinsed with water to remove the citric acid.

The tanks are sampled periodically to determine the condition of the solution and any sludge present. The Citric Acid Tank contents are analyzed for uranium concentration and citric acid concentration. A limit on ^{235}U of 0.2 g/L (0.02 ounces/gal) of bath has been established to prevent criticality. Additional citric acid is added as necessary to keep the citric acid concentration between 5% and 7%. Spent solutions, consisting of citric acid and various uranyl and metallic citrates, are transferred to a citric acid collection tank. The Rinse Water Tanks are checked for satisfactory pH levels; unusable water is transferred to an effluent collection tank.

All components are dried after decontamination. This is performed manually using compressed air.

The decontaminated components are inspected prior to release. The quantity of contamination remaining shall be "as-low-as-reasonably practicable." Components released for unrestricted use do not have contamination exceeding 83.3 Bq/100 cm^2 (5,000 dpm/100 cm^2) for average fixed alpha or beta/gamma contamination and 16 Bq/100 cm^2 (1,000 dpm/100 cm^2) removable alpha or beta/gamma contamination. However, if all the component surfaces cannot be monitored then the consignment will be disposed of as a low-level waste.

4.13.4.2.4 Sample Bottle Decontamination

Sample bottle decontamination is handled somewhat differently than the general decontamination process. The Decontamination Workshop has a separate area dedicated to sample bottle storage, disassembly, and decontamination. Used sample bottles are weighed to confirm the bottles are empty. The valves are loosened, and the remainder of the decontamination process is performed in the sample bottle decontamination hood. The valves are removed inside the fume hood. Any loose material inside the bottle or valve is dissolved in a citric acid solution. Spent citric acid is transferred to the Spent Citric Acid Collection Tank in the Liquid Effluent Collection and Treatment System.

Initially, sample bottles and valves are flushed with a 10% citric acid solution and then rinsed with deionized water. In the case of sample bottles, these are filled with deionized water and left to stand for an hour, while the valves are grouped together and citric acid is recirculated in a closed loop for an hour. These used solutions are collected and taken to the Citric Acid Collection Tank in the General Decontamination Cabinet. Any liquid spillages / drips are soaked away with paper tissues that are disposed of in the Solid Waste Collection Room. Bottles and valves are then rinsed again with deionized water. This used solution is collected in a small plastic beaker, and then poured into the Citric Acid Tank in the decontamination train. Both the bottles and valves are dried manually, using compressed air, and inspected for contamination and rust. The extracted air exhausts to the Gaseous Effluent Vent System (GEVS) to ensure airborne contamination is controlled. The bottles are then put into an electric oven to ensure total dryness, and on removal are ready for reuse. The cleaned components are transferred to the clean workshop for reassembly and pressure and vacuum testing.

4.13.4.2.5 Flexible Hose Decontamination

The decontamination of flexible hoses is handled somewhat differently than the general process and has a separate area. The decontamination process is performed in a Flexible Hose Decontamination Cabinet. This decontamination cabinet is designed to process only one flexible hose at a time and is comprised of a supply of citric acid, deionized water and compressed air.

Initially, the flexible hose is flushed with a 10% citric acid solution at 60°C (140°F) and then rinsed with deionized water (also at 60°C) (140°F) in a closed loop recirculation system. The used solutions (citric acid and deionized water) are transferred into the contaminated Citric Acid Tank for disposal. Interlocks are provided in the recirculation loop to prevent such that the recirculation pumps from starting if the flexible hose has not been connected correctly at both ends. Both the citric acid and deionized water recirculation pumps are equipped with a 15-minute timer device. The extracted air exhausts to the Gaseous Effluent Vent System (GEVS) to ensure airborne contamination is controlled. Spill from the drip tray are routed to either the Citric Acid Tank or the hot water recirculation tank, depending upon the decontamination cycle. Each flexible hose is then dried in the decontamination cupboard using hot compressed air at 60°C (140°F). to ensure complete dryness. The cleaned dry flexible hose is then transferred to the Vacuum Pump Rebuild Workshop for reassembly and pressure testing prior to reuse in the plant.

- 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).
- A Spill Prevention Control and Countermeasure (SPCC) plan, 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 handled by portable systems, until such time that plant sanitary facilities are available for site use. An adequate number of these portables systems will be provided.
- 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 concentration releases to the Treated Effluent Evaporative Basin and the UBC Storage Pad Stormwater Retention Basin will both be below the 10 CFR 20 (CFR, 2003q) uncontrolled release limits. Both basins are included in the site environmental monitoring plan.
- Periodic visual inspections of the NEF basins for high level will be performed to verify proper functioning. The visual inspections will be performed on a frequency that is sufficient to allow for identification of basin high water level conditions and implementation of corrective actions to restore water level of the associated basin(s) prior to overflowing.
- Control of surface water runoff will be required for activities as covered by the National Pollutant Discharge Elimination System (NPDES) Construction General Permit. As a result, no impacts are expected to surface or groundwater bodies.

The NEF 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 washing machines compared to standard machines reduces water usage.
- 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 to reduce water usage.

The UBC Storage Pad Stormwater Retention Basin, which exclusively serves the UBC Storage Pad and cooling tower blowdown water and heating boiler blowdown water discharges, 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 and an allowance for the cooling tower blowdown water and heating boiler 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.

Discharge of operations-generated potentially contaminated waste water is made exclusively to the Treated Effluent Evaporative Basin. Only liquids meeting site administrative limits (based on prescribed standards) and discharged to this basin. The basin is double-lined, open to allow evaporation, has no flow outlet and has leak detection.

5.2.5 Ecological Resources

Mitigation measures will be 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
- The use of detention and retention ponds
- Site stabilization practices to reduce the potential for erosion and sedimentation.
- Proposed wildlife management practices include:
- The placement of a raptor perch in an unused open area.
- The use of bird feeders at the visitor's center.
- The placement of quail feeders in the unused open areas away from the NEF buildings.
- 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 netting, or other suitable material, to ensure migratory birds are excluded from evaporative ponds that do not meet New Mexico Water Quality Control Commission (NMWQCC, 2002) surface water standards for wildlife usage.
- The use of animal-friendly fencing around the site so that wildlife cannot be injured or entangled in the site security fence.
- 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 proposed wildlife management practices above, LES 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.

After treatment, the effluent is released to the double-lined Treated Effluent Evaporative Basin, which includes leak detection monitoring. Concentrated radioactive solids generated by the liquid treatment processes at the facility are handled and disposed of as low-level radioactive waste.

The design basis uranium source term for routine liquid effluent discharge to the Treated Effluent Evaporative Basin has been conservatively estimated to be 14.4 MBq (390 μCi) per year. There is no offsite release of liquid effluents to unrestricted areas. ER Section 4.12, Public and Occupational Health Impacts, provides additional details regarding effluent source terms.

Representative sampling is required for all batch liquid effluent releases. Liquid samples are collected from each liquid batch and analyzed prior to any transfer. Isotopic analysis is performed prior to discharge. The MDC for analysis of liquid effluent are presented in Table 6.1-2, Required Lower Level of Detection for Effluent Sample Analyses. The liquid effluent sampling program supports the determination of quantities and concentrations of radionuclides discharged to the Treated Effluent Evaporative Basin and supports the collection of other information required in reports submitted to the NRC.

Periodic sampling of liquid effluent is required since these effluents are treated in batches. Representative sampling is assured through the use of tank agitators and recirculation lines. All collection tanks are sampled before the contents are sent through any treatment process. Treated water is collected in Monitor Tanks, which are sampled before discharge to the Treated Effluent Evaporative Basin.

NRC Information Notice 94-07 (NRC, 1994b) describes the method for determining solubility of discharged radioactive materials. Note that liquid effluents at the NEF are treated such that insoluble uranium is removed as part of the treatment process. Releases are in accordance with the ALARA principle.

General site stormwater runoff is routed to the Site Stormwater Detention Basin. The UBC Storage Pad Stormwater Retention Basin collects rainwater from the UBC Storage Pad as well as cooling tower blowdown water and heating boiler blowdown water. Approximately 174,100 m^3 (46 million gal) of stormwater are expected to be collected each year by the two basins. Both of these basins will be included in the site Radiological Environmental Monitoring Program. See ER Section 6.1.2.

6.1.2 Radiological Environmental Monitoring Program

The Radiological Environmental Monitoring Program (REMP) at the NEF is a major part of the effluent compliance program. It provides a supplementary check of containment and effluent controls, establishes a process for collecting data for assessing radiological impacts on the environs and estimating the potential impacts on the public, and supports the demonstration of compliance with applicable radiation protection standards and guidelines.

The primary objective of the REMP is to provide verification that the operations at the facility do not result in detrimental radiological impacts on the environment. Through its implementation, the REMP provides data to confirm the effectiveness of effluent controls and the effluent monitoring program. In order to meet program objectives, representative samples from various

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

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Effluent Type	Nuclide	MDC[a] in Bq/ml (μCi/ml)
Gaseous	^{234}U	3.7×10^{-13} (1.0×10^{-17})
	^{235}U	3.7×10^{-13} (1.0×10^{-17})
	^{236}U	3.7×10^{-13} (1.0×10^{-17})
	^{238}U	3.7×10^{-11} (1.0×10^{-15})
	Gross Alpha	3.7×10^{-11} (1.0×10^{-15})
Liquid	^{234}U	1.4×10^{-4} (3.0×10^{-9})
	^{235}U	1.4×10^{-4} (3.0×10^{-9})
	^{236}U	1.4×10^{-4} (3.0×10^{-9})
	^{238}U	1.4×10^{-4} (3.0×10^{-9})

[a] These MDCs are less than 2% of the limits in 10 CFR 20 Appendix B, Table 2 Effluent Concentrations

Table 6.1-4 Radiological Environmental Monitoring Program

Sample Type	Minimum Number of Sample Locations	Sampling and Collection Frequency	Type of Analysis
Continuous Airborne Particulate	7	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 each filter change. Quarterly isotopic analysis on composite sample.
Vegetation	8	1 to 2-kg (2.2 to 4.4-lb) samples collected semiannually	Isotopic analysis[a]
Groundwater	5	4-L (1.06-gal) samples collected semiannually	Isotopic analysis[a]
Basins	1 from each of 3 basins[b]	4-L (1.06-gal) water sample/1 to 2-kg (2.2 to 4.4-lb) sediment sample collected quarterly	Isotopic analysis[a]
Soil	8	1 to 2-kg (2.2 to 4.4-lb) samples collected semiannually	Isotopic analysis[a]
Septic Tank(s)	1 from each affected tank	1 to 2-kg (2.2 to 4.4-lb) sludge sample from the affected tank(s) prior to pumping	Isotopic analysis[a]
TLD	16	Quarterly	Gamma and neutron dose equivalent

[a] Isotopic analysis for ^{234}U, ^{235}U, ^{236}U, and ^{238}U.

[b] Site Stormwater Detention Basin, UBC Storage Pad Stormwater Retention Basin and Treated Effluent Evaporative Basin.

Note:

Physiochemical monitoring parameters are addressed separately in ER Section 6.2, Physiochemical Monitoring.

6.3 ECOLOGICAL MONITORING

6.3.1 Maps

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

6.3.2 Affected Important Ecological Resources

The existing natural habitats on the NEF 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 NEF. The habitat type at the NEF 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, LES 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 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 NEF 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 NEF site. No Black-Tailed Prairie Dogs are present at the NEF site.

6.3.3 Monitoring Program Elements

Several elements have been chosen for the ecological monitoring program. These elements include 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, LES will periodically monitor the NEF 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

The NEF site observations will include preconstruction, construction, and operations monitoring programs. The preconstruction monitoring program will establish the site baseline data. The procedures used to characterize the plant, bird, mammalian, and reptilian/amphibian communities at the NEF site during pre-construction monitoring are considered appropriate and will be used for both the construction and operations monitoring programs. Operational monitoring surveys will also be conducted annually (except semiannually for birds and reptiles/amphibians) using the same sampling sites established during the preconstruction monitoring program.

and time are each subdivided. Distances are divided into less than 50 m (164 ft) and greater than 50 m (164 ft) categories (estimated by the observer), and the time is divided into two categories, 0-3 minute and 3-5 minute segments. All birds seen and heard at each station/point visited will be recorded on standard point count forms. All surveys will be conducted from 0615 to 1030 hours to coincide with the territorial males' peak singing times. The stations/points will be recorded using the GPS enabling the observer to make return visits. Surveys will only be conducted at time when fog, wind, or rain does not interfere with the observer's ability to accurately record data.

The avian communities are described in ER Section 3.5.2. All data collected will be recorded and compared to information listed in Table 3.5-2, Birds Potentially Using the NEF Site. The field data collections will be done semiannually. The initial monitoring will be effective for at least the first 3 years of commercial operation. Following this period, program changes may be initiated based on operational experience.

Mammals

The existing mammalian communities are described in ER Section 3.5.2. General observations will be compiled concurrently with other wildlife monitoring data and compared to information listed in Table 3.5-1, Mammals Potentially Using the NEF Site. The initial monitoring will be effective for at least the first 3 years of commercial operation. Following this period, program changes may be initiated based on operational experience.

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 site and in the area.

A combination of pitfall drift-fence trapping and walking transects (at trap sites) can provide data in sufficient quantity to allow statistical measurements of population trends, community composition, body size distributions and sex ratios that will reflect environmental conditions and changes at the site over time.

As practical, the monitoring program will include at least two other replicated sample sites beyond the primary location on the NEF property. Offsite, locations on Bureau of Land Management (BLM) or New Mexico state land to the south, west or north of NEF will be given preference for additional sampling sites. Each of these catch sites will have the same pitfall drift-fence arrays and standardized walking transects and will be operated simultaneously. Each sample site will be designed to maximize the total catch of reptiles and amphibians, rather than data on each individual caught. Each animal caught will be identified, sexed, snout-vent length measured, inspected for morphological anomalies and released (sample with replacement design). There will be two sample periods, at the same time each year, in May and late June/early July. These coincide with breeding activity for lizards, most snakes and depending on rainfall, amphibians.

Because reptiles and amphibians are sensitive to climatic conditions, and to account for the spotty effects of rainfall, each sampling event will also record rainfall, relative humidity and temperatures. The rainfall and temperature data will act as a covariate in the analysis.

centrifuge equipment, production will commence prior to completion of the initial three-year construction period. The manpower and materials used during this phase of the project will vary depending on the construction plan. Table 7.2-2, Estimated Construction Material Yearly Purchases, provides the estimated total quantities of purchased construction materials and Table 7.2-3, Estimated Yearly Labor Costs for Construction, provides the estimated labor that will be required to install these materials. The scheduling of materials and labor expenditures is subject to the provisions of the project construction execution plan, which has not yet been developed.

Approximately 60 to 80% of the construction materials will be purchased from the local NEF site area. According to the labor survey conducted as part of the conceptual estimate, the major portion of the required craft labor forces will come from the five or six counties around the project area, including the nearby Texas counties.

7.2.2 Plant Operation

7.2.2.1 Surface and Groundwater Quality

Liquid effluents at the NEF will include stormwater runoff, sanitary and industrial wastewater, and treated radiologically contaminated wastewater. Radiologically contaminated process water will be treated to 10 CFR 20, Appendix B limits (CFR, 2003q) and discharged to the Treated Effluent Evaporative Basin, which is a double-lined treated effluent evaporative basin with leak detection. 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 by the National Pollutant Discharge Elimination System (NPDES) during operation. Approximately 174,100 m^3 (46 million gal) of stormwater from the plant site is expected to be released annually to the two stormwater basins.

7.2.2.2 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 NEF site. Thus, no operation activities are expected to impact such communities or habitats.

7.2.2.3 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 emergency diesel generators that supply standby electrical power operate only in the event of power interruptions. They will have negligible health and environmental impacts.

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. .

7.2.2.7 Other Impacts of Plant Operation

NEF water will be obtained from the Hobbs and Eunice, New Mexico municipal water systems, and routine liquid effluent will be treated and discharged to evaporative pond(s), whereas sanitary wastes will be discharged to onsite septic systems. Facility water requirements are relatively low and well within the capacities of the Hobbs and Eunice water utilities. The current capacity for the Eunice Potable water supply system is 16,350 m^3/day (4.3 million gpd), and current usage is 5,600 m^3/day (1.48 million gal/d). The Hobbs water system capacity is 75,700 m^3/day (20 million gal/d) whereas its usage is 23,450 m^3/day (6.2 million gal/d). Requirements for operation of the NEF are expected to be 240 m^3/day (63,423 gal/d), a volume well within the capacity of the supply systems. Non-hazardous and non-radioactive solid waste is expected to be approximately 172,500 kg (380,400 lbs) annually. It will be shipped offsite to a licensed landfill. *The local Lea County landfill capacity is more than adequate to accept the non-hazardous waste.*

7.2.2.8 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.

8.6 ENVIRONMENTAL IMPACTS OF OPERATION

Operation of the National Enrichment Facility (NEF) would result in the production of gaseous effluent, liquid effluent, and solid waste streams. Each stream could contain small amounts of hazardous and radioactive compounds, either alone or in a mixed form. Based on the experience gained from operation of the Urenco European plants, the aggregate routine airborne uranium gaseous releases to the atmosphere are estimated to be less than 10 g (0.35 ounces) annually. However, based on recent environmental monitoring at the Urenco plants, the annual release is closer to 0.1 MBq (2.8 μCi) which is equivalent to 3.9 g of natural uranium. Extremely minute amounts of uranium and hydrogen fluoride (all well below regulatory limits) could potentially be released at the roof-top through the gaseous effluent stacks. The discharge stacks for the Gaseous Effluent Vent System (GEVS) (Separations Building GEVS and Technical Services Building (TSB) GEVS) are co-located atop of the TSB. A third roof-top stack on the TSB discharges effluents from the confinement ventilation function of the TSB heating, ventilation and air conditioning (HVAC). A fourth roof-top stack is located atop the Centrifuge Assembly Building (CAB) that discharges any gaseous effluent from the Centrifuge Test and Post Mortem Facilities Exhaust Filtration System. Gaseous effluent discharges from each of the four stacks are filtered for particulates and hydrogen fluoride (HF), and are continuously monitored prior to release.

Liquid effluents include stormwater runoff, sanitary waste water, cooling tower blowdown water, heating boiler blowdown water and treated contaminated process water. All liquid effluents, with the exception of sanitary waste water, are discharged to one of three onsite basins.

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 UBC Storage Pad Stormwater Retention Basin, which exclusively serves the UBC Storage Pad, cooling tower blowdown water and heating boiler blowdown water discharges, 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 and an allowance for cooling tower blowdown and heating boiler blowdown. This lined basin has no flow outlet and all effluents are dispositioned through evaporation.

Discharge of operations-generated potentially contaminated liquid effluent is made exclusively to the Treated Effluent Evaporative Basin. Only liquids meeting site administrative limits (based on NRC standards in 10 CFR 20 (CFR, 2003q) are discharged to this basin. The basin is double-lined with leak detection and open to allow evaporation.

Sanitary waste water will be discharged onsite to the NEF septic tanks and leach fields. No contaminated liquid discharges will be allowed through the onsite septic systems.

Since the NEF will not obtain any water from or discharge process effluents from the site, there are no anticipated impacts on natural water systems quality due to facility water use. Control of surface water runoff will be required for NEF activities, covered by the NPDES General Permit

(20 million gpd), respectively and current usages are 5,600 m^3/day (1.48 million gpd) and 23,450 m^3/day (6.2 million gpd), respectively. Average and peak potable water requirements for operation of the NEF are expected to be approximately 240 m^3/day (63,423 gpd) and 85 m^3/hr (378 gpm), respectively. These usage rates are well within the capacities of both water systems.

Liquid effluents include stormwater runoff, sanitary waste water, cooling tower blowdown water, heating boiler blowdown water and treated contaminated process water. All liquid effluents, with the exception of sanitary waste water, are discharged to one of three onsite basins.

Stormwater from the site will be diverted and collected in the Site Stormwater Detention Basin. This basin collects runoff from various developed parts of the site. It is unlined and will have an outlet structure to control discharges above the design level. The normal discharge will be through evaporation and 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. It will have approximately 123,350 m^3 (100-acre-ft) of storage capacity. In addition, the basin has 0.6 m (2 ft) of free-board beyond the design capacity. It will also be 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 area.

Cooling tower blowdown water, heating boiler blowdown water and stormwater runoff from the UBC Storage Pad are discharged to the UBC Storage Pad Stormwater Retention Basin. The ultimate disposition of this water will be through evaporation along with permanent impoundment of the residual dry solids byproduct of 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 and an allowance for cooling tower blowdown water and heating boiler blowdown water. The UBC Storage Pad Stormwater Retention Basin is designed to contain a volume of approximately 77,700 m^3 (63 acre-ft). This basin is designed with a synthetic membrane lining to minimize any infiltration into the ground.

Discharge of treated contaminated plant process water will be to the onsite Treated Effluent Evaporative Basin. The Treated Effluent Evaporative Basin is utilized for the collection and containment of liquid effluent from the Liquid Effluent Collection and Treatment System. The ultimate disposal the liquid effluent will be through evaporation of water and permanent impoundment of the residual dry solids. Total annual discharge to that basin will be approximately 2,535 m^3/yr (669,844 gal/yr). The basin will be designed for double that volume. Evaporation will provide the only means of liquid disposal from this basin. The basin will include a double-layer membrane liner with a leak detection system to prevent infiltration of basin water into the ground.

Ecological Resources:

No communities or habitats that have been defined as rare or unique or that support threatened and endangered species have been identified as occurring on the 220-ha (543-acre) NEF site. 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 site area. Field surveys that were performed in September and October 2003, and April 2004, for the lesser prairie chicken, the sand dune lizard, and the black-tailed prairie dog determined that these species were not present at the NEF site. Another survey for the sand dune lizard was conducted in June 2004 and confirmed there were no sand dune lizards at the NEF site.

Several practices and procedures have been designed to minimize adverse impacts to the ecological resources of the NEF site. These practices and procedures include the use of BMPs,