APPENDIX C
RADIOLOGICAL DOSE ANALYTICAL METHODOLOGY

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APPENDIX C
RADIOLOGICAL DOSE ANALYTICAL METHODOLOGY

This appendix discusses the following topics:

- The dose assessment analysis for site preparation and construction activities for the proposed ACP; and

- Environmental transport and calculation of dose and risk.

C.1 Radiological Impacts from Site Preparation and Construction

Radiological impacts during site preparation and construction are primarily to the construction workers performing those activities. Exposures to off-site personnel are greatly below those of the construction workers themselves because of atmospheric dispersion of airborne material and distance from sources of external dose.

C.1.1 Dose to Construction Workers During Site Preparation and Construction

The primary modes of exposure for construction personnel are: (1) inhalation of radionuclides that are in the dust suspended by construction activities; (2) external exposure from radionuclides contained in the soil suspended in the air; (3) external exposure from radionuclides in the soil on the ground; and (4) external exposure from existing sources nearby on the site.

C.1.1.1 Construction Worker Exposure from Inhalation of Radionuclides in Air

The dose and risk calculation for inhalation is based on the methods of Federal Guidance Report 13 (EPA, 1999), which are themselves based on the models recommended by the International Commission on Radiological Protection. In this method, the computation of committed effective dose equivalent for a nuclide is arrived at by computing the intake quantity of the nuclide and multiplying that amount by a coefficient that converts intake quantity to committed effective dose equivalent.

The following linear exposure model will be used to calculate inhalation dose of the *i*th radionuclide from inhalation:

$$DSR_{inh,i} = \frac{B \times C_d \times DCF_i}{F_p} \qquad \text{(Eq. 1)}$$

where:

B	=	the volume of air inhaled per hour (m^3/hr)
C_d	=	the concentration of respirable dust in the air (g/m^3)
DCF_i	=	the adult inhalation dose conversion factor of radionuclide *i* from Federal Guidance Report 13 (mrem/pCi)
F_p	=	the assigned protection factor for respirators from 10 CFR 20 Appendix A (NRC, 1991)

Dose Conversion Factors in Federal Guidance Report 13 are a function of not just the radionuclide, but also the inhalation Type. The Type classification scheme, introduced in International Commission on Radiation Protection Publication 66 (ICRP, 1994), replaced the inhalation Class nomenclature previously used in most inhalation dose modeling. Inhalation Type is one of three values, F, M, or S. The dose conversion factor selected for a nuclide in this analysis will be the default recommended Type listed in

Federal Guidance Report 13 if one exists. If a default recommended Type does not exist, then Type M will be used.

For a few elements, the Dose conversion factor is also a function of the chemical state. For example, the Dose conversion factor for tritium (H-3) in Federal Guidance Report 13 is not only a function of Type, but also a function of whether the tritium is bound as a particulate, water vapor, organic, or in an elemental state. The element of interest in this analysis is uranium, for which Federal Guidance Report 13 has dose factors for only the particulate state.

Federal Guidance Report 13 contains dose conversion factors as a function of age. This analysis uses the adult dose conversion factors since all workers are expected to be over the age of 18. Federal Guidance Report 13 also contains risk coefficients for both mortality and morbidity that are analogous to the Dose Conversion Factors. An inhalation mortality risk for each isotope can be calculated using the same equation, but replacing the Dose Conversion Factor for an isotope with an analogous mortality risk coefficient from Federal Guidance Report 13.

The total inhalation dose from all radionuclides can be estimated by summing all the inhalation doses from the individual radionuclides.

$$\textit{Total Inhalation Dose} = E_d \, \Sigma (DSR_{inh,i} \times A_i) \qquad \text{(Eq. 2)}$$

where

A_i = the activity concentration of radionuclide *i* in dust (pCi/g)
E_d = the number of hours per year that the worker is exposed (hr/yr)

The inhalation analysis uses the following parameters, which provide for an analysis that should produce a high estimate of dose:

- 40 hours/week exposure, 48 weeks per year at job site (52 less 2 vacation and 2 weeks equivalent for holidays/sick time);
- No respiratory protection ($F_p = 1$);
- Breathing Rate is 1.4 cubic meters per hour from EPA Exposure Factors Handbook (EPA, 1997);
- The average uranium concentration in soil is 7.7 micrograms per gram soil from Table 3.3.2-1 in the ACP Environmental Report (USEC, 2004);
- On-site air contains 313 micrograms of soil per cubic meter (maximum hourly concentration from construction air modeling results);
- All the soil in the air comes from on-site soil with the average uranium concentrations; there is no contribution from off-site;
- The uranium in the soil is Type F for selecting inhalation dose conversion factors, technicium-99 is type S. These provide the maximum dose conversion factors;
- Technicium-99 activity in soil is one half of the maximum value in Table 3.3.2-1 of USEC, 2005; and
- All radioactive materials in the air exist in a fully respirable particle size.

The isotopic activity ratio for the site should average to approximately natural uranium. The mass fractions for the various isotopes of uranium are thus expected to be 0.9926 uranium-238, 0.0073 uranium-235, and 0.000054 uranium-234. The activity ratio is then the specific activity times the mass fraction as seen in Table C-1:

Table C-1 Site Isotopic Activity Ratio

Isotope	Mass Fraction	Specific Activity Ci/gram	Activity Ratio	Activity in Soil pCi/gram
U-234	5.4×10^{-05}	6.2×10^{-03}	3.4×10^{-07}	2.59
U-235	7.3×10^{-03}	2.2×10^{-06}	1.6×10^{-08}	0.12
U-238	9.9×10^{-01}	3.4×10^{-07}	3.3×10^{-07}	2.57
Tc-99	--	--	--	6.3

Notes:
Ci = curie; pCi = picocurie.

Information on isotopic ratios of natural uranium and specific activity is from the Chart of the Nuclides, Twelfth Edition, General Electric Company, San Jose, CA, 1977.

The uranium activity concentration in soil is then calculated from

$$A_i = 10^{12} \times AR_i \times C \qquad \text{(Eq. 3)}$$

where:

- A_i = the isotopic activity in soil in pCi/gram for isotope *i*;
- AR_i = the activity ratio for isotope *i* in Ci/gram of uranium;
- C = the concentration of uranium in the soil in microgram U/gram soil;
- 10^{12} = a factor to convert Ci to pCi.

Table C-2 describes the resulting dose from inhalation by isotope:

Table C-2 Inhalation Dose by Isotope

Isotope	Type	Dose Conversion Factor (mrem/pCi)	Dose (mrem/yr)
U-234	F	2.1×10^{-03}	4.5×10^{-03}
U-235	F	1.9×10^{-03}	1.9×10^{-04}
U-238	F	1.9×10^{-03}	4.0×10^{-03}
Tc-99	S	4.9×10^{-05}	2.6×10^{-04}
Total			**9.0×10^{-03}**

Notes:
mrem = millirem; pCi = picocurie; yr = year.

C.1.1.2 Construction Worker Exposure from Submersion

Dose to construction workers will occur from external exposure to radiation emitted by radionuclides that are in soil where the construction activities are taking place. The dominant sub-pathways for exposure to these radionuclides include air submersion and direct soil exposure. These exposures can be calculated using a method similar to that used for inhalation:

$$DSR_{sub,i} = C_d \times DCF_{sub,I} \quad \text{(Eq. 4)}$$

$DCF_{sub,i}$ is in units of millirem per Ci-yr per meter cubed.

With the DSR known, the submersion dose can then be calculated from:

$$\textit{Total Dose from Submersion} = E_D \sum_i (DSR_{sub,i} \times A_i) \quad \text{(Eq. 5)}$$

The dust concentrations and exposure times are the same as those used for inhalation. Table C-3 describes the dose to workers from submersion.

Table C-3 Worker Dose from Dust Submersion

Isotope	Dose Conversion Factor (mrem-m^3/Ci-yr)	Submersion Dose (mrem/yr)
U-234	$7.2 \times 10^{+05}$	4.1×10^{-09}
U-235	$7.6 \times 10^{+08}$	2.0×10^{-07}
U-238	$2.9 \times 10^{+05}$	1.7×10^{-09}
Tc-99	$3.4 \times 10^{+06}$	4.6×10^{-08}
Total		**2.5×10^{-07}**

Notes:
mrem-m^3 = millirem-cubic meter; Ci-yr = curie-year; mrem/yr = millirem per year.

C.1.1.3 Construction Worker External Dose from Radionuclides in Soil

Workers will also be subject to exposure from exposure to radionuclides in the soil. Dose from this exposure is calculated using the equation:

$$DSR_{ext,i} = C_s \times DCF_{ext,i} \quad \text{(Eq. 6)}$$

$DCF_{ext,i}$, is the Dose conversion factor for exposure to external radiation in soil, is in units of millirem per pCi-yr per gram.

The exposure time and soil concentrations used are identical to those used in the inhalation calculation. Again, with the DSR known the total external dose from radionuclides in soil can be calculated from:

$$\textit{Total Dose from Radionuclides in Soil} = E_D \sum_i (DSR_{ext,i} \times A_i) \quad \text{(Eq. 7)}$$

Table C-4 describes the total external dose to workers from radionuclides in soil.

Table C-4 Total Worker External Dose from Soil

Isotope	Dose Conversion Factor (mrem-g/pCi-yr)	External Dose (mrem/yr)
U-234	3.4×10^{-04}	2.0×10^{-04}
U-235	6.6×10^{-01}	1.7×10^{-02}
U-238	8.0×10^{-05}	4.5×10^{-05}
Tc-99	1.1×10^{-04}	1.5×10^{-04}
Total		**1.8×10^{-02}**

Notes:
mrem-g = millirem per gram; pCi-yr = picocurie-year; mrem/yr = millirem per year.

C.1.1.4 Construction Worker External Dose from Existing Sources

DOE has maintained a set of thermoluminescent dosimeters both on and offsite to measure the direct radiation exposure at various locations from the totality of on-site sources, including the cylinder storage pads and other secondary sources. Thermoluminescent dosimeters provide the best estimate of the external radiation exposure rates at various locations around the site. Work related to the proposed ACP is expected to occur primarily at and around the existing X-3001 and X-3002 buildings, with some additional work being done to build the new X-745H cylinder storage pad approximately 200 yards north of the existing X-745G cylinder storage pad.

In 2003 the environmental exposure rate in the vicinity of the X-3001 and X-3002 buildings was approximately 20 millirem per quarter based on the thermoluminescent dosimeter in that region, TLD 1404A (DOE, 2004). Environmental thermoluminescent dosimeters record information around the clock, or about 2,190 hours per quarter. Assuming a 40 hour work week for a thirteen week quarter, a construction worker in the vicinity of the X-3001 or X-3002 buildings would receive a maximum external radiation dose of 0.5 millisieverts (5 millirem) per quarter or 0.20 millisieverts (20 millirem) per year.

The ambient dose rate in the vicinity of the X-745H cylinder storage pad is expected to be greater than that near the X-3001 and X-3002 buildings. Thermoluminescent dosimeters near the existing storage yards show wide variance in their measured exposure rates; for example, the three thermoluminescent dosimeters nearest the expected location of the X-745H pad record exposure rates at approximately 20 millirem per quarter, while others slightly farther away record higher values, with one thermoluminescent dosimeter reading a value as high as 1.87 millisieverts (187 millirem) per quarter (DOE, 2004). The variation is the result of a number of factors, including the distance and geometry of the thermoluminescent dosimeter relative to the existing storage yards, and any work that may have temporarily placed a source in the vicinity of the thermoluminescent dosimeter.. Using a very conservative assumption that the exposure rate at the X-745H construction site is 1 millisievert (100 millirem) per quarter (4 millisieverts [400 millirem] per year), a construction worker working 40 hours per week for 48 weeks at that job site would receive a maximum external dose of approximately 88 millirem for the year, which is below the public dose limit of 1 millisievert (100 millirem) per year contained in 10 CFR 20.1301(a)(1). The most likely radiation dose to workers at the X-745H pad is expected to be much less, on the order of 0.20 millisieverts (20 millirem) per year, based on the readings from the nearby thermoluminescent dosimeters and the fact that the average annual dose for storage pad workers was 0.29 millisieverts (29 millirem) in 2003. A dose of 0.20 millisieverts (20 millirem), is on the same scale as the variations in individual dose caused by the fluctuation in natural background.

Background radiation dose in the United States averages approximately 3.6 millisieverts (360 millirem) per year (NRC, 2005).

The estimate for external dose from other sources is, for a number of reasons, likely to be significantly exaggerated relative to any actual dose received by a construction worker. First, construction of the pad is not expected to last a full calendar year even though the dose estimate assumes an annual exposure period. Second, the analysis implicitly assumes the same personnel are used in the higher dose rate area for the entire year regardless of the fact that the specific tasks may be changing (i.e. grading versus pouring concrete). Third, the analysis assumes that these personnel spend 100 percent of their work time in the higher dose rate region. The analysis is useful in demonstrating that even with these assumptions in place the maximum dose would still be below the applicable NRC public dose limit.

C.1.1.5 Total Potential Dose to Construction Workers

Total occupational exposures from all four pathways are expected to be less than 1 millisievert (100 millirem) per year, even for estimates combining the most conservative analytical assumptions. This dose presents a nearly negligible risk, representing a lifetime excess cancer risk of approximately 5×10^{-06} when using a risk coefficient of 5×10^{-04} risk per rem (EPA, 1994). Based on this assessment, the impact to workers, from radiological exposure during site preparation and construction is SMALL.

C.1.2 Dose to Off-Site Public from Site Preparation and Construction

Exposures to off-site personnel will be significantly smaller than that for construction workers, particularly since off-site personnel will not have any potential for measurable exposure from the depleted uranium storage pads. The off-site public will also not be exposed to dose from on-site soil containing concentrations of radionuclides above background concentrations.

Estimates of dose to the off-site public from site preparation and construction are limited to two of the pathways used in the analysis of dose to construction workers, inhalation and air submersion. The methodology used to calculate inhalation and submersion dose to the offsite public is the same as that used to calculate the doses to construction workers; only the concentration of dust in air and the exposure duration in hours per year are changed. The airborne dust concentration used in the off-site inhalation exposure is 22.7 micrograms per cubic meter, which represents the maximum fenceline one hour concentration. The exposure duration is considered to be 8,760 hours per year, or full time occupancy. Using these values in the previous models results in the following inhalation dose values in millirem per year of exposure (Table C-5):

Table C-5 Dose to the Off-Site Public

Isotope	Inhalation Dose (mSv/yr)	Submersion Dose (mSv/yr)
U-234	4.5×10^{-05}	0
U-235	1.9×10^{-06}	0
U-238	4.0×10^{-05}	0
Tc-99	2.6×10^{-06}	0
Total	**8.9×10^{-05}**	**0**

Notes:
mSv/yr = millisievert per year.
To convert millisievert to millirem multiply by 100.

The maximum exposure to off-site personnel is estimated to be much less than 0.01 millisieverts (1millirem) per year, so the impact to off-site personnel from site preparation and construction is SMALL.

C.2 Estimation of Dose and Risk

The purpose of this section is to present the mathematical models and equations used in CAP88-PC for environmental transport and estimation of dose and risk from air transport of radioactive material.

C.2.1 Environmental Transport

CAP88-PC incorporates a modified version of the AIRDOS-EPA (Moore, 1979) program to calculate environmental transport. Relevant portions of this document are reproduced here, as referenced.

C.2.1.1 Plume Rise

CAP88-PC calculates plume rise in the subroutine CONCEN using either Rupp's equation (Ru48) for momentum dominated plume rise, or Briggs' equations (Br69) for hot buoyant plumes (Mo79). CAP88-PC also accepts user-supplied values for plume rise for each Pasquill stability class. The plume rise, Dh, is added to the actual physical stack height, h, to determine the effective stack height, H. The plume centerline is shifted from the physical height, h, to H as it moves downwind. The plume centerline remains at H unless gravitational settling of particulates produces a downward tilt, or until meteorological conditions change.

Rupp's equation for momentum dominated plumes is:

$$\Delta h = \frac{1.5vd}{\mu} \qquad \text{(Eq. 1)}$$

where:

- Δh = plume rise
- v = effluent stack gas velocity (m/sec)
- d = inside stack diameter (m)
- μ = wind velocity (m/sec)

CAP88-PC models Briggs' buoyant plume rise for stability categories A, B, C, and D with:

$$\Delta h = \frac{1.6\, F^{1/3}\, x^{2/3}}{\mu} \qquad \text{(Eq. 2)}$$

where:

- Δh = plume rise
- F = $3.7 \times 10^{-5}\, Q_H$
- Q_H = heat emission from stack gases (cal/sec)
- x = downwind distance (m)
- μ = wind speed (m/sec)

This equation is valid until the downwind distance is approximately ten times the stack height, 10h, where the plume levels off. For downwind distances greater than 10h, the equation used is:

$$\Delta h = \frac{1.6\, F^{1/3}\, x\, (10h)^{2/3}}{\mu} \qquad \text{(Eq. 3)}$$

Equation (2) is also used to a distance of $X = 2.4\, \mu S^{-1/2}$ for stable categories E, F, and G, beyond which the plume is assumed to level off. For higher values of x, the stability parameter, S, is used in the equation:

$$\Delta h = 2.9\, (F/\mu S)^{1/3} \qquad \text{(Eq. 4)}$$

in which:

$$S = (g/T_a)(dT_a/dz + G) \qquad \text{(Eq. 5)}$$

- g = gravitational acceleration (m/sec^2)
- T_a = air temperature (^oK)
- dT_a/dz = vertical temperature gradient ($^oK/m$)
- z = vertical distance above stack (m)
- G = adiabatic lapse rate of atmosphere ($0.0098^oK/m$)

The value of the vertical temperature gradient, dT_a/dz, is positive for stable categories. In CAP88-PC, dT_a/dz values are:

7.280E-02 $^oK/m$ for Pasquill category E
1.090E-01 $^oK/m$ for Pasquill category F
1.455E-01 $^oK/m$ for Pasquill category G

The true-average wind speed for each Pasquill stability category is used in CAP88-PC to estimate plume rise, as it is greater than the reciprocal-averaged wind speed, and produces a smaller, more conservative plume rise. This procedure does not risk underestimating the significant contribution of relatively calm periods to downwind nuclide concentrations which could result from direct use of a plume rise calculated for each separate wind-speed category. This procedure avoids calculating an infinite plume rise when wind speed is zero (during calms), since both momentum and buoyancy plume rise equations contain wind speed in the denominator (Moore, 1979).

CAP88-PC also accepts user-supplied plume rise values, for situations where actual measurements are available or the supplied equations are not appropriate. For example, plume rises of zero may be used to model local turbulence created by building wakes.

For this analysis, the plume rise was set to zero for each Pasquill category.

C.2.1.2 Plume Dispersion

Plume dispersion is modeled with the Gaussian plume equation of Pasquill (Pasquill, 1961, and Moore, 1979), as modified by Gifford:

$$\chi = \frac{Q}{2\pi\sigma_y\sigma_z\mu}\; exp[-\tfrac{1}{2}(y/\sigma_y)^2]\{exp[-\tfrac{1}{2}((z-H)/\sigma_z)^2] + exp[-\tfrac{1}{2}((z+H)/\sigma_z)^2]\} \qquad \text{(Eq. 6)}$$

where:

χ = concentration in air (chi) at x meters downwind, y meters crosswind, and z meters above ground (Ci/m^3)
Q = Release rate from stack (Ci/sec)
μ = wind speed (m/sec)

σ_y = horizontal dispersion coefficient (m)
σ_z = vertical dispersion coefficient (m)
H = effective stack height (m)
y = crosswind distance (m)
z = vertical distance (m)

The downwind distance x comes into Equation (6) through σ_y and σ_z, which are functions of x as well as the Pasquill atmospheric stability category applicable during emission from the stack. CAP88-PC converts χ in Equation (6) and other plume dispersion equations from units of curies per cubic meter to units of picocuries per cubic centimeter.

Annual-average meteorological data sets usually include frequencies for several wind-speed categories for each wind direction and Pasquill atmospheric stability category. CAP88-PC uses reciprocal-averaged wind speeds in the atmospheric dispersion equations, which permit a single calculation for each wind-speed category. Equation (6) is applied to ground-level concentrations in air at the plume centerline by setting y and z to zero, which results in:

$$\chi = \frac{Q}{\pi \sigma_y \sigma_z \mu} \quad exp[-½(H/\sigma_z)^2] \qquad \text{(Eq. 7)}$$

The average ground-level concentration in air over a sector of 22.5° can be approximated by the expression:

$$\chi_{ave} = f\chi \qquad \text{(Eq. 8)}$$

where f is the integral of the exponential expression:

$$\exp\left[-½(y/\sigma_y)^2\right]$$

in Equation (6) from a value of y equals zero to infinity divided by y_s, the value of y at the edge of the 22.5° sector, which is the value of the downwind distance, x, multiplied by the tangent of half the sector angle. The expression is:

$$f = \frac{\int_o^\infty \exp\left[-\left(0.5/\sigma_y^2\right) y^2\right] dy}{y_s} \qquad \text{(Eq. 9)}$$

The definite integral in the numerator of Equation (9) is evaluated as

$\sigma_y (\pi/2)^{½}$

Since $y_s = x \tan (11.25^o)$,

$$f = \frac{6.300836\sigma_y}{x} \qquad \text{(Eq. 10)}$$

The equation for sector-averaged ground level concentration in air is therefore:

$$\chi = \frac{Q}{0.15871\pi x\sigma_z\mu} \quad exp[-½(H)/\sigma_z)^2] \qquad \text{(Eq. 11)}$$

This method of sector-averaging compresses the plume within the bounds of each of the sixteen 22.5° sectors for unstable Pasquill atmospheric stability categories in which horizontal dispersion is great enough to extend significantly beyond the sector edges. It is not a precise method, however, because the integration over the y-axis, which is perpendicular to the downwind direction, x, involves increasing values for x as y is increased from zero to infinity.

An average lid for the assessment area is provided as part of the input data. The lid is assumed not to affect the plume until x becomes equal to $2x_L$, where x_L is the value of x for which $\sigma_z = 0.47$ times the height of the lid (Turner, 1969). For values of x greater than $2x_L$, vertical dispersion is restricted and radionuclide concentration in air is assumed to be uniform from ground to lid.

The average concentration between ground and lid, which is the ground-level concentration in air for values of x greater than $2x_L$, may be expressed by:

$$\chi_{ave} = \int_o^\infty \frac{\chi}{L} dz \qquad \text{(Eq. 12)}$$

where χ is taken from Equation (6) and L is lid height. The value of H in Equation (6) may be set at zero since X_{ave} is not a function of the effective stack height.

The resulting simplified expression may be evaluated for constant x and y values (s_y and s_z held constant) by using a definite integral similar to that in Equation (10):

$$\chi_{ave} = \left(\frac{1}{L}\right)\int_o^\infty \left(\frac{Q}{\pi\sigma_y\sigma_z}\right)\exp\left(\frac{-Z^2}{2\sigma_Z^2}\right)\exp\left(\frac{-Z^2}{2\sigma_y^2}\right)dz \qquad \text{(Eq. 13)}$$

The result is:

$$\chi_{ave} = \frac{Q}{2.5066\ \sigma_y L\mu} \quad exp[-y^2/\sigma y^2] \qquad \text{(Eq. 14)}$$

One obtains the sector-averaged concentration at ground level by replacing the exponential expression containing y by f in Equation (11):

$$\chi_{ave} = Q/0.397825xL\mu \quad \text{(Eq. 15)}$$

It should be noted at this point that for values of the downwind distance greater than $2x_L$ dispersion, as expressed in Equation (16), no longer can be said to be represented by the Pasquill equation. The model is simply a uniform distribution with a rectangle of dimensions LID and 2x tan (11.25^o).

Gravitational settling is handled by tilting the plume downward after it has leveled off at height H by subtracting V_g x/m from H in the plume dispersion equations. For CAP88-PC V_g is set at the default value of zero and cannot be changed by the user.

C.2.1.3 Dry Deposition

Dry deposition is modeled as being proportional to the ground-level concentration of the radionuclide (Moore, 1979):

$$R_d = V_d\chi \quad \text{(Eq. 16)}$$

where:

- R_d = surface deposition rate (pCi/cm^2-sec)
- V_d = deposition velocity (cm/sec)
- χ = ground-level concentration (chi) in air (pCi/cm^3)

Although V_d has units of velocity, it is only a proportionality constant and is usually higher than the actual, measured velocity of radionuclides falling to the ground. The proportionality constant must include deposition from fallout interception by foliage, which subsequently falls to the ground and so adds to ground deposition. Defaults for deposition velocity used by CAP88-PC are 3.5×10^{-02} meters per second for Iodine, 1.8×10^{-03} meters per second for particulates, and zero for gases.

C.2.1.4 Precipitation Scavenging

The deposition rate from precipitation scavenging (Moore, 1979), which occurs when rain or snow removes particles from the plume, is modeled with:

$$R_s = \Phi\chi_{ave}L \quad \text{(Eq. 17)}$$

where:

- R_s = surface deposition rate (pCi/cm^2-sec)
- Φ = scavenging coefficient (sec^{-1})
- χ_{ave} = average concentration in plume up to lid height (pCi/cm^3)
- L = lid height (tropospheric mixing layer) (cm)

The scavenging coefficient, Φ (in sec^{-1}), is calculated in CAP88-PC by multiplying the rainfall rate in cm/yr, by 1.0×10^{-07} yr/cm-sec.

C.2.1.5 Plume Depletion

Radionuclides are depleted from the plume by precipitation scavenging, dry deposition, and radioactive decay. Depletion is accounted for by substituting a reduced release rate, Q^1, for the original release rate Q for each downwind distance x (Slade, 1968). The ratio of the reduced release rate to the original is the depletion fraction. The overall depletion fraction used in CAP88-PC is the product of the depletion fractions for precipitation scavenging, dry deposition and radioactive decay.

For precipitation scavenging the depletion fraction for each downwind distance (x) is:

$$\frac{Q^1}{Q} = e^{-\Phi t} \qquad \text{(Eq. 18)}$$

where:

- Φ = scavenging coefficient (sec^{-1})
- t = time (sec) required for the plume to reach the downwind distance x

The depletion fraction for dry deposition is derived by using Equation (6) with z set to zero for ground-level concentrations, and subtracting the quantity (V_g x)/U from H for a tilted plume (Van, 1968, and Moore, 1979):

$$\frac{Q^1}{Q} = \exp\left\{ -\left(\frac{2}{\pi}\right)^{1/2} \left(\frac{V_d}{\mu}\right) \int_o^x \frac{\exp\left[-\left(H - V_g \chi / \mu \right) / 2\sigma_z^2 \right]}{\sigma_z} dx \right\} \qquad \text{(Eq. 19)}$$

where:

- V_d = deposition velocity (m/sec)
- μ = wind speed (m/sec)
- σ_z = vertical dispersion coefficient (m)
- V_g = gravitational velocity (m/sec)
- H = effective stack height (m)
- x = downwind distance (m)

The integral expression must be evaluated numerically. Values for the vertical dispersion coefficient s_z are expressed as functions of x in the form x^D/F where D and F are constants with different values for each Pasquill atmospheric stability category, to facilitate integrations over x.

Values for the depletion fraction for cases where V_g is zero are obtained from the subroutine QY in CAP-88. Subroutine QY obtains depletion fractions for the conditions V_d = 0.01 m/sec and μ = 1 m/sec for each Pasquill stability category from the data file REFA.DAT. This file contains values for release heights (meters) of:

1, 1.5, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12.5, 15, 17.5, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200, 240, 260, 300 and 400;

and for downwind distances (meters) of:

35, 65, 100, 150, 200, 300, 400, 500, 650, 800, 1,000, 1,500, 2,000, 4,000, 7,000, 10,000, 25,000, 60,000, 90,000, and 200,000.

The stored depletion fractions were calculated numerically with a Simpson's rule routine. CAP88-PC uses a linear interpolation to produce a fraction for the required downwind value, release height and Pasquill category for V_d = 0.01 m/sec and μ = 1 m/sec. The value is then converted to the appropriate value for the actual deposition velocity and wind speed by use of the equation:

$$(Q^1/Q)_2 = (Q^1/Q)_1^{100\ Vd/\mu} \quad \text{(Eq. 20)}$$

in which subscript 2 refers to the desired value and subscript 1 refers to the value for V_d = 0.01 μ/sec and m = 1 m/sec.

For downwind distances greater than $2x_L$ where Equation 15 applies to the ground-level concentrations in air, the depletion is modeled with (Moore, 1979):

$$\frac{Q_x^1}{Q_{2x_L}^1} = \exp\left[-V_d\,(x - 2x_L)\Big/ L\mu\right] \quad \text{(Eq. 21)}$$

Which shows the reduced release rates at distances x and $2x_L$, respectively.

The depletion fraction for radioactive decay is:

$$\frac{Q^1}{Q} = \exp(-\lambda_r t) \quad \text{(Eq. 22)}$$

where:

λ_r = effective decay constant in plume
t = time required for plume travel

The decay constant used is referred to as the "effective decay constant" since it is not the true radiological decay constant in all cases. For example, if a radionuclide is a short-lived decay product in equilibrium with a longer-lived parent, the effective decay constant would be equal to the true radiological decay constant of the parent.

The atmospheric dispersion equations use the reciprocal-averaged wind speed, but neither this value nor the true average wind speed can adequately be used to calculate reduced release rates to account for radiological decay and scavenging losses because averaging of exponential terms is required. CAP88-PC uses an approximate method of calculation for this purpose, which establishes three wind speeds (1 m/sec, the average wind speed, and 6 m/sec) to simulate the actual wind-speed spectrum for each specific wind direction and Pasquill category. The wind speeds 1 and 6 m/sec were chosen because they approximate the upper and lower bounds in most meteorological data sets.

If f_1, f_2 and f_3 are designated as the time fractions for the three wind speeds, then:

$$f_1 + (\mu_a f_2) + 6f_3 = \mu$$

$$f_1 + (f_2/\mu_a) + f_3/6 = 1/\mu_r$$

and

$$f_1 + f_2 + f_3 = 1$$

where:

μ_a = Arithmetic-average wind speed
μ_r = Reciprocal-average wind speed

Solving the three simultaneous equations yields:

$$f_1 = 1 - f_2 - f_3$$

$$f_2 = \frac{(7/6) - (\mu_a/6) - (1/\mu_r)}{(7/6) - (\mu_a/6) - (1/\mu_a)}$$

$$f_3 = \frac{(\mu_a - 1)(1 - f_2)}{5}$$

The depletion fraction to account for radioactive decay is then approximated by:

$$f_1 \exp(-\lambda_r x) + f_2 \exp[-\lambda_r(x/\mu_a)] + f_3 \exp[-\lambda_r(x/6)]$$

where:

λ_r = effective decay constant in plume (sec^{-1})
μ_a = Arithmetic-average wind speed
x = downwind distance (m)

For precipitation scavenging losses, the depletion fraction is:

$$f_1 \exp(-\Phi x) + f_2 \exp[-\Phi(x/\mu_a)] + f_3 \exp[-\Phi(x/6)]$$

where Φ is the scavenging coefficient (sec^{-1}).

The overall depletion fraction is calculated by multiplying the depletion fraction for dry deposition by the fraction for radioactive decay and precipitation scavenging.

C.2.1.6 Dispersion Coefficients

Horizontal and vertical dispersion coefficients (s_y and s_z) used for dispersion calculation in CONCEN and for depletion fraction determination in QY are taken from recommendations by G.A. Briggs of the Atmospheric Turbulence and Diffusion Laboratory at Oak Ridge, Tennessee (Moore, 1979, and Gifford, 1976). The coefficients are different functions of the downwind distance x for each Pasquill stability category for open-country conditions, as shown in Table C-6:

Table C-6 Coefficients for Open-Country Conditions

Pasquill category	σ_y (m)	σ_z (m)
A	$0.22 \times (1+0.0001x)^{-1/2}$	$0.20 x$
B	$0.16 \times (1+0.0001x)^{-1/2}$	$0.12 x$
C	$0.11 \times (1+0.0001x)^{-1/2}$	$0.08 \times (1+0.0002x)^{-1/2}$
D	$0.08 \times (1+0.0001x)^{-1/2}$	$0.06 \times (1+0.0015x)^{-1/2}$
E	$0.06 \times (1+0.0001x)^{-1/2}$	$0.03 \times (1+0.0003x)^{-1}$
F	$0.04 \times (1+0.0001x)^{-1/2}$	$0.016 \times (1+0.0003x)^{-1}$
G	calculated by subtracting half the difference between values for categories E and F from the value for category F.	

where:

x = downwind distance

CAP88-PC uses the functions in the form of

$\sigma_y = x^A / C$

$\sigma_z = x^D / F$

to facilitate integrations over x. Values for A, C, D, and F for each stability category and downwind distance are stored in a data statement.

C.2.1.7 Ground Surface Concentrations

Ground surface and soil concentrations are calculated for those nuclides subject to deposition due to dry deposition and precipitation scavenging. The deposition accumulation time is defined by the user. This value corresponds to establishing a cutoff for the time following a release when any significant intake or external exposure associated with deposition on soil might take place.

Ingrowth from a parent radionuclide is calculated using the Bateman decay equations for all chains contained in the isotope database from Federal Guidance Report 13. Ingrowth is calculated for the entire chain based on the decay time input by the user. The default decay time is 100 years.

Radionuclide concentrations in meat, milk, and vegetables are calculated using elemental transfer factors from Report 123 of the National Council on Radiation Protection (NCRP, 1996). The concentration in soil for each isotope is multiplied by the appropriate elemental transfer factor to generate a concentration in each of the ingestion pathways media for that isotope in that sector. This information is then supplied to the dose and risk calculation models via an intermediate output file.

C.2.2 Dose and Risk Estimates

CAP88-PC uses a modified version of DARTAB (ORNL, 1981) and a database of dose and risk factors from Federal Guidance Report 13 (EPA, 1999) for estimating dose and risk. Relevant portions of these documents are reproduced here, as referenced.

Dose and risk conversion factors include the effective dose equivalent calculated with the weighting factors in International Commission on Radiation Protection Publication Number 72 (ICRP, 1996). Dose

and risk factors are provided for the pathways of ingestion and inhalation intake, ground level air immersion, and ground surface irradiation. Factors are further broken down by particle size, clearance category chemical form, and gut-to-blood transfer factors. These factors are stored in a database for use by the program. At this time CAP88-PC only uses dose and risk factors for adult populations, for particle sizes of 1 micron, and for cancer mortality.

For assessments where radon-222 decay products are not considered, estimates of dose and risk are made by combining the inhalation and ingestion intake rates, air and ground surface concentrations with the appropriate dose and risk conversion factors. CAP88-PC lists the dose and risk to the maximum individual and the collective population. CAP88-PC calculates dose to the 23 internal organs in International Commission on Radiation Protection Publication 72 (ICRP, 1996) in addition to the 50 year effective dose equivalent. Risks are estimated for 15 cancer sites, including leukemia, bone, thyroid, breast, lung, stomach, colon, liver, pancreas, ovaries, skin, kidneys, esophagus, and bladder. Doses and risks can be further tabulated as a function of radionuclide, pathway, location, and organ.

For each assessment, CAP88-PC tabulates the frequency distribution of risk, that is, the number of people at various levels of risk (lifetime risk). The risk categories are divided into powers of ten, from one in ten to one in one million. The number of health effects is also tabulated for each risk category.

C.2.2.1 Air Immersion

Individual dose is calculated for air immersion with the general equation:

$$\frac{E_{ij}(k)\ DF_{ijl}\ K_j}{P(k)}$$

where:

- $E_{ij}(k)$ = exposure rate, person-pCi/cm^3
- DF_{ijl} = Dose rate factor, mrem/nCi-yr/m^3
- $P(k)$ = number of exposed people
- K_j = 0.001 nCi/pCi x 1,000,000 cm^3/m^3 (proportionality factor)

Risk is calculated similarly, by substituting the risk conversion factor, for the dose conversion factor. The risk conversion factor is in units of risk/nCi-yr/m^3.

C.2.2.2 Surface Exposure

Individual dose is calculated for ground surface exposure with the general equation:

$$\frac{E_{ij}(k)\ DF_{ijl}\ K_j}{P(k)}$$

where:

- $E_{ij}(k)$ = exposure rate, person-pCi/cm^2
- DF_{ijl} = Dose rate factor, mrem/nCi-yr/m^2
- $P(k)$ = number of exposed people
- K_j = 0.001 nCi/pCi x 10,000 cm^2/m^2 (proportionality factor)

Risk is calculated by substituting the risk conversion factor for the dose conversion factor. The risk conversion factor is in units of risk/nCi-yr/m^2.

C.2.2.3 Ingestion and Inhalation

Individual dose is calculated for the ingestion and inhalation exposure pathway with the general equation:

$$\frac{E_{ij}(k)\ DF_{ijl}\ K_j}{P(k)}$$

where:

$E_{ij}(k)$ = exposure rate, person-pCi/cm^3
DF_{ijl} = Dose rate factor, mrem/nCi-yr/m^3
$P(k)$ = number of exposed people
K_j = 0.001 nCi/pCi x 1,000,000 cm^3/m^3 (proportionality factor)

Risk is calculated by substituting the risk conversion factor or the dose conversion factor.

C.2.2.4 Maximally-Exposed Individual

Doses for the maximally-exposed individual in population runs are estimated by CAP88-PC for the location, or sector-segment in the radial assessment grid, of highest risk where at least one individual actually resides. The effective dose equivalent for the maximally-exposed individual is tabulated in mrem/yr for a 50 year exposure. The reported risk associated with the 50 year Total Effective Dose Equivalent based on the risk coefficients contained in Federal Guidance Report 13.

When performing assessments of individual dose in CAP88-PC, the code will calculate the maximum individual dose based on the result from the highest grid point input by the user for that individual case. Alternatively, the user may specify the grid location where CAP88-PC is to generate the maximum exposed individual. This is done using the ILOC and JLOC parameters on the individual assessment grid input screen.

C.2.2.5 Collective Population

Collective population dose and risk are found by summing, for all sector segments, the intake and exposure rates multiplied by the appropriate dose or risk conversion factors from Federal Guidance Report 13. Collective population dose is reported by person-Rem per year (not millirem), and collective risk is reported in deaths per year.

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APPENDIX D
TRANSPORTATION ANALYSIS METHODOLOGY, ASSUMPTIONS, AND IMPACTS

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APPENDIX D
TRANSPORTATION ANALYSIS METHODOLOGY, ASSUMPTIONS, AND IMPACTS

D.1 Introduction

This appendix presents the methodology, assumptions, and impacts from the transportation of radiological materials to and from the proposed American Centrifuge Plant (ACP) near Piketon, Ohio. Transportation of radiological materials include shipments of feed materials to the ACP, shipments of product materials and heel cylinders from the proposed ACP, shipments of radioactive waste from the proposed ACP during the operation of the facility, and the shipment of radioactive materials resulting from the decontamination and decommissioning of the ACP. Also included in the appendix is the eventual shipment of depleted uranium to a disposal site after its conversion from uranium hexafluoride (UF_6) to triuranium octaoxide (U_30_8), and calcium fluoride (CaF_2), a by-product of the conversion that would be contaminated with small amounts of uranium. Shipments to and from the ACP are modeled as truck shipments, while shipments from the conversion plant are modeled as rail shipments..

This appendix is organized into separate sections that include a description of the radioactive materials being shipped; a description of the routes modeled; the input parameters used to estimate the number of latent cancer fatalities from both incident-free transport and accidents; the results of the risk assessment; and a discussion of the chemical impacts from accidents.

D.2 Radioactive Materials Description

The feed material is transported in Type 48Y or Type 48X cylinders. The product consists of enriched UF_6 and is transported in Type 30B cylinders. Specifications for these cylinders are given in Table D-1. Two other radioactive materials requiring transportation that result from the conversion of UF_6 are depleted U_3O_8 and calcium fluoride (CaF_2), contaminated with uranium. Assuming no change in isotopic concentration of the uranium isotopes, the U_3O_8 material would have the same isotopic ratios as the depleted UF_6 tails. The CaF_2 could have about 55 becquerels (1.5 picocuries) per gram of depleted uranium as a radioactive contaminate (DOE, 2004). Finally radioactive waste resulting from routine operations and the eventual decontamination and decommissioning (D&D) of the plant would be transported to a waste disposal site. Specifications for 55-gallon drums and B-25 boxes, used to transport radioactive waste are give in Table D-2.

Table D-1 Specifications for Type 30B, 48X, and 48Y Cylinders

Cylinder Specification	30B	48X	48Y
Nominal Diameter	76 cm	122 cm	122 cm
Nominal Length	206 cm	302 cm	380 cm
Wall Thickness	1.3 cm	1.6 cm	1.6 cm
Nominal Tare Weight	635 kg	2,000 kg	2,359 kg
Maximum Net Weight	2,300 kg	9,540 kg	12,500 kg
Nominal Gross Weight	2,900 kg	11,600 kg	14,800 kg
Minimum Volume	0.74 m^3	3.05 m^3	4.04 m^3
Basic Construction Material	Steel: ASTM-516	Steel: ASTM-516	Steel: ASTM-516
Service Pressure	1,380 kPa gage	1,380 kPa gage	1,380 kPa gage
Hydrostatic Test Pressure	2,760 kPa gage	2,760 kPa gage	2,760 kPa gage
Isotopic Content Limit (Max. with Moderation Control)	5.0 % U-235	4.5 % U-235 (5.0% in-plant use)	4.5 % U-235
Valve Used	2.54 cm valve	2.54 cm valve	2.54 cm valve

Notes:
cm = centimeter;m^3 = cubic meter; kg = kilogram; kPa = kilopascal; psi = pounds per square inch; ASTM = American Society for Testing and Materials.
To convert cm to inches multiply by 0.394.
To convert m^3 to ft^3 multiply by 35.3.
To convert kg to lb multiply by 2.2.
To convert kPa to psi multiply by 0.144.
Source: USEC, 1995.

Table D-2 Specifications for 55-Gallon Drums and B-25 Boxes

Cylinder Specification	55-Gallon Drum	B-25 Box
Nominal Diameter	61 cm	122 cm × 183 cm
Nominal Length	89 cm	122 cm
Minimum Volume	259 L	2,720 L
Material of Construction	Steel	Steel

Notes:
cm = centimeter; L = liter
To convert cm to inches multiply by 0.394.
To convert L to ft^3 multiply by 0.35.
Source: USEC, 2005.

Table D-3 provides the isotopic mass fractions used to calculate the activities of the individual radionuclides in the various shipping containers. The calculated activity of the uranium isotopes and their

most prevalent progeny are given in Table D-4. The activities of the various isotopes of protactinium and thorium are calculated assuming one year of decay. These progeny along with the uranium isotopes account for more than 99 percent of the total activity of the radioactive materials described in Section D.1. While other progeny are present in very small quantities, their contribution to the total risk is negligible.

Table D-3 Uranium Isotopic Mass Fractions

Radionuclide	Mass Fraction		
	Feed Material (%)	Product Materials (%)	Depleted Tails (%)
U-234	0.0054	0.047	0.00052
U-235	0.7	4.7	0.3
U-238	99.3	95.2	99.7

Table D-4 Activities of Uranium, Protactinium, and Thorium Radionuclides in Various Shipping Containers (becquerels)

Radionuclide	Feed Material			Product 30B Cylinder	Heels 30B Cylinder	Radioactive Waste[1]		Depleted Uranium Bulk Bag	Calcium Fluoride Bulk Bag
	48X Cylinder	48Y Cylinder	30B Cylinder			55-Gallon Drum	B-25		
Th-230	7.4×10^{5}	9.6×10^{5}	1.6×10^{6}	1.6×10^{6}	8.1×10^{3}	0	0	1.1×10^{5}	5.2×10^{-1}
Th-231	3.7×10^{9}	4.8×10^{9}	5.9×10^{9}	5.9×10^{9}	2.9×10^{7}	7.4×10^{6}	7.4×10^{7}	2.1×10^{9}	1.0×10^{4}
Th-234	8.1×10^{10}	1.0×10^{11}	1.9×10^{10}	1.9×10^{10}	9.3×10^{7}	1.2×10^{8}	1.6×10^{9}	1.2×10^{11}	5.6×10^{5}
Pa-231	7.8×10^{4}	1.0×10^{5}	1.2×10^{5}	1.2×10^{5}	5.9×10^{2}	0	0	4.4×10^{4}	2.1×10^{-1}
Pa-234	1.0×10^{8}	1.4×10^{8}	2.4×10^{7}	2.4×10^{7}	1.2×10^{5}	0	0	1.6×10^{8}	7.4×10^{2}
Pa-234m	8.1×10^{10}	1.0×10^{11}	1.9×10^{10}	1.9×10^{10}	9.3×10^{7}	1.2×10^{8}	1.6×10^{9}	1.2×10^{11}	5.6×10^{4}
U-234	8.1×10^{10}	1.0×10^{11}	1.7×10^{11}	1.7×10^{11}	8.1×10^{8}	1.2×10^{8}	1.6×10^{9}	1.1×10^{10}	5.6×10^{4}
U-235	3.7×10^{9}	4.8×10^{9}	1.6×10^{9}	1.6×10^{9}	2.9×10^{7}	7.4×10^{6}	7.4×10^{7}	2.1×10^{9}	1.0×10^{4}
U-238	8.1×10^{10}	1.0×10^{11}	1.9×10^{10}	1.9×10^{10}	9.3×10^{7}	1.2×10^{8}	1.6×10^{9}	1.2×10^{11}	5.6×10^{5}
Total Curies	$\mathbf{3.3 \times 10^{11}}$	$\mathbf{4.1 \times 10^{11}}$	$\mathbf{2.4 \times 10^{11}}$	$\mathbf{2.4 \times 10^{11}}$	$\mathbf{1.0 \times 10^{9}}$	$\mathbf{5.2 \times 10^{8}}$	$\mathbf{6.7 \times 10^{9}}$	$\mathbf{3.7 \times 10^{11}}$	$\mathbf{1.7 \times 10^{6}}$

Notes:
1 curie (Ci) = 3.7×10^{10} becquerels
[1]Source: USEC, 2005.

D.3 Transportation Routes

Transportation of radiological materials would include shipments of feed material to the proposed ACP, shipments of product materials (enriched UF_6) from the proposed ACP, and shipments of radioactive waste from the proposed ACP (USEC, 2005). Depleted UF_6 is assumed to be stored onsite until it is converted from UF_6 to U_3O_8, a more stable chemical form, and then transported by railcar to a low-level radioactive waste disposal site. According to the ACP Environmental Report, feed materials will be transported from Metropolis, Illinois; Port Hope, Ontario, Canada; and Wilmington, Delaware in Type 48Y, Type 48X , and Type 30B cylinders, respectively. Product materials will be shipped to Richland, Washington; Columbia, South Carolina; Wilmington, North Carolina; and Seattle, Washington in Type 30B cylinders. Wilmington, Delaware is the shipping port for feed materials from Russia, while Seattle is the port for product shipments to Korea, and Japan. Low-level radioactive waste (LLRW) will be shipped to Gainsville, Florida; Clive, Utah; and the Nevada Test Site. The transportation of radiological materials is subject to NRC and DOT regulations. Table D-5 presents a matrix of the shipping origins and destinations for the various radioactive materials.

In addition to the transport of radioactive materials during the operation of the proposed ACP, low-level radioactive waste will be shipped to disposal sites during decontamination and decommissioning (D&D) waste are expected to include of the proposed ACP. Shipments of decontamination and decommissioning waste are expected to be 5,100 shipments to the Nevada Test Site; 105 shipments to Clive, Utah; and 60 shipments to Kingston, Tennessee.

WebTragis (ORNL, 2003) was used to generate the routing information. WebTragis is a web-based version of Tragis (Transport Routing Analysis Geographic Information System) and is used to calculate highway, rail, or waterway routes within the United States. WebTragis generates routing distance, population density within 800 meters (0.5 mile), and for the truck routes, the number of rest stops and stops for State inspections. Table D-6 presents the output from WebTragis to be used in this risk assessment. For Port Hope, Ontario, an additional 241 kilometers (150 miles) of route distance was added to the TRAGIS output to account for that portion of the route located in Canada. Even though transportation regulations by truck do not require restricted routing for the shipment of natural uranium, low-enriched uranium, or depleted uranium, routing restrictions were applied as follows (USEC, 2005):

- Highway Route Controlled Quantity preferred route with two drivers;
- Prohibit use of links prohibiting truck use; and
- Prohibit use of ferry crossing; prohibit use of roads with hazardous materials prohibition.

Transport routes generated by TRAGIS are shown in Figures D-1 through D-5 for the different types of materials transported.

Table D-5 Radioactive Waste Shipment Routes

Route	Radioactive Shipments							
	Feed Material (Natural UF_6)	Product (Enriched UF_6)	Heeled Containers	Low-Level Radioactive Waste	Mixed Low- Level Radioactive Waste	Low-Level Liquid Radioactive Waste	Depleted Uranium (U_3O_8)	Calcium Fluoride (CaF_2)
Metropolis, IL to ACP	✓							
Port Huron, ON to ACP	✓							
Wilmington, DE to ACP	✓							
ACP to Richland, WA		✓	✓					
ACP to Columbia, SC		✓	✓					
ACP to Wilmington, NC		✓						
ACP to Seattle, WA		✓						
ACP to Clive, UT				✓			✓	✓
ACP to Nevada Test Site, NV				✓				
ACP to Gainsville, FL					✓			
ACP to Oak Ridge, TN						✓		

Source: USEC, 2005.

Table D-6 Route Information as Generated by TRAGIS

Destination/ Origin	Distance (km)				Elapsed Time (hh:mm)	Weighted Population (people/km^2)			Population within 800 m Buffer Zone
	Rural	Suburban	Urban	Total		Rural	Suburban	Urban	
Metropolis, IL	554.1 (63.0%)	307.3 (35.0%)	17.7 (2.0%)	879.1 (100%)	9:31	20.6	282	2,193	174,192
Port Hope, ON	457.8 (50.9%)	392.7 (43.7%)	48.2 (5.4%)	898.7 (100%)	10:26	21	305.2	2,444	316,151
Wilmington, DE	474.4 (54.3%)	355.3 (40.7%)	44.3 (5.1%)	873.9 (100%)	10:06	19	330.6	2,316	308,509
Richland, WA	3,130.9 (81.4%)	653.4 (17.0%)	60.8 (1.6%)	3,844.8 (100%)	41:27	10.9	298.3	2,235	494,741
Columbia, SC	422.2 (53.8%)	331.8 (42.3%)	30.4 (3.9%)	784.3 (100%)	8:02	17.6	367	2,278	256,008
Wilmington, NC	549.2 (55.3%)	409.7 (41.3%)	33.8 (3.4%)	992.6 (100%)	10:26	18.3	359.1	2,150	305,803
Seattle, WA	3,229.9 (79.2%)	743.8 (18.2%)	103.6 (2.5%)	4,077.2 (100%)	44:09	11	320.7	2,319	695,631
Clive, UT (Truck)	2,430.1 (80.7%)	520.8 (17.3%)	60.1 (2.0%)	3,010.9 (100%)	31:46	11.1	310.4	2,292	448,863
Clive, UT (Rail)	2,518.1 (80.0%)	500.2 (15.9%)	128.3 (4.1%)	3,146.4 (100%)	72.26	9.3	370.3	2,375	716,122
Nevada Test Site, NV	2,935.2 (80.6%)	617.7 (17.0%)	90.5 (2.5%)	3,643.1 (100%)	38:15	10.7	316.2	2,405	614,875
Gainsville, FL	875.3 (61.2%)	519.4 (36.3%)	36.3 (2.5%)	1,430.8 (100%)	14:52	15.1	334.6	2,306	343,734
Oak Ridge, TN	350.9 (59.1%)	226.6 (38.2%)	16.3 (2.8%)	593.3 (100%)	6:20	21	293.8	2,065	131,400

Notes:
km = kilometer; km^2 = square kilometer
To convert km to mi multiply by 0.62.
To convert from km^2 to mi^2 multiply by 0.386.

Figure D-1 Routes Modeled for the Transport Feed Material by Truck to the American Centrifuge Plant (ACP) from Port Huron, ON; Metropolis, IL; and Wilmington, DE

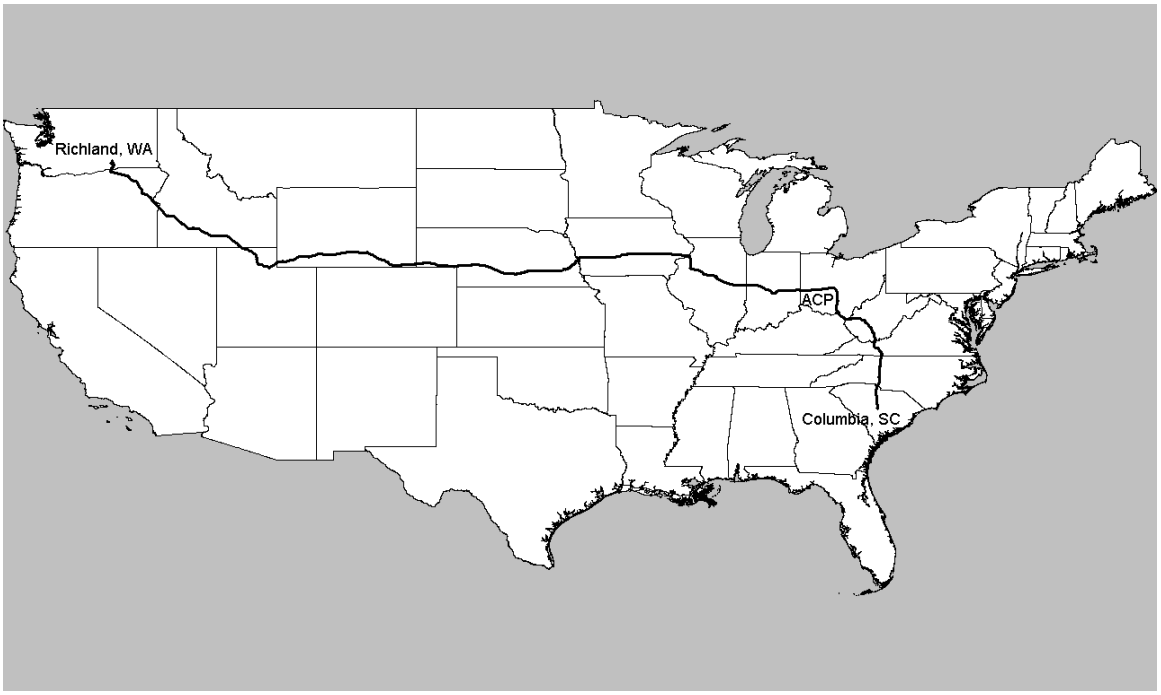

Figure D-2 Routes Modeled for the Transport of Product Materials by Truck from the American Centifuge Plant (ACP) to Seattle, WA; Richland, WA; Wilmington, NC; and Columbia, SC

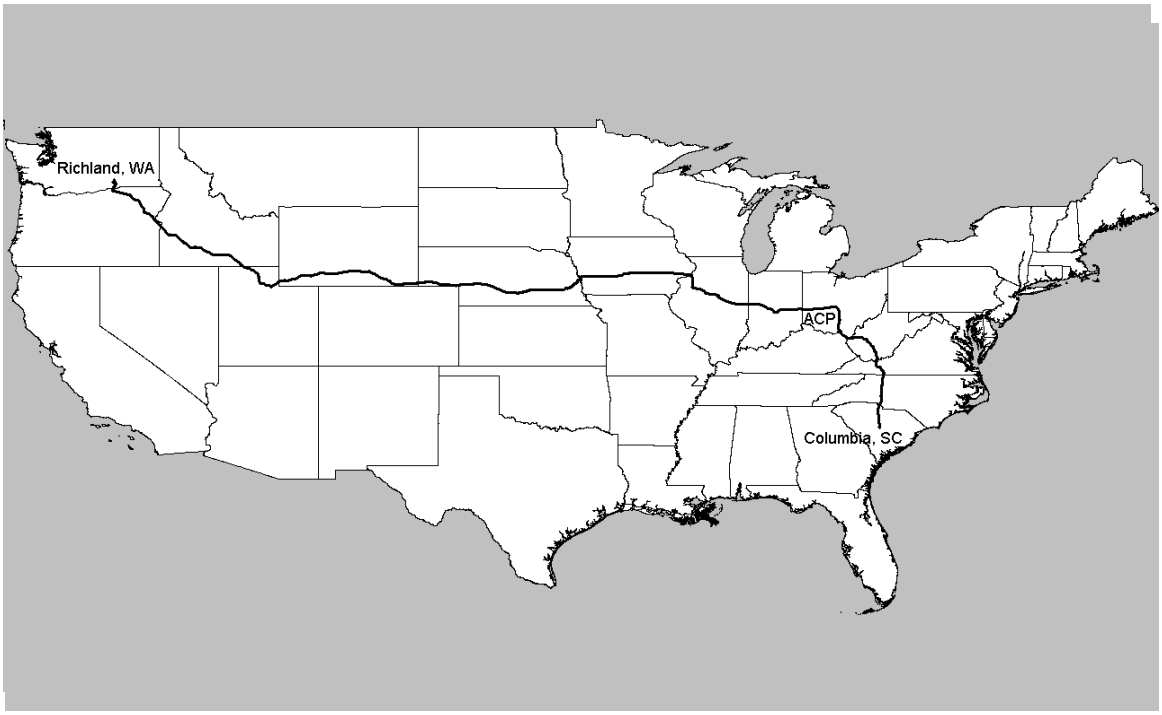

Figure D-3 Routes Modeled for the Transport of Heeled Cylinders by Truck from the American Centifuge Plant to Richland, WA and Columbia, SC

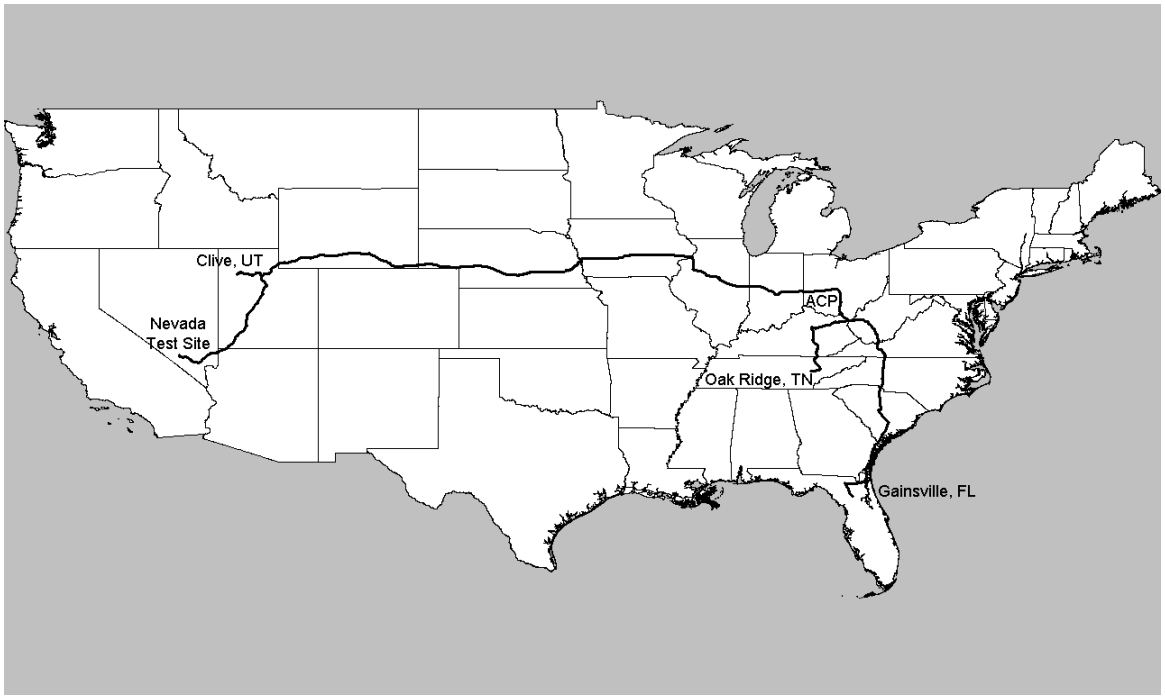

Figure D-4 Routes Modeled for the Transport of Radioactive Waste by Truck from the American Centrifuge Plant (ACP) to the Nevada Test Site; Clive, UT; Oak Ridge, TN; and Gainsville, FL

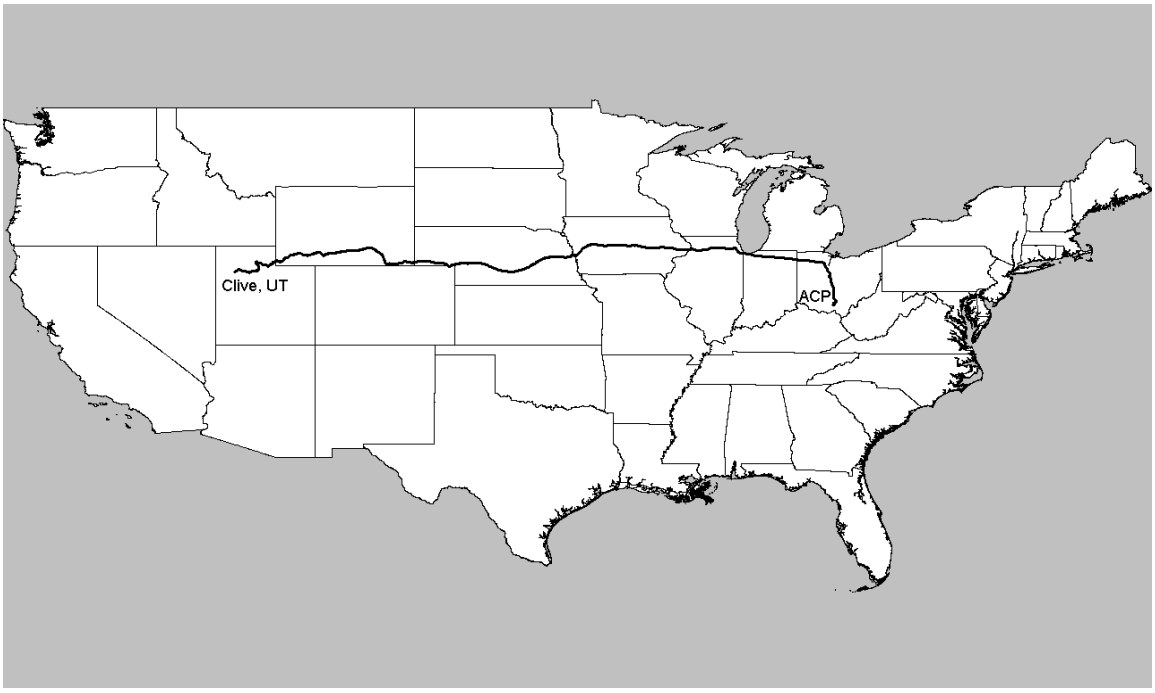

Figure D-5 Route Modeled for the Transport of Conversion Products by Rail from a Conversion Facility located in Piketon, OH to Clive, UT

D.4 RADTRAN Modeling Inputs and Results

The radiological impacts to occupational workers and the general public from the transport of the radioactive materials were estimated using RADTRAN 5 (Osborn, 2005), a computer code that calculates the risks for both the incident-free transport of radioactive-material and for accidents. The term "incident free" means that no traffic accident or other incident resulted in the release of radioactive material to the surrounding environment. In this context, accidents refer only to incidents that result in the release of radioactive material. The risks associated with the transport of radioactive materials include injuries and fatalities from traffic accidents and an increased risk of cancer fatalities from exposure of persons near the vehicle to direct radiation.

Exposure to radiation from radioactive shipments is assumed to result in an increased risk of latent cancer to crews operating the truck or train, persons sharing the route with the shipment (on-link public), persons living alongside the route (off-link public), and persons at rest stops and inspection stops. These latent cancers do not occur immediately after exposure, but instead occur a number of years after the exposure. RADTRAN 5 estimates the number of latent cancer fatalities from the incident free transport of the materials and accidents. This section includes the RADTRAN input parameters used in this analysis and the results of that analysis in expected latent cancer fatalities.

D.4.1 Incident-Free Parameters

The risks from incident-free transport depend on the external radiation levels of the package being transported; the length and time duration of the route; and the number of persons sharing the route. Tables D-7 and D-8 provide a listing of the input parameters to RADTRAN that were used in this risk assessment.

Table D-7 RADTRAN "Package" Parameters

Package	RADTRAN Parameter			
	Long Dimension (m)	Dose Rate (mrem/hr)[1]	Gamma Fraction	Neutron Fraction
Feed Material (48X cylinder)	3.0	0.7	1	0
Feed Material (48Y cylinder)	3.8	0.7	1	0
Feed Material (30B cylinder)	2.1	0.7	1	0
Product Material (30B cylinder)	2.1	0.4	1	0
Heels (30B cylinder)	2.1	0.4	1	0
Waste (55-gallon drums)	0.9	1	1	0
Waste (B-25)	1.8	1	1	0
Depleted UF_6 (bulk bag)	8	1	1	0
CaF_2 (bulk bag)	8	0.0001	1	0

Notes:
[1]Dose rate is the external dose rate at 1 m from the package.
m = meter; mrem/hr = millirem per hour
To convert from m to ft multiply by 3.28.

Table D-8 RADTRAN "Link" Parameters

RADTRAN Parameter	Truck Links			Rail Links		
	Rural	Suburban	Urban	Rural	Suburban	Urban
Speed (km/hr)	88.5	40.2	24.1	64.4	40.2	24.2
Vehicle Density (vehicles/hr)	470	780	2,800	1	5	5
Persons Per Vehicle	2	2	2	3	3	3
Accident Rate (accidents/vehicle-hour)	3×10^{-7}	3×10^{-7}	3×10^{-7}	1×10^{-7}	1×10^{-7}	1×10^{-7}
Zone	Rural	Suburban	Urban	Rural	Suburban	Urban
Type	Primary Highway	Primary Highway	Primary Highway	N/A	N/A	N/A
Farm Fraction	1	0	0	1	0	0

Notes:
km = kilometer
To convert km to mi multiply by 0.62.

D.4.2 Accident Parameters

To calculate the risk associated with accidents that result in the release of radioactive material, RADTRAN 5 estimates the probability, or likelihood, of an accident and the consequences, or outcome, of such an accident. The likelihood or frequency of an accident is a function of the type of road and the number of vehicles using the road. NRC classifies accidents into eight severity categories, based on the mechanical (impact) and thermal (fire) forces involved (NRC, 1977). Category I is the least severe and Category VIII is the most severe. Less severe accidents occur more frequently, but have relatively mild consequences. More severe accidents happen less frequently, but have more significant consequences, including the release of some or all of the radioactive material in the shipment. NRC has estimated the fraction of accidents for truck and rail transport that fall within each category. Additionally, NRC has estimated the fraction of accidents in each category that occur in rural, suburban, and urban areas. As shown in Table 2-9 less severe accidents are most likely to occur in urban areas, where driving speeds are typically lower, while more severe accidents are more likely to occur in rural areas where driving speeds are higher (NRC, 1977). These estimates when combined with average accident rates are used estimate the number of latent cancer fatalities due to exposure to radiation and radioactivity from transportation accidents. Fatalities to chemical effects and bodily injury are addressed separately. Tables D-9 and D-10 provided the fractional occurrences of accidents by severity category used in this risk assessment.

Table D-9 Fractional Occurrences of Truck Accidents by Severity Category

Accident Severity Category	Fractional Occurrences of Severity Category	Fractional Occurrence by Population Zone		
		Rural	Suburban	Urban
I	0.55	0.1	0.1	0.8
II	0.36	0.1	0.1	0.8
III	0.07	0.3	0.4	0.3
IV	0.016	0.3	0.4	0.3
V	0.0028	0.5	0.3	0.2
VI	0.0011	0.7	0.2	0.1
VII	0.000085	0.8	0.1	0.1
VIII	0.000015	0.9	0.05	0.05

Source: NRC, 1977.

Table D-10 Fractional Occurrences of Rail Accidents by Severity Category

Accident Severity Category	Fractional Occurrences of Severity Category	Fractional Occurrence by Population Zone		
		Rural	Suburban	Urban
I	0.5	0.1	0.1	0.8
II	0.3	0.1	0.1	0.8
III	0.18	0.3	0.4	0.3
IV	0.018	0.3	0.4	0.3
V	0.0018	0.5	0.3	0.2
VI	0.00013	0.7	0.2	0.1
VII	0.00006	0.8	0.1	0.1
VIII	0.00001	0.9	0.05	0.05

Source: NRC, 1977.

Table D-11 provides the release fraction used for each severity category. For purposes of this analysis, all releases of material are assumed to be airborne and respirable.

Table D-11 Release Fractions for Accidents by Severity Category

Accident Severity Category	Release Fraction
I	0
II	0.01
III	0.1
IV, V, VI, VII, and VIII	1

Source: DOE, 2002.

D.4.3 RADTRAN Results

The transportation of feed material, product, heel cylinders, radioactive waste, and the products from the conversion of depleted UF_6 results in some increased risk of cancer to both the occupational workers transporting and handling the material and to members of the public driving on the roads or living along the transportation route. RADTRAN results for the transportation of radioactive materials associated with operations are given in Tables D-12 and D-13 on an annual basis. The transport of all materials is estimated to result in approximately 0.014 latent cancer fatalities per year of operation from exposure to direct radiation during incident-free transport, and an additional 0.008 latent cancer fatalities per year from accidents that result in the release of radioactive material into the environment. The total latent cancer fatalities per year is estimated to be 0.02 per year of operation or about one cancer fatality over thirty years of operation.

In addition to the transport of radioactive materials during the operation of the proposed ACP, low level radioactive waste will be shipped to disposal sites during decontamination and decommissioning (D&D) of the proposed ACP. Tables D-14 and D-15 provide the RADTRAN results for the transportation of radioactive materials associated with all decontamination and decommissioning activities of the proposed ACP. The number of latent cancer fatalities from the transportation of all decontamination and decommissioning waste is estimated to be 0.3, including 0.005 deaths resulting from the release of radioactive material from accidents.

The risk assessment described above is for product materials enriched to approximately 5 weight percent of uranium-235. Although it is currently believed to be unlikely, USEC may in the future enrich relatively small volumes of product up to 10 weight percent of uranium-235. There are currently no 2.5 ton cylinders certified for the shipment of UF_6. In the event this higher enrichment occurs, USEC would have to gain the appropriate certification before it shipped 10 percent product in either an existing 2.5-ton cylinder or in a new 2.5-ton cylinder. External exposure rates surrounding such a cylinder would likely be similar to those around the 30B cylinders presently used to ship 5 percent product and less than the external dose equivalent rates used in this assessment, which are considered conservative. For this reason, the risks associated with the incident free transport of the 10 percent enriched product would not be significantly than that of the 5 percent enriched product.

Table D-12 Number of Latent Cancer Fatalities Expected from the Incident-Free Transportation of Radioactive Materials for One Year of Operation

Route	Material	Latent Cancer Fatalities							
		MEI	**Drivers**	**Off-Link Public**	**On-Link Public**	**Rest Stop**	**Inspect-ion Stop**	**Loading**	**Total**
Metropolis, IL to ACP	Feed Material	6.2×10^{-9}	1.2×10^{-3}	6.8×10^{-5}	4.4×10^{-4}	8.1×10^{-4}	1.1×10^{-3}	3.0×10^{-3}	$\mathbf{4.0 \times 10^{-3}}$
Port Hope, ON to ACP	Feed Material	9.4×10^{-9}	1.4×10^{-3}	1.4×10^{-4}	1.1×10^{-3}	1.2×10^{-3}	6.9×10^{-4}	5.2×10^{-4}	$\mathbf{5.1 \times 10^{-3}}$
Wilmington, DE to ACP	Feed Material	1.5×10^{-9}	2.5×10^{-4}	2.2×10^{-5}	1.7×10^{-4}	2.0×10^{-4}	1.8×10^{-4}	9.7×10^{-5}	$\mathbf{9.1 \times 10^{-4}}$
ACP to Richland, WA	Product	5.0×10^{-10}	2.8×10^{-4}	1.3×10^{-5}	1.1×10^{-4}	2.6×10^{-4}	1.1×10^{-4}	6.5×10^{-5}	$\mathbf{8.3 \times 10^{-4}}$
ACP to Columbia, SC	Product	5.9×10^{-10}	8.8×10^{-5}	8.8×10^{-6}	5.2×10^{-5}	3.8×10^{-5}	7.1×10^{-5}	7.7×10^{-5}	$\mathbf{3.3 \times 10^{-4}}$
ACP to Wilmington, NC	Product	6.7×10^{-10}	1.2×10^{-4}	1.2×10^{-5}	7.0×10^{-5}	8.7×10^{-5}	6.4×10^{-5}	8.7×10^{-5}	$\mathbf{4.4 \times 10^{-4}}$
ACP to Seattle, WA (Korea)	Product	1.3×10^{-10}	1.1×10^{-4}	4.0×10^{-6}	3.6×10^{-5}	8.3×10^{-5}	3.3×10^{-5}	1.6×10^{-5}	$\mathbf{2.8 \times 10^{-4}}$
ACP to Seattle, WA (Japan)	Product	1.9×10^{-10}	1.5×10^{-4}	7.7×10^{-6}	7.0×10^{-5}	2.3×10^{-4}	5.4×10^{-5}	2.2×10^{-5}	$\mathbf{5.4 \times 10^{-4}}$
Richland, WA to ACP	Heels	8.9×10^{-11}	5.1×10^{-5}	2.3×10^{-6}	1.9×10^{-5}	4.7×10^{-5}	1.9×10^{-5}	4.9×10^{-5}	$\mathbf{1.9 \times 10^{-4}}$
Columbia, SC to ACP	Heels	8.9×10^{-11}	1.3×10^{-5}	1.3×10^{-6}	8.0×10^{-6}	5.8×10^{-6}	1.1×10^{-5}	4.9×10^{-5}	$\mathbf{8.8 \times 10^{-5}}$
ACP to Clive UT	LLW	3.5×10^{-10}	1.3×10^{-4}	7.4×10^{-6}	6.4×10^{-5}	1.6×10^{-4}	4.1×10^{-5}	7.3×10^{-5}	$\mathbf{4.7 \times 10^{-4}}$
ACP to Nevada Test Site, NV	LLW	1.4×10^{-10}	1.6×10^{-4}	3.6×10^{-6}	3.4×10^{-5}	8.1×10^{-5}	3.8×10^{-5}	3.0×10^{-5}	$\mathbf{3.5 \times 10^{-4}}$
ACP to Gainsville, FL	Mixed LLW	7.3×10^{-11}	2.5×10^{-5}	1.6×10^{-6}	9.3×10^{-6}	1.4×10^{-5}	1.4×10^{-5}	1.0×10^{-5}	$\mathbf{7.5 \times 10^{-5}}$
Piketon, OH to Clive, UT	U_3O_8	3.2×10^{-11}	2.2×10^{-7}	7.3×10^{-7}	7.3×10^{-8}	2.7×10^{-5}	0	0	$\mathbf{2.8 \times 10^{-5}}$
Piketon, OH to Clive, UT	CaF_2	3.2×10^{-15}	2.2×10^{-10}	7.3×10^{-11}	7.3×10^{-11}	2.7×10^{-9}	0	0	$\mathbf{3.1 \times 10^{-9}}$
Total		$\mathbf{9.4 \times 10^{-9}}$	$\mathbf{4.0 \times 10^{-3}}$	$\mathbf{2.9 \times 10^{-4}}$	$\mathbf{2.2 \times 10^{-3}}$	$\mathbf{3.3 \times 10^{-3}}$	$\mathbf{2.4 \times 10^{-3}}$	$\mathbf{1.4 \times 10^{-3}}$	$\mathbf{1.4 \times 10^{-2}}$

Table D-13 Number of Latent Cancer Fatalities Expected from Accidents Resulting from the Transportation of Radioactive Materials for One Year of Operation

Route	Material	Latent Cancer Fatalities				
		Ground	Inhaled	Resuspended	Cloudshine	Total
Metropolis, IL to ACP	Feed Material	5.2×10^{-6}	4.8×10^{-4}	3.2×10^{-4}	3.5×10^{-10}	$\mathbf{8.0 \times 10^{-4}}$
Port Hope, ON to ACP	Feed Material	1.3×10^{5}	1.2×10^{-3}	8.0×10^{-4}	8.8×10^{-10}	$\mathbf{2.0 \times 10^{-3}}$
Wilmington, DE to ACP	Feed Material	9.8×10^{-6}	8.0×10^{-4}	5.2×10^{-4}	2.5×10^{-10}	$\mathbf{1.3 \times 10^{-3}}$
ACP to Richland, WA	Product	7.5×10^{-6}	6.6×10^{-4}	2.1×10^{-4}	2.0×10^{-10}	$\mathbf{8.7 \times 10^{-4}}$
ACP to Columbia, SC	Product	4.9×10^{-6}	4.3×10^{-4}	1.3×10^{-4}	1.3×10^{-10}	$\mathbf{5.6 \times 10^{-4}}$
ACP to Wilmington, NC	Product	6.5×10^{-6}	5.7×10^{-4}	1.8×10^{-4}	1.8×10^{-10}	$\mathbf{7.5 \times 10^{-4}}$
ACP to Seattle, WA (Korea)	Product	2.5×10^{-6}	2.1×10^{-4}	6.9×10^{-5}	6.6×10^{-11}	$\mathbf{2.8 \times 10^{-4}}$
ACP to Seattle, WA (Japan)	Product	3.5×10^{-6}	3.0×10^{-4}	9.6×10^{-5}	9.2×10^{-11}	$\mathbf{3.9 \times 10^{-4}}$
Richland, WA to ACP	Heels	5.2×10^{-8}	3.2×10^{-6}	7.2×10^{-6}	1.0×10^{-12}	$\mathbf{1.0 \times 10^{-5}}$
Columbia, SC to ACP	Heels	2.8×10^{-8}	1.8×10^{-6}	4.0×10^{-6}	5.5×10^{-13}	$\mathbf{5.8 \times 10^{-6}}$
ACP to Clive UT	LLW	5.2×10^{-8}	4.4×10^{-6}	5.1×10^{-6}	5.7×10^{-12}	$\mathbf{9.5 \times 10^{-6}}$
ACP to Nevada Test Site, NV	LLW	8.8×10^{-9}	5.5×10^{-7}	1.7×10^{-6}	4.5×10^{-12}	$\mathbf{2.2 \times 10^{-6}}$
ACP to Gainsville, FL	Mixed LLW	2.0×10^{-9}	1.3×10^{-7}	5.7×10^{-7}	1.0×10^{-12}	$\mathbf{7.0 \times 10^{-7}}$
Piketon, OH to Clive, UT	U_3O_8	1.7×10^{-6}	7.4×10^{-4}	6.1×10^{-7}	9.1×10^{-10}	$\mathbf{7.5 \times 10^{-4}}$
Piketon, OH to Clive, UT	CaF_2	3.5×10^{-11}	2.9×10^{-9}	1.3×10^{-8}	3.6×10^{-15}	$\mathbf{1.6 \times 10^{-8}}$
Total		$\mathbf{5.4 \times 10^{-5}}$	$\mathbf{5.4 \times 10^{-3}}$	$\mathbf{2.3 \times 10^{-3}}$	$\mathbf{3.1 \times 10^{-9}}$	$\mathbf{7.8 \times 10^{-3}}$

Table D-14 Number of Latent Cancer Fatalities Expected from the Incident-Free Transportation of Radioactive Materials of All Decontamination and Decommissioning (D&D) Waste

Route	Material	Latent Cancer Fatalities							
		MEI	Drivers	Off-Link Public	On-Link Public	Rest Stop	Inspect-ion Stop	Loading	Total
ACP to Clive, UT	D&D Waste	4.1×10^{-9}	1.4×10^{-3}	8.6×10^{-5}	7.4×10^{-4}	2.2×10^{-3}	1.9×10^{-3}	4.7×10^{-4}	**6.8×10^{-3}**
ACP to Nevada Test Site, NV	D&D Waste	2.0×10^{-7}	8.9×10^{-2}	5.1×10^{-3}	4.8×10^{-2}	1.2×10^{-1}	3.1×10^{-2}	2.1×10^{-2}	**3.1×10^{-1}**
ACP to Kingston, TN	D&D Waste	1.8×10^{-10}	2.7×10^{-5}	1.5×10^{-6}	1.0×10^{-5}	1.2×10^{-5}	1.0×10^{-5}	1.1×10^{-4}	**1.7×10^{-4}**
Total		**2.0×10^{-7}**	**9.1×10^{-2}**	**5.2×10^{-3}**	**4.9×10^{-2}**	**1.2×10^{-1}**	**3.2×10^{-2}**	**2.1×10^{-2}**	**3.2×10^{-1}**

Table D-15 Number of Latent Cancer Fatalities Expected from Accidents Resulting from the Transportation of Radioactive Materials of All Decontamination and Decommissioning (D&D) Waste

Route	Material	Latent Cancer Fatalities				
		Ground	Inhaled	Resuspended	Cloudshine	Total
ACP to Clive, UT	D&D Waste	3.2×10^{-7}	2.5×10^{-5}	4.7×10^{-5}	3.3×10^{-11}	**7.3×10^{-5}**
ACP to Nevada Test Site, NV	D&D Waste	2.1×10^{-5}	1.6×10^{-3}	3.0×10^{-3}	2.1×10^{-9}	**4.7×10^{-3}**
ACP to Kingston, TN	D&D Waste	7.5×10^{-9}	5.3×10^{-7}	1.2×10^{-6}	4.4×10^{-12}	**1.7×10^{-6}**
Total		**2.1×10^{-5}**	**1.7×10^{-3}**	**3.1×10^{-3}**	**2.1×10^{-9}**	**4.7×10^{-3}**

However, the accident related radiological risks associated with the transport of the 10 percent enriched product would be somewhat greater than that of the 5 percent enriched product. This primarily due to the higher activity of uranium-234 in the 10 percent enriched product. Uranium-234 does not contribute significantly to the external dose rate, but is an inhalation hazard if released. Table D-16 shows the calculated latent cancer fatalities from the transport of the higher enriched product material for the same routes used previously. The number of expected latent cancer fatalities associated with the transport of product material only would be approximately a factor of three greater than that previously estimated. It should be noted that this factor of three is conservative in that it assumes all the product material is enriched to 10 percent; and that it does not account for the decreased risks associated with lower activities of uranium-234 in shipment of the conversion products.

Table D-16 Number of Latent Cancer Fatalities Expected from Accidents Resulting from the Transportation of Product Material Enriched to 10 Percent for One Year of Operation

Route	Material	Latent Cancer Fatalities				
		Ground	Inhaled	Resuspended	Cloudshine	Total
ACP to Richland, WA	Product	1.6×10^{-5}	2.3×10^{-3}	1.4×10^{-4}	3.6×10^{-10}	$\mathbf{2.5 \times 10^{-3}}$
ACP to Columbia, SC	Product	1.0×10^{-5}	1.5×10^{-3}	9.4×10^{-5}	2.4×10^{-10}	$\mathbf{1.6 \times 10^{-3}}$
ACP to Wilmington, NC	Product	1.3×10^{-5}	2.0×10^{-3}	1.3×10^{-4}	3.1×10^{-10}	$\mathbf{2.1 \times 10^{-3}}$
ACP to Seattle, WA (Korea)	Product	5.2×10^{-6}	7.5×10^{-4}	1.1×10^{-4}	1.2×10^{-10}	$\mathbf{8.6 \times 10^{-4}}$
ACP to Seattle, WA (Japan)	Product	7.3×10^{-6}	1.0×10^{-3}	1.5×10^{-4}	1.6×10^{-10}	$\mathbf{1.2 \times 10^{-3}}$
Total		$\mathbf{5.2 \times 10^{-5}}$	$\mathbf{7.6 \times 10^{-3}}$	$\mathbf{6.2 \times 10^{-4}}$	$\mathbf{1.2 \times 10^{-9}}$	$\mathbf{8.3 \times 10^{-3}}$

D.5 Chemical Impacts from Transportation Accidents

In addition to the radiological impacts during transportation described above, chemical impacts from a transportation accident involving uranium could also affect the surrounding public. Uranium compounds, in addition to being radioactive, can have toxic chemical effects (primarily on the kidneys) if inhaled or ingested. The operation of the ACP would result in the transport of UF_6 as feed and product material to and from the ACP, as well as the transport of triuranium octaoxide as a conversion product. Calcium fluoride, another conversion product, contains small amounts of uranium as a contaminant.

Uranium hexafluoride does not react with nitrogen (N_2), oxygen (O_2), carbon dioxide (CO_2) or dry air, but does react rapidly with water vapor to hydrogen fluoride (HF) and uranyl fluoride (UO_2F_2):

$$UF_6 + (2+4\,x)\,H_2O \rightarrow UO_2F_2 * 2\,H_2O + 4\,HF * x\,H_2O$$

Hydrogen fluoride is extremely corrosive and can damage the lungs and cause death if inhaled at high enough concentrations. Irreversible adverse effects resulting from sufficiently high concentrations of these chemicals include permanent organ damage or the impairment of everyday functions, includingdeath. The number of deaths resulting from the chemical effects of hydrogen fluoride and uranyl fluoride is estimated to occur in one percent of those experiencing irreversible effects (Policastro et al., 1997). In contrast to the irreversible adverse effects from exposure to higher concentrations of hydrogen fluoride and uranyl fluoride, the adverse effects from exposure to lower concentrations include skin rash and respiratory irritation.

To estimate the chemical effects of an accident involving the transport of UF_6, the Department of Energy (ANL 2001, DOE 2004) modeled the dispersion of chemical emissions released into the environment from a transportation accident involving a fire. The results were used to determine the number of people whose exposure would exceed the threshold for adverse and irreversible adverse effects. DOE estimated the chemical effects for accidents in rural, suburban, and urban areas. Table D-17 shows the potential chemical impacts to the public from a hypothetical severe transportation accident that involves a fire.

Table D-17 Potential Chemical Consequences to the Population from Severe Transportation Accidents

Material	Mode	Number of Persons with Potential Adverse Health Effects			Number of Persons with Potential Irreversible Adverse Health Effects		
		Rural	Suburban	Urban	Rural	Suburban	Urban
UF_6	Truck	6	760	1,700	0	1	3
U_3O_8	Rail	0	47	103	0	17	38

Source: DOE, 2004.

Based on the total number of trips, the length of the trips, and the mean accident rate, the estimated number of accidents involving shipments of UF_6 is 0.5 accidents per year, or an average of one accident every two years. Of these accidents, approximately 55 percent will not result in the release of any UF_6, and another 43 percent will result in a release of no more than 10 percent of the UF_6. About 2 percent of all accidents are expected to be severe enough to result in the release of all the UF_6 present. The probability of one or more of the fifteen expected accidents being this severe is about 26 percent. Such an accident is most likely to occur in a rural or suburban area.

D.6 References

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(NRC 1977) U.S. Nuclear Regulatory Commission. "Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes." NUREG-0170. 1977.

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APPENDIX E
AIR QUALITY ANALYSIS

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APPENDIX E
AIR QUALITY ANALYSIS

E.1 Air Dispersion Modeling Inputs

This section discusses the inputs used in the application of the ISCLT3 air dispersion model (EPA, 1995) to assess the non-radiological air quality impacts from site preparation and construction as well as from the operation of the proposed ACP. Modeling results can be found in Chapter 4 of the EIS.

E.1.1 Emissions from Site Preparation and Construction

Emissions during the site preparation and construction phases can be divided into four parts: emissions from diesel equipment used by the work crews, emissions from gasoline-powered trucks used by the work crews, emissions from commuter vehicles and delivery trucks, and fugitive dust from construction activity for the construction of new buildings. Emissions related to work crews, crew trucks, and fugitive dust were modeled as area sources with the same footprint as the building being constructed or prepared. Emissions from on-road vehicles were modeled as elongated area sources following the most likely (shortest distance from main entrance) route of traffic.

During the construction period, four work crews are expected to be active: the steel crew, the electrical and mechanical crew, the equipment crew, and the utilities crew. Equipment and fuel proposed for use for each crew are summarized in Table E-1. (USEC, 2005) Diesel equipment is assumed to consume one gallon of fuel per 10 hp per day with equipment horsepowers were taken from the Means Open Shop Building Construction Cost Data Book (USEC, 2005). Each crew trucks is assumed to consume 10 gallons of gasoline per day.

Table E-1 Equipment and Fuel Use Associated with each Crew

Steel Crew			**Electrical and Mechanical Crews**		
90T Crane	275	hp	Bucket Truck	200	hp
Welding	50	hp	55T Crane	170	hp
Diesel	260	gal/day	12T Crane	40	hp
Gas	40	gal/day	Diesel	328	gal/day
			Gas	30	gal/day
Utilities Crew			**Equipment Crew**		
Excavator	240	hp	90T Crane	275	hp
Diesel	192	gal/day	Diesel	220	gal/day
Gas	10	gal/day	Gas	20	gal/day

Notes:

gal/day = gallons per day; hp = horsepower

The NONROAD model is the EPA's standard method for preparing emissions inventories for mobile sources that are not classified as being related to on-road traffic, railroads, air traffic, or water going vessels (EPA, 2002a). The model was developed to estimate county-level emission inventories, but contains all of the information needed to develop a facility specific inventory. Thus NRC used the used the supporting information from the NONROAD model for developing a site-specific emission inventory.

The NONROAD model uses the following general equation to estimate emissions separately for CO, NO_x, PM (essentially all the PM from combustion is $PM_{2.5}$), and THC:

$$EMS = EF * HP * LF * ACT * DF \quad \text{(Eq. 1)}$$

where:

EMS = estimated emissions
EF = emissions factor in grams per horsepower hours
HP = peak horsepower
LF = load factor (assumed percentage of peak horsepower)
ACT = Activity in hours of operation per period of operation
DF = Deterioration Factor

The emissions factor (EF) is specific to the equipment type, engine size, and technology type. The technology type for diesel equipment can be "Base" (before 1988), Tier 0 (1988-1999), or Tier 1 (2000-2005). Tier 2 emissions factors are appropriate for equipment that satisfies 2006 national standards (or slightly earlier California standards). The range in years represents a phase-in by equipment type, engine size and technology. Since most construction activity is schedule for the 2007-2010 time period it was assumed that equipment would meet the Tier 1 standard. Different emissions factors are applied to different ranges of engine sizes. These size ranges are lower bound exclusive and upper bound inclusive. Thus a 175 hp diesel forklift is included in the 100-175 hp range rather than the 175-300 hp range.

The load factor (LF) is specific to the equipment type in the NONROAD model regardless of engine size or technology type and represents the average fraction of peak horsepower at which the engine is assumed to operate.

The deterioration factor (DF) is used to estimate increased emissions due to engine age and is calculated according to the following equation:

$$DF = 1 + A*(AGE)^b \quad \text{(Eq. 2)}$$

where:

A,b = factors given specified in the NONROAD model
AGE = normalized age of the engine

The normalized age of each type of engine appearing in the NONROAD model is calculated using equation 3:

$$AGE = (\text{cumulative hours of operation}) * LF / (\text{median engine life}) \quad \text{(Eq. 3)}$$

The median engine life is specified in the NONROAD model's data files and LF is the load factor used in equation 1 above. The "cumulative hours of operation" can be calculated by multiplying the age in years of the engine by the average activity assumed by the NONROAD model. For this study we assumed a nominal equipment age of five years.

The source classification code and name associated by the NONROAD model with each piece of equipment is presented in Table E-2.

Table E-2 Equipment with Source Classification Codes and Names as they appear in the NONROAD Data Tables

Equipment	Source Classification Code	NONROAD Name
Bucket Truck	2270003010	Diesel Aerial Lift
Crane	2270002045	Diesel Crane
Excavator	2270002036	Diesel Excavator
Welding	2270006025	Diesel Light Commercial Welder

All of the information needed to estimate the facility specific emissions is available as part of the NONROAD model's data files. Sample calculations for estimating CO emissions from the 240 hp excavator follow.

From the NONROAD model data file ACTIVITY.DAT the following record is associated with diesel powered excavators (some blank spaces have been deleted):

```
2270002036 Diesel Excavators    ALL 0 9999 0.59  hrs/yr  1092  DEFAULT
```

The fields of interest are the load factor (0.59) and the average hours of operation per year (1092). The other fields appear identical for all equipment and are intended for use in a future version of the model.

The data file with emissions factors for each pollutant is called EXHCO.EMF which contains the exhaust factors for CO. The following lines are associated with diesel excavators between 175 and 300 hp (some blank spaces and additional technology types have been deleted):

```
2270002036  175  300    Base    T0      T1      T2   g/hp-hr   CO
                          3.98    4.13    1.14    1.14
```

Once again the source classification code appears followed by the minimum and maximum horsepower for the following emissions factors. Because all equipment is assumed to be Tier 1 (T1) the emissions factor will be 1.14 grams of CO per horsepower-hour. In this case an advance to Tier 2 would not produce an improvement, but it could for other pollutants and/or other equipment types and sizes.

To estimate the emissions per eight-hour day using Equation 1 all that is needed is to calculate the deterioration factor.

The following record is associated with Tier 1 diesel equipment in the file EXHCO.DAT:

```
T1                          0.101       1.0       1.0        CO
```

The second field gives factor "A" from Equation 2; the third field gives factor "b"; and the fourth field gives the emissions cap in median life units (the largest number that can be used for "age" in Equation 2).

To determine the "age" used in Equation 3 it is now necessary to know the cumulative hours of operation and the "median engine life." This information is found from equipment type population survey's available for each state. For Ohio, the equipment population file OH.POP gives the expected useful life of a diesel excavator between 175 and 300 hp as 4,667 hours (some blank spaces have been deleted):

```
39000 2000 2270002036 Dsl - Excavators 175 300 233.3 4667 DFAULT
1577.2
```

It is now possible to calculate CO emissions for the excavator.

Starting with Equation 3:

AGE = (5 years * 1092 hrs/yr)*0.59/(4667 hours) = 0.69

Then Equation 2:

$DF = 1 + 0.101*(0.69)^1 = 1.07$

Finally Equation 3:

EMS = (1.14 g/hp-hr)*(240 hp)*(0.59)*(8 hr/day)*(1.07)*(0.002205 lb/g) = 3.05 lb/day

The above process was used to estimate emissions of PM, CO, NO_x, and non-methane hydrocarbons (NMHC). All PM was assumed to be $PM_{2.5}$. SO_2 emissions were calculated by mass balance using the 2007 nonroad sulfur emission standard (500 ppm) and an average density of 7.1 lbs per gallon of diesel.

Each work crew was assumed to have one truck for every four people (USEC, 2005). Emissions were estimated assuming that each crew had a truck similar to a Ford F-150 Supercab meeting Tier 1 standards with at least 80,500 kilometers (50,000 miles) of use. Such a truck fits into the Heavy Duty-Light Truck classification. Table E-3 gives the emissions standards for this truck type. Each truck was assumed to be in use for a full eight-hour day (USEC, 2005) traveling at an average speed of five miles per hour.

Table E-3 Emissions from crew trucks

	NMHC	CO	NOx	PM
grams/mile	0.56	7.3	1.53	0.12
grams/day	22.4	292	61.2	4.8

Notes:
To convert grams to ounces multiply by 0.35.

SO_2 emissions from crew trucks were calculated by mass balance using the 2007 gasoline sulfur standard (30 ppm) and an average fuel density of 6.1 lbs per gallon of gasoline.

Emissions from on-road heavy-duty delivery trucks and commuter cars and trucks were estimated using EPA's MOBILE6.2 model (EPA, 2002b). Long-haul diesel truck emission rates were estimated based on trucks operating in 2010 using national fleet age distribution. Medium-haul diesel trucks were based on the same parameters. Commuter vehicle emissions rates were applied using national defaults for fleet age distribution, but assumed that the fleet mix was half light duty gasoline vehicles and half light duty gasoline trucks. Table E-4 gives emission rates for delivery trucks and commuter vehicles.

Table E-4 Emissions rates for on-road vehicles (grams per mile)

	NMHC	CO	NO_x	PM_{10}	SO_2
Long-Haul Heavy Duty Diesel Delivery Trucks	0.36	1.3	5.61	0.11	0.01
Medium-Haul Heavy Duty Diesel Delivery Trucks	0.44	1.9	8.32	0.16	0.01
Commuter vehicles	0.83	10.6	0.66	0.03	0.01

Notes:
To convert grams per mile to ounces per mile multiply by 0.035.

Delivery trucks were modeled as elongated area sources originating at the facility's main entrance and taking larger roads to the north end of the construction area. Commuter vehicles were modeled as elongated area sources originating at the southwest construction access entrance and following interior roads to the parking lot south of the construction area. During the construction period an average of 28 one-way truck trips (9 long-haul and 19 medium-haul) per day and 2,612 one-way commuter trips per day were modeled. This assumed that each construction worker arrived in a single occupant vehicle.

Emissions rates for fugitive dust were estimated using guidelines outlined in the Western Regional Air Partnership fugitive dust handbook (WRAP, 2004). Although these guidelines were developed for use in western states they assume standard dust mitigation activities, such as wetting, so they were deemed applicable to a Midwestern setting. The handbook offers several options for selecting PM_{10} factors depending on what information is known. Table E-5 shows the possible emissions factors and bases for choosing them.

Table E-5 PM_{10} emissions factors recommended by the Western Regional Air Partnership Handbook

Basis for Emission Factor	Recommended PM10 Emission Factor
Only area and duration known	0.11 ton/acre/month (average conditions) or 0.22 ton/acre/month (average, no mitigation) or 0.43 ton/acre/month (worst-case conditions)
Volume of earth moved known	0.011 ton/acre/month for general construction plus 0.059 ton/1000 yd3 for on-site cut-fill plus 0.22 ton/1000 yd3 for off-site cut-fill
Equipment usage known	0.13 lb/acre/work-hr for general construction plus 49 lb/scraper-hr for on-site haulage plus 94 lb/hr for off-site haulage

Notes:
lb = pounds; yd^3 = cubic yards; hr = hour

Because equipment usage is known, the third option is most appropriate for the proposed ACP. However, because the foundations have been dug and the fill has been hauled before the modeled construction period only the 0.13 pound/acre/work-hour factor was applied. Once PM_{10} was estimated, the Western Regional Air Partnership recommended fractional factor of 0.209 was used to estimate $PM_{2.5}$ from PM_{10}.

Fugitive dust emissions were only applied to new buildings and then only to the construction phase, not to other phases such as equipment installation.

E.1.2 Emissions from Plant Operations

Air emissions during plant operation were associated with the use of emergency backup generators burning diesel fuel as well as the on-road delivery trucks and commuter vehicles. These are the only non-radioactive emissions associated with the normal operation of the proposed proposed ACP.

Emissions factors for on-road vehicles were identical to those used for the construction phase. During plant operations, however, an average of 24 one-way delivery truck trips per day and 1,116 commuter one-way trips per day were modeled.

A number of diesel-powered emergency generators will be installed at the plant. The generators' total emissions rates for CO, NOx, PM_{10}, $PM_{2.5}$, SO_2, and NMHC were modeled using specifications from a proprietary appendix to the Environmental Report (USEC, 2005).

Each generator was modeled as a point source located at the assigned building as identified in a proprietary index to the Environmental Report (USEC, 2005). Stack parameters were based on a typical 1,109 hp diesel generator described in Appendix 7 of CARB's Diesel Risk Reduction Plan (CARB, 2000) with the exception that the stack height was increased from 3 meters to 10 meters to reflect good engineering practice to avoid downwash effects assuming that the stacks are located on top of the building(s). Table E-7 lists the stack parameters used in modeling the generators.

Table E-7 Stack Parameters for Diesel Generators

Stack Temperature	Stack Height	Stack Diameter	Exit Velocity
787 ˚K	30 m (10 m above roof)	0.25 m	59.8 m/s

Notes:
K = ˚Kelvin; m = meter; m/s = meters per second.
To convert °K to °F use the following formula: ° F = ((°K - 275.15) x 1.8) + 32
To convert meters to feet multiply by 3.3

E.1.3 Emissions from Manufacturing and Assembly

[The information in this section is being withheld pursuant to 10 CFR 2.390.]

[The information in this section is being withheld pursuant to 10 CFR 2.390.]

E.2 Meteorological Inputs

Surface meteorological data, including wind data, have been collected at the on-site meteorological tower at the 10-, 30-, and 60-meters (33-, 98-, and 197-feet) levels. The tower is in the southern part of the reservation. A comparison of annual wind roses for the period 1995 through 2001 indicates that wind patterns at the 10-m (33-ft) level are different from those at the 30-m and 60-meters (98- and 197-feet) levels. Winds at the 10-m (33-ft) level appear to be influenced by local topographical and/or vegetative features. Accordingly, wind data at the 30-meters (98-feet) level, believed to be representative of the site, were used in this analysis. This same meteorological data set was used in the radiological air quality assessment.

Seasonal temperatures from Waverly, OH (NOAA, 2000) and mean mixing heights were obtained from Huntington, WV (Holzworth, 1972). Table E-12 lists temperature data used in modeling and Table E-13 gives the mixing heights.

Table E-12 Seasonal temperatures (°K) for Waverly, OH (Climatology:1960-1991, NOAA)

	Minimum	Maximum	Average
Winter	267	273	279
Spring	277	284	291
Summer	289	296	302
Fall	278	285	292

Notes:
°K = °Kelvin
To convert °K to °F use the following formula: ° F = ((°K - 275.15) x 1.8) + 32

Table E-13 Mean afternoon mixing heights (meters) for Huntington, WV (Holzworth, 1972)

Winter	1,079
Spring	1,986
Summer	1,641
Fall	1,340

Notes:
To convert meters to feet multiply by 3.3.

E.2 References

(CARB, 2000) California Air Resources Board. "Risk Reduction Plan to Reduce Particulate Matter from Diesel-Fueled Engines and Vehicles." Appendix 7, Sacramento, CA. October 2000.

(EPA, 1995) U.S. Environmental Protection Agency. "User's Guide for the Industrial Source Complex (ISC3) Dispersion Models." Volume 1. EPA-454/B-95-003a. September 1995.

(EPA, 2002a) U.S. Environmental Protection Agency. "User's Guide for the EPA Emissions Model Draft NONROAD 2002." EPA-420-P-02-013. December 2002.

(EPA, 2002b) User's Guide to MOBILE6.1 and MOBILE6.2: Mobile Source Emission Factor Model (Draft). EPA420-R-02-010. March 2002.

(Holzworth, 1972) Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States, EPA, Office of Air Programs, RTP, AP-101. 1972.

(NOAA, 2000) Climatography of the United States No. 20, 1971-2000., Waverly, Ohio, National Oceanic Atmospheric Administration, National Climate Data Center, North Carolina. 2000.

(USEC, 2005) USEC Inc. "Environmental Report for the American Centrifuge Plant in Piketon, Ohio." Revision 6. LA-3605-0002, Docket No. 70-7004. Nonvember 2005.

(WRAP, 2004) Western Regional Air Partnership. "Fugitive Dust Handbook." Prepared by Countess Environmental, 4001 Whitesail Circle, Westlake Village, CA. under contract to the Western Governor Association (WGA), WGA Contract No. 30204-83. November 2004.

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APPENDIX F
ENVIRONMENTAL JUSTICE ANALYSIS

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APPENDIX F
ENVIRONMENTAL JUSTICE ANALYSIS

This appendix provides additional data for the assessment of the potential for disproportionately high and adverse human health or environmental effects on minority and/or low-income populations resulting from the proposed construction, operation, and decommissioning of the proposed American Centrifuge Plant (ACP).

Tables F-1 and F-2 present detailed year 2000 Census data for the environmental justice analysis at the State and county level, respectively. The tables provide minority and low-income population data for each Census tract within 80 kilometers (50 miles) of the proposed ACP. Census tracts exceeding minority or low-income criteria are shown in bold.

A summary of the number of Census tracts exceeding minority and/or low-income criteria is presented in Tables F-3 and F-4. Table F-3 summarizes information at the State level; Table F-4 summarizes information at the county level.

Refer to Chapter 3 of this Environmental Impact Statement (EIS) for methods and references.

Table F-1 State Population Data, by Census Tract [a, b]

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
State of Ohio	11353140	10.6	84.9	11.5	0.2	1.2	0.8	1.5	1.9	16
Threshold for EJ Concerns	NA	30.6	NA	31.5	20.2	21.2	20.8	21.5	21.9	36
Adams County										
39001990100	4868	22.4	96.8	0	1.3	0	0.1	1.7	0.8	3.9
39001990200	4635	13.1	98.4	0	0.2	0.2	0.1	1.1	0.6	1.9
39001990300	6212	12.6	98.8	0.1	0.1	0	0.2	0.8	0.3	1.5
39001990400	4630	17.6	97.8	0	1.3	0	0	1	0	2.2
39001990500	3454	21.7	96.3	0	1.6	0	0	2.1	0	3.7
39001990600	3531	19.6	99	0	0.1	0.1	0	0.8	0.5	1.5
Athens County										
39009972800	4272	27.7	97.4	0.4	0.8	0.4	0.3	0.6	1.8	4
39009972900	5362	29.8	90.9	3.1	0.4	3.1	0.3	2.1	0.5	9.5
39009973200	4320	17.4	87.8	3.7	0.5	4.4	0.5	2.5	2.2	13
39009973700	3967	13.9	95.7	1.2	0.6	0.8	0.2	1.6	1.4	5.7
39009973800	4642	11.3	98.4	0.2	0	0.7	0.1	0.5	0.5	2
Brown County										
39015951200	9522	6.2	98.3	0.2	0.1	0.3	0	1.1	0	1.7
39015951300	6435	12.3	98.7	0.3	0.2	0.3	0	0.5	0.3	1.6
39015951400	4408	14.4	98.6	0.4	0	0.1	0	0.8	0.5	1.9
39015951500	4896	12.3	98.5	0	0.9	0.4	0	0.2	0	1.5
39015951600	3869	16.5	97.4	1.1	0.3	0.2	0.2	0.8	1.4	3.5
39015951700	2764	15.3	92.8	4.8	0.1	0.1	0.1	2.1	0.6	7.6
39015951800	4650	12.2	97.4	2	0.2	0.1	0	0.3	0.4	2.9
39015951900	5741	12.1	99	0	0.2	0	0.3	0.5	0.6	1.2

Table F-1 State Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
Clinton County										
39027994300	3871	10.3	97.6	0.9	0	0.1	0.4	1	0.1	2.4
39027994400	4808	4.4	98.1	0	0.7	0	0	1.2	0.2	2.1
39027995000	3967	7.9	99.3	0.1	0.2	0.1	0	0.4	0.1	0.7
39027995100	4105	8	97	0.1	1.2	0.2	0.9	0.6	1.2	3.2
Fairfield County										
39045031200	4901	6.1	99.3	0	0	0.1	0.3	0.3	1.3	1.8
39045032500	5996	6.1	83.8	14	0.4	0.1	0.3	1.1	0.7	16.2
39045032600	5840	5	99.1	0.1	0.2	0	0.1	0.5	0.4	1.2
Fayette County										
39047985800	3785	9.1	96.9	1.3	0.2	0	0.8	0.8	0.9	3.2
39047985900	3847	8.7	95.3	2.2	0.2	0.1	0.1	2	0.9	5.2
39047986000	4180	9.4	96.1	0.6	0.4	2.4	0	0.6	0.8	4.7
39047986100	4132	17.1	94	4	0	0	0	2	0	6
39047986200	4623	10.3	93	3.1	0.2	0.8	1.8	1.1	2.8	8.2
39047986300	3602	11	96.8	2.7	0.1	0	0	0.4	1	4
39047986400	4264	5.5	98.3	1	0	0	0.2	0.5	0.4	1.9
Gallia County										
39053953500	4929	14.3	94.5	3.4	0.3	0.8	0.2	0.8	0.4	5.7
39053953600	3974	19.7	95.5	2.3	0.2	0.6	0.1	1.3	0.6	4.8
39053953700	4067	27.4	95.6	0.7	0.2	1.2	0.2	1.9	0.3	4.6
39053953800	4322	19.4	98.2	0.3	0	0	0.2	1.3	0.7	2
39053953900	6790	13.6	94.4	4.1	0	0.4	0	1.2	0	5.6
39053954000	4489	17.2	92.4	3.4	0.8	1.5	0.5	1.5	0.9	8
39053954100	2498	20.7	93.8	3.4	0.3	0	0	2.5	0.4	6.2

Table F-1 State Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
Highland County										
39071954400	3825	11	97.1	2.2	0.4	0	0.3	0	0.3	2.9
39071954500	4129	10.8	96.9	1.2	0	0	0.1	1.8	1.2	3.9
39071954600	4726	6.8	99	0.6	0	0.1	0	0.3	0	1
39071954700	5976	6.8	98.1	0	0.3	0.4	0	1.2	0	1.9
39071954800	4011	17.5	95.1	2.1	0.3	1.4	0.6	0.5	0.1	4.9
39071954900	3757	13.8	87.2	9	0.6	1.3	0	1.9	1	12.8
39071955000	4027	19.1	97.9	0.3	1.8	0	0	0	0.9	2.6
39071955100	5783	14	97.6	0.1	0.5	0.7	0	1	0.1	2.5
39071955200	4641	9.6	99.5	0	0.4	0	0	0.1	0.2	0.6
Hocking County										
39073964900	4400	7.3	98.7	0.3	0.7	0	0	0.4	0.1	1.4
39073965000	3888	15.7	99.6	0.2	0.2	0	0	0	0.7	1.1
39073965100	4134	10.5	97.9	0.4	0	0	0	1.7	0	2.1
39073965200	4302	15.9	98.7	0.8	0.2	0	0	0.3	0.2	1.5
39073965300	3548	10.9	99.5	0.4	0.2	0	0	0	0.1	0.7
39073965400	3991	18.9	96.1	0.7	0	1.6	0	1.5	0.6	4.2
39073965500	3978	16.2	93.5	4.6	0.1	0	0.3	1.5	0.3	6.5
Jackson County										
39079957200	5318	16.7	98.1	0.6	0	0.4	0.2	0.7	0.7	2.4
39079957300	3669	19.7	97	0.2	0.3	0.4	0.2	1.8	0.8	3.5
39079957400	5332	15.3	95.3	2.8	0.3	0.3	0.2	1.1	1.2	4.9
39079957500	5765	16	98.5	1.1	0	0.2	0	0.3	2.6	4.1
39079957600	2822	16.6	96.5	0.2	0.2	0.2	0	2.3	0.4	3.5
39079957700	5188	17.2	97.1	0.6	0.2	0.6	0	1.5	1.8	4.7
39079957800	4547	14.8	98.3	0.5	0.9	0	0	0.4	0.1	1.7

Table F-1 State Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
Lawrence County										
39087050100	2692	15.2	95.9	2.8	0.2	0	0	1.1	0.8	4.9
39087050200	2524	20.8	97	2.5	0	0	0	0.5	0.3	3.3
39087050300	2349	**33**	78.1	19.6	0	1.4	0.2	0.5	0.9	22.3
39087050400	3155	25.1	97.8	1.6	0.3	0	0	0.3	0.4	2.3
39087050500	6585	19.1	97.6	0.1	0.3	1	0.2	0.7	0.9	2.9
39087050600	1677	28.1	94.5	1.4	0.3	0	0.4	3.5	0.4	5.5
39087050700	3749	26	99	0	0	0.7	0	0.3	0	1
39087050800	3843	22.6	97.4	1.8	0	0.7	0	0.1	0.2	2.8
39087050900	2279	18.4	98.3	0.3	0.4	0	0.4	0.7	1	2
39087051001	4475	13.9	95	3.7	0	0	0	1.3	0	5
39087051002	4316	14.5	96.7	1.6	0	0	0	1.7	0	3.3
39087051100	6977	21.2	92.2	5.7	0.6	0	0.5	1.1	0.5	7.8
39087051200	5299	15.7	98.6	0.3	0.3	0	0.1	0.6	1	1.9
39087051300	3705	18.4	98.7	0.3	0	0.1	0	1	0	1.3
39087051400	8694	12	97.5	1.1	0.3	0.6	0.2	0.3	0.4	2.8
Madison County										
39097041200	3282	7.6	97.8	0	0.1	0.9	0.2	1	1.4	3.3
Meigs County										
39105964200	4423	17.3	98.6	0.3	0.1	0	0.1	0.8	0.2	1.5
39105964300	4342	21.3	96.8	0.3	0.3	0	0.5	2	0.7	4
39105964400	3676	28.2	94.5	2.2	0.6	0.1	0	2.6	0	5.5
Pickaway County										
39129020100	2050	22.9	92.6	3.1	2.2	0	0	2.1	0.7	8.1
39129020200	2698	10.8	98.3	1.3	0	0	0	0.4	0.6	2.3

Table F-1 State Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
39129020310	5089	6.2	96.5	1.1	0.2	0.8	0.1	1.2	0	3.5
39129020320	3335	6.8	93.8	2.2	1.1	1.7	1.1	0.2	2.4	7.5
39129020400	2543	25.6	98	1	0	0	0.2	0.8	0.3	2.2
39129021100	6910	5.5	97.9	0.1	0.3	0.8	0	1	0.4	2.4
39129021200	6424	8.9	97.3	0.3	0.9	0.1	0.1	1.3	0.5	3.1
39129021400	8992	7.7	88.1	9.8	0.3	0.1	0.1	1.5	0.7	12.2
39129021500	2987	9.2	99.2	0	0.1	0	0	0.7	1.3	1.9
39129021600	3528	12.7	98.1	0.4	0.5	0.1	0.1	0.9	0.1	2
39129021700	4506	7.1	99	0.6	0.4	0	0.1	0	1	1.9
Pike County										
39131952200	5592	16.2	94.2	1.9	1.4	0.2	0.6	1.8	0.3	5.9
39131952300	5067	18.6	95.9	1.2	0.3	0.5	0	2.1	0.4	4.4
39131952400	3368	10.7	95.5	1.3	1	1.4	0.1	0.7	0	4.5
39131952500	3753	17.7	97.9	0	0.1	0.5	0	1.5	0.6	2.1
39131952600	5573	20.6	96.9	0.2	2	0	0	1	0.3	3.4
39131952700	4342	25.7	98	0	1.1	0.3	0.3	0.3	1.7	3.4
Ross County										
39141955500	5388	5.2	98.6	0.1	0.2	0	0.2	0.8	0.7	1.8
39141955601	2047	7.5	98.5	0.8	0.4	0	0.3	0	1.9	3.4
39141955602	4954	4.8	57.1	**39.3**	0.2	0	0	4	2.2	**44**
39141955603	3861	11.8	98.3	0.6	0.1	0.5	0.2	0.3	0	1.7
39141955700	4267	12.5	98.5	0.4	0.4	0.1	0	0.5	0.4	1.9
39141955800	6824	9.8	94.9	3.5	0	0.1	0.5	1	0.7	5.4
39141955900	4257	10.4	87.9	8.7	0	0.8	0.2	2.5	0.1	12.2
39141956000	4549	12	90.1	6.8	1.3	0	0	1.8	0.2	10.1
39141956100	3774	9.4	84.9	11.8	0.2	0.8	0	2.3	0.3	15.4

Table F-1 State Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
39141956200	2299	11	90.9	2.9	1.3	2.3	0.3	2.5	0.8	9.7
39141956300	2942	14.4	93.6	4.2	0	0.7	0	1.3	0.6	6.7
39141956400	3665	15.3	89.1	7.5	0.6	0.2	0.4	2.3	0.7	11.2
39141956500	4045	16.4	91.3	5.9	0.9	0	0	2	1.7	9.5
39141956600	5044	9.5	98.9	0.2	0	0.6	0	0.2	0.6	1.6
39141956700	5003	13.5	97	1	1.1	0.4	0.3	0.3	1	3.7
39141956800	6026	15.4	97.6	0.9	0.1	0.1	0	1.3	1.7	4
39141956900	4400	18	97.7	0.4	0	0.3	0	1.6	0	2.3
Scioto County										
39145992100	4960	17.4	98.3	0	0.2	0.1	0.6	0.7	0.6	1.7
39145992200	5180	12.8	79.9	16	0.4	0.1	0.3	3.4	2	20.8
39145992300	4867	16.1	96.7	0.2	1.5	0	0.3	1.3	0	3.3
39145992400	5626	21	97.2	0	0.2	0.7	0.3	1.6	1	3.2
39145992500	3188	17.8	95.4	0.5	0	0.6	0.5	2.9	1.5	5.1
39145992600	4164	16	98.2	0	0.2	0.1	0.1	1.2	1.4	2.3
39145992700	4538	12.5	96.7	0.2	0.2	0.2	0.1	2.5	0.4	3.3
39145992800	4486	18.8	95.7	2.5	1.1	0.3	0	0.4	0.3	4.7
39145992900	6372	15.4	98.1	0.7	0.4	0	0	0.8	0	1.9
39145993000	3878	20.8	96.9	0.3	0.9	1.3	0	0.6	0	3.1
39145993100	3495	21.9	98.5	0	0.4	0.3	0.1	0.6	0.1	1.5
39145993200	1861	**31.5**	97.6	0.3	0	0	0	2.1	0	2.4
39145993300	2698	14.1	94.6	2.4	0.8	1.8	0	0.5	0.9	6.3
39145993400	3801	28.5	93.1	3.9	0.5	0.2	0.2	2.1	0.3	7.1
39145993500	2859	29.3	97.2	0.2	0.8	0.2	0	1.6	1.5	4.4
39145993600	2596	**43.4**	88.8	7	0	1.2	0	2.9	0	11.2
39145993700	2618	24.6	75.4	20.3	0.4	0	0	4.2	1.4	25.6
39145993800	4689	8.1	95.6	0.7	0.2	1.9	0	1.6	0.2	4.6

Table F-1 State Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
39145993900	3515	22.6	96.4	0	2.3	0.2	0	1.1	0	3.6
39145994000	3804	20.3	98.1	0.6	0.3	0.3	0.1	0.5	0.3	1.9
Vinton County										
39163953000	4509	17.8	98.3	0.3	0.5	0	0.1	0.8	0.4	2
39163953100	5284	21.4	97.3	0.1	0.5	0	0.2	1.9	0.8	3.4
39163953200	3013	20.8	98.4	0	0	0	0	1.6	0.5	2
State of Kentucky	4041769	15.8	90	7.3	0.2	0.7	0.5	1.2	1.4	10.7
Threshold for EJ Concerns	NA	35.8	NA	27.3	20.2	20.7	20.5	21.2	21.4	30.7
Boyd County										
21019030200	1182	25.9	81.2	9.2	0.5	4.9	1.2	3	0.6	19.4
21019030300	2542	32.3	96.6	3	0	0	0	0.4	0.2	3.6
21019030400	2072	27.9	93.1	2.3	0.2	0.2	1	3.2	2.3	7.1
21019030500	4489	11.1	97.3	1.6	0	0.9	0	0.2	0	2.7
21019030600	4169	9.9	97	1.6	0.1	0.2	0	1.1	0.2	3
21019030700	3578	8.7	95.8	0.8	0.5	0.1	1.1	1.6	0.4	4.3
21019030800	3969	29.4	97.6	0.5	0	0	0.2	1.8	1	3
21019030900	5772	13.7	99	0.2	0.3	0	0	0.5	0.3	1.3
21019031000	8122	12.6	88.7	7	0.4	0.3	1.1	2.3	4.7	14.1
21019031100	7764	10.9	98	0.5	0	0.2	0.1	1	0.5	2.1
21019031200	3374	11.5	99.1	0.9	0	0	0	0	0	0.9
21019031300	2719	19.2	97.1	1.1	0.2	0.3	0.1	1.3	0	2.9
Carter County										
21043960100	3370	26	98.5	0.7	0	0	0	0.8	0.7	2.2
21043960200	4334	25.5	99.3	0	0.1	0.3	0	0.3	0.2	0.9
21043960300	3080	20.8	100	0	0	0	0	0	0.6	0.6

Table F-1 State Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
21043960400	1696	25.6	98.8	0	0.9	0.2	0	0	0	1.2
21043960500	4183	18	99	0.3	0.5	0	0	0.2	0	1
21043960600	5863	18.6	99.3	0.2	0	0.2	0.3	0	0.2	0.7
21043960700	4363	24.5	98.1	0	0	1.2	0	0.7	1.3	2.9
Fleming County										
21069980100	3949	16.6	94.9	4.5	0	0	0.1	0.5	0.8	6
21069980200	3184	12.9	98.4	1	0.2	0	0	0.4	1.3	2.7
21069980400	4085	24.1	99.1	0.9	0	0	0	0	0	0.9
Greenup County										
21089040100	4375	5.5	98.1	0.2	0.2	0.8	0.3	0.3	1.9	3.5
21089040200	7475	12.2	97.8	0.6	0.2	0.1	0.5	0.8	1.9	3.5
21089040300	4531	11.3	97	0.3	0	1.5	0.1	1	0.4	3.3
21089040400	5562	14.6	98.5	0.6	0	0.2	0.1	0.6	0.2	1.6
21089040500	8110	18.7	96.7	1.6	0	0.4	0.2	1.1	0.3	3.4
21089040600	3310	18	98.1	0	0.2	0.2	0	1.5	0	1.9
21089040700	3528	17.6	99.1	0	0.2	0.3	0	0.3	0	0.9
Lewis County										
21135990100	4716	29.1	99.7	0	0.2	0	0	0.1	0.2	0.5
21135990200	3990	33.6	98.9	0.4	0.2	0	0	0.5	0.5	1.6
21135990300	3293	22.5	97	0.8	0.6	0	0.7	0.9	0.7	3.2
21135990400	2093	27.1	100	0	0	0	0	0	0	0

Table F-1 State Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
Mason County										
21161960100	3093	14.3	97.3	1.6	0	0	0.2	0.9	0.8	3.3
21161960200	3478	24.7	84.5	12.2	0.2	0	0.9	2.3	1.3	15.7
21161960300	4337	16.8	85.7	10.3	0.1	1.1	0.9	1.9	1.5	15.6
21161960400	4140	11.4	94.7	2.4	0.4	0.7	0.5	1.5	1	5.7
Carter County										
21205950100	6103	16.5	94.4	2.2	0.5	0.9	1	1	2	6.5
State of West Virginia	1808344	17.9	95	3.1	0.2	0.5	0.2	1	0.7	5.5
Threshold for EJ Concerns	NA	37.9	NA	23.1	20.2	20.5	20.2	21	20.7	25.5
Cabell County										
54011000600	1607	**58.9**	89.3	4	1.2	5	0.4	0	0.9	10.7
54011000900	1852	30.7	95.3	3.2	0	0	0.3	1.2	0.3	4.7
54011001000	2426	29.6	97.7	1.1	0	0	0	1.3	0.4	2.7
54011001100	2096	28.1	93.6	2	0	0	0	4.5	2.6	6.4
54011010700	7160	15.5	98.1	0.3	0	0.3	0.1	1.2	0.4	2.2
Mason County										
54053954800	6909	16.3	98.5	0.6	0.2	0	0	0.6	0.2	1.7
54053954900	6750	24	98.8	0.6	0	0.4	0	0.1	0.6	1.7
54053955000	5025	17.6	96.5	1.8	0	1.5	0	0.2	0.5	4
54053955100	7273	21.2	99	0	0.2	0.1	0	0.7	0.2	1.3
Wayne County										
54099005100	2181	13.7	98.4	0	0.6	0.7	0	0.3	0	1.6
54099005200	2086	14.1	98.8	0	0	0.9	0.3	0	0.3	1.2
54099020100	2545	13.1	99.3	0.4	0.4	0	0	0	0	0.7

Table F-1 State Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
54099020300	5307	16.4	99	0.4	0	0.2	0.1	0.3	0.4	1.3
54099020400	6219	11.8	99.3	0	0	0	0.2	0.5	1.1	1.6

Notes:
[a] NA = Not available.
[b] Census tracts exceeding minority/low-income criteria are shown in bold.

Table F-2 County Population Data, by Census Tract [a, b]

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
Ohio										
Adams County	39001	6	17.4	0	0.7	0	0.1	1.2	0.4	2.4
Threshold for EJ Concerns	NA	26	NA	20	20.7	20	20.1	21.2	20.4	22.4
39001990100	4868	22.4	96.8	0	1.3	0	0.1	1.7	0.8	3.9
39001990200	4635	13.1	98.4	0	0.2	0.2	0.1	1.1	0.6	1.9
39001990300	6212	12.6	98.8	0.1	0.1	0	0.2	0.8	0.3	1.5
39001990400	4630	17.6	97.8	0	1.3	0	0	1	0	2.2
39001990500	3454	21.7	96.3	0	1.6	0	0	2.1	0	3.7
39001990600	3531	19.6	99	0	0.1	0.1	0	0.8	0.5	1.5
Ohio										
Athens County	39009	5	27.4	2.4	0.5	1.8	0.3	1.6	1	7.3
Threshold for EJ Concerns	NA	25	NA	22.4	20.5	21.8	20.3	21.6	21	27.3
39009972800	4272	**27.7**	97.4	0.4	0.8	0.4	0.3	0.6	1.8	4
39009972900	5362	**29.8**	90.9	3.1	0.4	3.1	0.3	2.1	0.5	9.5
39009973200	4320	17.4	87.8	3.7	0.5	4.4	0.5	2.5	2.2	13
39009973700	3967	13.9	95.7	1.2	0.6	0.8	0.2	1.6	1.4	5.7
39009973800	4642	11.3	98.4	0.2	0	0.7	0.1	0.5	0.5	2

Table F-2 County Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
Ohio										
Brown County	39015	8	11.6	0.8	0.2	0.2	0.1	0.7	0.4	2.3
Threshold for EJ Concerns	NA	28	NA	20.8	20.2	20.2	20.1	20.7	20.4	22.3
39015951200	9522	6.2	98.3	0.2	0.1	0.3	0	1.1	0	1.7
39015951300	6435	12.3	98.7	0.3	0.2	0.3	0	0.5	0.3	1.6
39015951400	4408	14.4	98.6	0.4	0	0.1	0	0.8	0.5	1.9
39015951500	4896	12.3	98.5	0	0.9	0.4	0	0.2	0	1.5
39015951600	3869	16.5	97.4	1.1	0.3	0.2	0.2	0.8	1.4	3.5
39015951700	2764	15.3	92.8	4.8	0.1	0.1	0.1	2.1	0.6	7.6
39015951800	4650	12.2	97.4	2	0.2	0.1	0	0.3	0.4	2.9
39015951900	5741	12.1	99	0	0.2	0	0.3	0.5	0.6	1.2
Ohio										
Clinton County	39027	4	8.6	2.1	0.3	0.2	0.4	1.1	0.9	4.7
Threshold for EJ Concerns	NA	24	NA	22.1	20.3	20.2	20.4	21.1	20.9	24.7
39027994300	3871	10.3	97.6	0.9	0	0.1	0.4	1	0.1	2.4
39027994400	4808	4.4	98.1	0	0.7	0	0	1.2	0.2	2.1
39027995000	3967	7.9	99.3	0.1	0.2	0.1	0	0.4	0.1	0.7
39027995100	4105	8	97	0.1	1.2	0.2	0.9	0.6	1.2	3.2

Table F-2 County Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
Ohio										
Fairfield County	39045	3	5.9	2.6	0.3	0.7	0.3	1	1	5.5
Threshold for EJ Concerns	NA	23	NA	22.6	20.3	20.7	20.3	21	21	25.5
39045031200	4901	6.1	99.3	0	0	0.1	0.3	0.3	1.3	1.8
39045032500	5996	6.1	83.8	14	0.4	0.1	0.3	1.1	0.7	16.2
39045032600	5840	5	99.1	0.1	0.2	0	0.1	0.5	0.4	1.2
Ohio										
Fayette County	39047	7	10.1	2.1	0.2	0.5	0.4	1.1	1	4.8
Threshold for EJ Concerns	NA	27	NA	22.1	20.2	20.5	20.4	21.1	21	24.8
39047985800	3785	9.1	96.9	1.3	0.2	0	0.8	0.8	0.9	3.2
39047985900	3847	8.7	95.3	2.2	0.2	0.1	0.1	2	0.9	5.2
39047986000	4180	9.4	96.1	0.6	0.4	2.4	0	0.6	0.8	4.7
39047986100	4132	17.1	94	4	0	0	0	2	0	6
39047986200	4623	10.3	93	3.1	0.2	0.8	1.8	1.1	2.8	8.2
39047986300	3602	11	96.8	2.7	0.1	0	0	0.4	1	4
39047986400	4264	5.5	98.3	1	0	0	0.2	0.5	0.4	1.9
Ohio										
Gallia County	39053	7	18.1	2.6	0.2	0.7	0.2	1.4	0.4	5.3
Threshold for EJ Concerns	NA	27	NA	22.6	20.2	20.7	20.2	21.4	20.4	25.3
39053953500	4929	14.3	94.5	3.4	0.3	0.8	0.2	0.8	0.4	5.7
39053953600	3974	19.7	95.5	2.3	0.2	0.6	0.1	1.3	0.6	4.8
39053953700	4067	**27.4**	95.6	0.7	0.2	1.2	0.2	1.9	0.3	4.6
39053953800	4322	19.4	98.2	0.3	0	0	0.2	1.3	0.7	2

Table F-2 County Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
39053953900	6790	13.6	94.4	4.1	0	0.4	0	1.2	0	5.6
39053954000	4489	17.2	92.4	3.4	0.8	1.5	0.5	1.5	0.9	8
39053954100	2498	20.7	93.8	3.4	0.3	0	0	2.5	0.4	6.2
Ohio										
Highland County	39071	9	11.8	1.5	0.5	0.4	0.1	0.8	0.4	3.4
Threshold for EJ Concerns	NA	29	NA	21.5	20.5	20.4	20.1	20.8	20.4	23.4
39071954400	3825	11	97.1	2.2	0.4	0	0.3	0	0.3	2.9
39071954500	4129	10.8	96.9	1.2	0	0	0.1	1.8	1.2	3.9
39071954600	4726	6.8	99	0.6	0	0.1	0	0.3	0	1
39071954700	5976	6.8	98.1	0	0.3	0.4	0	1.2	0	1.9
39071954800	4011	17.5	95.1	2.1	0.3	1.4	0.6	0.5	0.1	4.9
39071954900	3757	13.8	87.2	9	0.6	1.3	0	1.9	1	12.8
39071955000	4027	19.1	97.9	0.3	1.8	0	0	0	0.9	2.6
39071955100	5783	14	97.6	0.1	0.5	0.7	0	1	0.1	2.5
39071955200	4641	9.6	99.5	0	0.4	0	0	0.1	0.2	0.6
Ohio										
Hocking County	39073	7	13.5	1	0.2	0.2	0	0.8	0.3	2.5
Threshold for EJ Concerns	NA	27	NA	21	20.2	20.2	20	20.8	20.3	22.5
39073964900	4400	7.3	98.7	0.3	0.7	0	0	0.4	0.1	1.4
39073965000	3888	15.7	99.6	0.2	0.2	0	0	0	0.7	1.1
39073965100	4134	10.5	97.9	0.4	0	0	0	1.7	0	2.1
39073965200	4302	15.9	98.7	0.8	0.2	0	0	0.3	0.2	1.5
39073965300	3548	10.9	99.5	0.4	0.2	0	0	0	0.1	0.7
39073965400	3991	18.9	96.1	0.7	0	1.6	0	1.5	0.6	4.2

Table F-2 County Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
39073965500	3978	16.2	93.5	4.6	0.1	0	0.3	1.5	0.3	6.5
Ohio										
Jackson County	39079	7	16.5	0.9	0.3	0.3	0.1	1.1	1.2	3.6
Threshold for EJ Concerns	NA	27	NA	20.9	20.3	20.3	20.1	21.1	21.2	23.6
39079957200	5318	16.7	98.1	0.6	0	0.4	0.2	0.7	0.7	2.4
39079957300	3669	19.7	97	0.2	0.3	0.4	0.2	1.8	0.8	3.5
39079957400	5332	15.3	95.3	2.8	0.3	0.3	0.2	1.1	1.2	4.9
39079957500	5765	16	98.5	1.1	0	0.2	0	0.3	2.6	4.1
39079957600	2822	16.6	96.5	0.2	0.2	0.2	0	2.3	0.4	3.5
39079957700	5188	17.2	97.1	0.6	0.2	0.6	0	1.5	1.8	4.7
39079957800	4547	14.8	98.3	0.5	0.9	0	0	0.4	0.1	1.7
Ohio										
Lawrence County	39087	15	18.9	2.4	0.2	0.3	0.1	0.8	0.5	4.2
Threshold for EJ Concerns	NA	35	NA	22.4	20.2	20.3	20.1	20.8	20.5	24.2
39087050100	2692	15.2	95.9	2.8	0.2	0	0	1.1	0.8	4.9
39087050200	2524	20.8	97	2.5	0	0	0	0.5	0.3	3.3
39087050300	2349	33	78.1	19.6	0	1.4	0.2	0.5	0.9	22.3
39087050400	3155	25.1	97.8	1.6	0.3	0	0	0.3	0.4	2.3
39087050500	6585	19.1	97.6	0.1	0.3	1	0.2	0.7	0.9	2.9
39087050600	1677	28.1	94.5	1.4	0.3	0	0.4	3.5	0.4	5.5
39087050700	3749	26	99	0	0	0.7	0	0.3	0	1
39087050800	3843	22.6	97.4	1.8	0	0.7	0	0.1	0.2	2.8
39087050900	2279	18.4	98.3	0.3	0.4	0	0.4	0.7	1	2
39087051001	4475	13.9	95	3.7	0	0	0	1.3	0	5

Table F-2 County Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
39087051002	4316	14.5	96.7	1.6	0	0	0	1.7	0	3.3
39087051100	6977	21.2	92.2	5.7	0.6	0	0.5	1.1	0.5	7.8
39087051200	5299	15.7	98.6	0.3	0.3	0	0.1	0.6	1	1.9
39087051300	3705	18.4	98.7	0.3	0	0.1	0	1	0	1.3
39087051400	8694	12	97.5	1.1	0.3	0.6	0.2	0.3	0.4	2.8
Ohio										
Madison County	39097	1	7.8	6	0.2	0.5	0.2	1.5	0.7	8.7
Threshold for EJ Concerns	NA	21	NA	26	20.2	20.5	20.2	21.5	20.7	28.7
39097041200	3282	7.6	97.8	0	0.1	0.9	0.2	1	1.4	3.3
Ohio										
Meigs County	39105	3	19.8	0.6	0.3	0.2	0.3	1.3	0.6	3
Threshold for EJ Concerns	NA	23	NA	20.6	20.3	20.2	20.3	21.3	20.6	23
39105964200	4423	17.3	98.6	0.3	0.1	0	0.1	0.8	0.2	1.5
39105964300	4342	21.3	96.8	0.3	0.3	0	0.5	2	0.7	4
39105964400	3676	**28.2**	94.5	2.2	0.6	0.1	0	2.6	0	5.5
Ohio										
Pickaway County	39129	11	9.5	5.7	0.5	0.3	0.2	1.1	0.8	8.3
Threshold for EJ Concerns	NA	31	NA	25.7	20.5	20.3	20.2	21.1	20.8	28.3
39129020100	2050	22.9	92.6	3.1	2.2	0	0	2.1	0.7	8.1
39129020200	2698	10.8	98.3	1.3	0	0	0	0.4	0.6	2.3
39129020310	5089	6.2	96.5	1.1	0.2	0.8	0.1	1.2	0	3.5
39129020320	3335	6.8	93.8	2.2	1.1	1.7	1.1	0.2	2.4	7.5
39129020400	2543	25.6	98	1	0	0	0.2	0.8	0.3	2.2

Table F-2 County Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
39129021100	6910	5.5	97.9	0.1	0.3	0.8	0	1	0.4	2.4
39129021200	6424	8.9	97.3	0.3	0.9	0.1	0.1	1.3	0.5	3.1
39129021400	8992	7.7	88.1	9.8	0.3	0.1	0.1	1.5	0.7	12.2
39129021500	2987	9.2	99.2	0	0.1	0	0	0.7	1.3	1.9
39129021600	3528	12.7	98.1	0.4	0.5	0.1	0.1	0.9	0.1	2
39129021700	4506	7.1	99	0.6	0.4	0	0.1	0	1	1.9
Ohio										
Pike County	39131	6	18.6	0.8	1	0.4	0.2	1.3	0.5	4
Threshold for EJ Concerns	NA	26	NA	20.8	21	20.4	20.2	21.3	20.5	24
39131952200	5592	16.2	94.2	1.9	1.4	0.2	0.6	1.8	0.3	5.9
39131952300	5067	18.6	95.9	1.2	0.3	0.5	0	2.1	0.4	4.4
39131952400	3368	10.7	95.5	1.3	1	1.4	0.1	0.7	0	4.5
39131952500	3753	17.7	97.9	0	0.1	0.5	0	1.5	0.6	2.1
39131952600	5573	20.6	96.9	0.2	2	0	0	1	0.3	3.4
39131952700	4342	25.7	98	0	1.1	0.3	0.3	0.3	1.7	3.4
Ohio										
Ross County	39141	17	12	5.7	0.4	0.3	0.1	1.4	0.8	8.5
Threshold for EJ Concerns	NA	37	NA	25.7	20.4	20.3	20.1	21.4	20.8	28.5
39141955500	5388	5.2	98.6	0.1	0.2	0	0.2	0.8	0.7	1.8
39141955601	2047	7.5	98.5	0.8	0.4	0	0.3	0	1.9	3.4
39141955602	4954	4.8	57.1	**39.3**	0.2	0	0	4	2.2	**44**
39141955603	3861	11.8	98.3	0.6	0.1	0.5	0.2	0.3	0	1.7
39141955700	4267	12.5	98.5	0.4	0.4	0.1	0	0.5	0.4	1.9
39141955800	6824	9.8	94.9	3.5	0	0.1	0.5	1	0.7	5.4

Table F-2 County Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
39141955900	4257	10.4	87.9	8.7	0	0.8	0.2	2.5	0.1	12.2
39141956000	4549	12	90.1	6.8	1.3	0	0	1.8	0.2	10.1
39141956100	3774	9.4	84.9	11.8	0.2	0.8	0	2.3	0.3	15.4
39141956200	2299	11	90.9	2.9	1.3	2.3	0.3	2.5	0.8	9.7
39141956300	2942	14.4	93.6	4.2	0	0.7	0	1.3	0.6	6.7
39141956400	3665	15.3	89.1	7.5	0.6	0.2	0.4	2.3	0.7	11.2
39141956500	4045	16.4	91.3	5.9	0.9	0	0	2	1.7	9.5
39141956600	5044	9.5	98.9	0.2	0	0.6	0	0.2	0.6	1.6
39141956700	5003	13.5	97	1	1.1	0.4	0.3	0.3	1	3.7
39141956800	6026	15.4	97.6	0.9	0.1	0.1	0	1.3	1.7	4
39141956900	4400	18	97.7	0.4	0	0.3	0	1.6	0	2.3
Ohio										
Scioto County	39145	20	19.3	2.6	0.5	0.5	0.2	1.5	0.6	5.5
Threshold for EJ Concerns	NA	40	NA	22.6	20.5	20.5	20.2	21.5	20.6	25.5
39145992100	4960	17.4	98.3	0	0.2	0.1	0.6	0.7	0.6	1.7
39145992200	5180	12.8	79.9	16	0.4	0.1	0.3	3.4	2	20.8
39145992300	4867	16.1	96.7	0.2	1.5	0	0.3	1.3	0	3.3
39145992400	5626	21	97.2	0	0.2	0.7	0.3	1.6	1	3.2
39145992500	3188	17.8	95.4	0.5	0	0.6	0.5	2.9	1.5	5.1
39145992600	4164	16	98.2	0	0.2	0.1	0.1	1.2	1.4	2.3
39145992700	4538	12.5	96.7	0.2	0.2	0.2	0.1	2.5	0.4	3.3
39145992800	4486	18.8	95.7	2.5	1.1	0.3	0	0.4	0.3	4.7
39145992900	6372	15.4	98.1	0.7	0.4	0	0	0.8	0	1.9
39145993000	3878	20.8	96.9	0.3	0.9	1.3	0	0.6	0	3.1
39145993100	3495	21.9	98.5	0	0.4	0.3	0.1	0.6	0.1	1.5

Table F-2 County Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
39145993200	1861	31.5	97.6	0.3	0	0	0	2.1	0	2.4
39145993300	2698	14.1	94.6	2.4	0.8	1.8	0	0.5	0.9	6.3
39145993400	3801	28.5	93.1	3.9	0.5	0.2	0.2	2.1	0.3	7.1
39145993500	2859	29.3	97.2	0.2	0.8	0.2	0	1.6	1.5	4.4
39145993600	2596	**43.4**	88.8	7	0	1.2	0	2.9	0	11.2
39145993700	2618	24.6	75.4	20.3	0.4	0	0	4.2	1.4	**25.6**
39145993800	4689	8.1	95.6	0.7	0.2	1.9	0	1.6	0.2	4.6
39145993900	3515	22.6	96.4	0	2.3	0.2	0	1.1	0	3.6
39145994000	3804	20.3	98.1	0.6	0.3	0.3	0.1	0.5	0.3	1.9
Ohio										
Vinton County	39163	3	20	0.1	0.4	0	0.1	1.4	0.6	2.5
Threshold for EJ Concerns	NA	23	NA	20.1	20.4	20	20.1	21.4	20.6	22.5
39163953000	4509	17.8	98.3	0.3	0.5	0	0.1	0.8	0.4	2
39163953100	5284	21.4	97.3	0.1	0.5	0	0.2	1.9	0.8	3.4
39163953200	3013	20.8	98.4	0	0	0	0	1.6	0.5	2
Kentucky										
Boyd County	21019	12	15.5	2.2	0.2	0.3	0.4	1.2	1.1	5
Threshold for EJ Concerns	NA	32	NA	22.2	20.2	20.3	20.4	21.2	21.1	25
21019030200	1182	25.9	81.2	9.2	0.5	4.9	1.2	3	0.6	19.4
21019030300	2542	**32.3**	96.6	3	0	0	0	0.4	0.2	3.6
21019030400	2072	27.9	93.1	2.3	0.2	0.2	1	3.2	2.3	7.1
21019030500	4489	11.1	97.3	1.6	0	0.9	0	0.2	0	2.7
21019030600	4169	9.9	97	1.6	0.1	0.2	0	1.1	0.2	3
21019030700	3578	8.7	95.8	0.8	0.5	0.1	1.1	1.6	0.4	4.3

Table F-2 County Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
21019030800	3969	29.4	97.6	0.5	0	0	0.2	1.8	1	3
21019030900	5772	13.7	99	0.2	0.3	0	0	0.5	0.3	1.3
21019031000	8122	12.6	88.7	7	0.4	0.3	1.1	2.3	4.7	14.1
21019031100	7764	10.9	98	0.5	0	0.2	0.1	1	0.5	2.1
21019031200	3374	11.5	99.1	0.9	0	0	0	0	0	0.9
21019031300	2719	19.2	97.1	1.1	0.2	0.3	0.1	1.3	0	2.9
Kentucky										
Carter County	21043	7	22.3	0.2	0.2	0.3	0.1	0.3	0.4	1.3
Threshold for EJ Concerns	NA	27	NA	20.2	20.2	20.3	20.1	20.3	20.4	21.3
21043960100	3370	26	98.5	0.7	0	0	0	0.8	0.7	2.2
21043960200	4334	25.5	99.3	0	0.1	0.3	0	0.3	0.2	0.9
21043960300	3080	20.8	100	0	0	0	0	0	0.6	0.6
21043960400	1696	25.6	98.8	0	0.9	0.2	0	0	0	1.2
21043960500	4183	18	99	0.3	0.5	0	0	0.2	0	1
21043960600	5863	18.6	99.3	0.2	0	0.2	0.3	0	0.2	0.7
21043960700	4363	24.5	98.1	0	0	1.2	0	0.7	1.3	2.9
Kentucky										
Fleming County	21069	3	18.6	1.8	0.1	0	0	0.4	0.8	3
Threshold for EJ Concerns	NA	23	NA	21.8	20.1	20	20	20.4	20.8	23
21069980100	3949	16.6	94.9	4.5	0	0	0.1	0.5	0.8	6
21069980200	3184	12.9	98.4	1	0.2	0	0	0.4	1.3	2.7
21069980400	4085	**24.1**	99.1	0.9	0	0	0	0	0	0.9

Table F-2 County Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
Kentucky										
Greenup County	21089	7	14.1	0.6	0.1	0.4	0.2	0.8	0.8	2.8
Threshold for EJ Concerns	NA	27	NA	20.6	20.1	20.4	20.2	20.8	20.8	22.8
21089040100	4375	5.5	98.1	0.2	0.2	0.8	0.3	0.3	1.9	3.5
21089040200	7475	12.2	97.8	0.6	0.2	0.1	0.5	0.8	1.9	3.5
21089040300	4531	11.3	97	0.3	0	1.5	0.1	1	0.4	3.3
21089040400	5562	14.6	98.5	0.6	0	0.2	0.1	0.6	0.2	1.6
21089040500	8110	18.7	96.7	1.6	0	0.4	0.2	1.1	0.3	3.4
21089040600	3310	18	98.1	0	0.2	0.2	0	1.5	0	1.9
21089040700	3528	17.6	99.1	0	0.2	0.3	0	0.3	0	0.9
Kentucky										
Lewis County	21135	4	28.5	0.3	0.3	0	0.2	0.4	0.4	1.4
Threshold for EJ Concerns	NA	24	NA	20.3	20.3	20	20.2	20.4	20.4	21.4
21135990100	4716	**29.1**	99.7	0	0.2	0	0	0.1	0.2	0.5
21135990200	3990	**33.6**	98.9	0.4	0.2	0	0	0.5	0.5	1.6
21135990300	3293	22.5	97	0.8	0.6	0	0.7	0.9	0.7	3.2
21135990400	2093	**27.1**	100	0	0	0	0	0	0	0

Table F-2 County Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
Kentucky										
Mason County	21161	4	16.8	6.4	0.1	0.5	0.9	1.5	1.4	9.9
Threshold for EJ Concerns	NA	24	NA	26.4	20.1	20.5	20.9	21.5	21.4	29.9
21161960100	3093	14.3	97.3	1.6	0	0	0.2	0.9	0.8	3.3
21161960200	3478	**24.7**	84.5	12.2	0.2	0	0.9	2.3	1.3	15.7
21161960300	4337	16.8	85.7	10.3	0.1	1.1	0.9	1.9	1.5	15.6
21161960400	4140	11.4	94.7	2.4	0.4	0.7	0.5	1.5	1	5.7
Kentucky										
Carter County	21043	7	22.3	0.2	0.2	0.3	0.1	0.3	0.4	1.3
Threshold for EJ Concerns	NA	27	NA	20.2	20.2	20.3	20.1	20.3	20.4	21.3
21205950100	6103	16.5	94.4	2.2	0.5	0.9	1	1	2	6.5
West Virginia										
Cabell County	54011	5	19.2	4	0.2	0.9	0.3	1.3	0.6	7
Threshold for EJ Concerns	NA	25	NA	24	20.2	20.9	20.3	21.3	20.6	27
54011000600	1607	**58.9**	89.3	4	1.2	5	0.4	0	0.9	10.7
54011000900	1852	**30.7**	95.3	3.2	0	0	0.3	1.2	0.3	4.7
54011001000	2426	**29.6**	97.7	1.1	0	0	0	1.3	0.4	2.7
54011001100	2096	**28.1**	93.6	2	0	0	0	4.5	2.6	6.4
54011010700	7160	15.5	98.1	0.3	0	0.3	0.1	1.2	0.4	2.2

Table F-2 County Population Data, by Census Tract (continued)

Census Tract	Persons	Below Poverty Level (%)	Whites (%)	African American/ Black (%)	Native American (%)	Asian and Pacific Islander (%)	Other Races (%)	Two or More Races (%)	Hispanic or Latino (%)	Minorities (%)
West Virginia										
Mason County	54053	4	19.9	0.7	0.1	0.4	0	0.4	0.4	2
Threshold for EJ Concerns	NA	24	NA	20.7	20.1	20.4	20	20.4	20.4	22
54053954800	6909	16.3	98.5	0.6	0.2	0	0	0.6	0.2	1.7
54053954900	6750	**24**	98.8	0.6	0	0.4	0	0.1	0.6	1.7
54053955000	5025	17.6	96.5	1.8	0	1.5	0	0.2	0.5	4
54053955100	7273	21.2	99	0	0.2	0.1	0	0.7	0.2	1.3
West Virginia										
Wayne County	54099	5	19.6	0.1	0.2	0.2	0.1	0.5	0.3	1.4
Threshold for EJ Concerns	NA	25	NA	20.1	20.2	20.2	20.1	20.5	20.3	21.4
54099005100	2181	13.7	98.4	0	0.6	0.7	0	0.3	0	1.6
54099005200	2086	14.1	98.8	0	0	0.9	0.3	0	0.3	1.2
54099020100	2545	13.1	99.3	0.4	0.4	0	0	0	0	0.7
54099020300	5307	16.4	99	0.4	0	0.2	0.1	0.3	0.4	1.3
54099020400	6219	11.8	99.3	0	0	0	0.2	0.5	1.1	1.6

Notes:
[a] NA = Not available.
[b] Census tracts exceeding minority/low-income criteria are shown in bold.

Table F-3 Number of Census Tracts Exceeding State Environmental Justice Threshold [a]

County	Below Poverty Level	African American/ Black	Native American	Asian and Pacific Islander	Other Races	Two or More Races	Hispanic or Latino (All Races)	Minorities (Racial Minorities plus White Hispanics)	Total Minority Tracts
State of Ohio (%)	10.6	11.5	0.2	1.2	0.8	1.5	1.9	16	--
Threshold for EJ Concerns (%)	30.6	31.5	20.2	21.2	20.8	21.5	21.9	36	--
Adams	0	0	0	0	0	0	0	0	0
Athens	0	0	0	0	0	0	0	0	0
Brown	0	0	0	0	0	0	0	0	0
Clinton	0	0	0	0	0	0	0	0	0
Fairfield	0	0	0	0	0	0	0	0	0
Fayette	0	0	0	0	0	0	0	0	0
Gallia	0	0	0	0	0	0	0	0	0
Highland	0	0	0	0	0	0	0	0	0
Hocking	0	0	0	0	0	0	0	0	0
Jackson	0	0	0	0	0	0	0	0	0
Lawrence	**1**	0	0	0	0	0	0	0	NA
Madison	0	0	0	0	0	0	0	0	0
Meigs	0	0	0	0	0	0	0	0	0
Pickaway	0	0	0	0	0	0	0	0	0
Pike	0	0	0	0	0	0	0	0	0
Ross	0	**1**	0	0	0	0	0	**1**	NA
Scioto	**2**	0	0	0	0	0	0	0	NA
Vinton	0	0	0	0	0	0	0	0	0
Total Ohio Counties	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	NA

Table F-3 Number of Census Tracts Exceeding State Environmental Justice Threshold (continued)

County	Below Poverty Level	African American/ Black	Native American	Asian and Pacific Islander	Other Races	Two or More Races	Hispanic or Latino (All Races)	Minorities (Racial Minorities plus White Hispanics)	Total Minority Tracts
State of Kentucky (%)	15.8	7.3	0.2	0.7	0.5	1.2	1.4	10.7	--
Threshold for EJ Concerns (%)	35.8	27.3	20.2	20.7	20.5	21.2	21.4	30.7	--
Boyd	0	0	0	0	0	0	0	0	0
Carter	0	0	0	0	0	0	0	0	0
Fleming	0	0	0	0	0	0	0	0	0
Greenup	0	0	0	0	0	0	0	0	0
Lewis	0	0	0	0	0	0	0	0	0
Mason	0	0	0	0	0	0	0	0	0
Carter	0	0	0	0	0	0	0	0	0
Total Kentucky Counties	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
State of West Virginia (%)	17.9	3.1	0.2	0.5	0.2	1	0.7	5.5	--
Threshold for EJ Concerns (%)	37.9	23.1	20.2	20.5	20.2	21	20.7	25.5	--
Cabell	**1**	0	0	0	0	0	0	0	NA
Mason	0	0	0	0	0	0	0	0	0
Wayne	0	0	0	0	0	0	0	0	0
Total West Virginia Counties	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	NA

Table F-3 Number of Census Tracts Exceeding State Environmental Justice Threshold (continued)

County	Below Poverty Level	African American/ Black	Native American	Asian and Pacific Islander	Other Races	Two or More Races	Hispanic or Latino (All Races)	Minorities (Racial Minorities plus White Hispanics)	Total Minority Tracts
Grand Total (3 States)	**4**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**NA**

Notes:

[a] NA = Not available.

Table F-4 Number of Census Tracts Exceeding County Environmental Justice Threshold [a]

County	Below Poverty Level	African American/ Black	Native American	Asian and Pacific Islander	Other Races	Two or More Races	Hispanic or Latino (All Races)	Minorities (Racial Minorities plus White Hispanics)	Total Minority Block Groups
State of Ohio (%)	10.6	11.5	0.2	1.2	0.8	1.5	1.9	16	--
Threshold for EJ Concerns (%)	30.6	31.5	20.2	21.2	20.8	21.5	21.9	36	--
Adams	0	0	0	0	0	0	0	0	0
Athens	**2**	0	0	0	0	0	0	0	NA
Brown	0	0	0	0	0	0	0	0	0
Clinton	0	0	0	0	0	0	0	0	0
Fairfield	0	0	0	0	0	0	0	0	0
Fayette	0	0	0	0	0	0	0	0	0
Gallia	**1**	0	0	0	0	0	0	0	NA
Highland	0	0	0	0	0	0	0	0	0
Hocking	0	0	0	0	0	0	0	0	0
Jackson	0	0	0	0	0	0	0	0	0
Lawrence	0	0	0	0	0	0	0	0	0
Madison	0	0	0	0	0	0	0	0	0
Meigs	**1**	0	0	0	0	0	0	0	NA
Pickaway	0	0	0	0	0	0	0	0	0
Pike	0	0	0	0	0	0	0	0	0
Ross	0	**1**	0	0	0	0	0	**1**	NA
Scioto	**1**	0	0	0	0	0	0	**1**	NA
Vinton	0	0	0	0	0	0	0	0	0
Total Ohio Counties	**5**	**1**	0	0	0	0	0	**2**	NA

Table F-4 Number of Census Tracts Exceeding County Environmental Justice Threshold (continued)

County	Below Poverty Level	African American/ Black	Native American	Asian and Pacific Islander	Other Races	Two or More Races	Hispanic or Latino (All Races)	Minorities (Racial Minorities plus White Hispanics)	Total Minority Block Groups
State of Kentucky (%)	15.8	7.3	0.2	0.7	0.5	1.2	1.4	10.7	--
Threshold for EJ Concerns (%)	35.8	27.3	20.2	20.7	20.5	21.2	21.4	30.7	--
Boyd	**1**	0	0	0	0	0	0	0	NA
Carter	0	0	0	0	0	0	0	0	0
Fleming	**1**	0	0	0	0	0	0	0	NA
Greenup	0	0	0	0	0	0	0	0	0
Lewis	**3**	0	0	0	0	0	0	0	NA
Mason	**1**	0	0	0	0	0	0	0	NA
Total Kentucky Counties	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	NA
State of West Virginia (%)	17.9	3.1	0.2	0.5	0.2	1	0.7	5.5	--
Threshold for EJ Concerns (%)	37.9	23.1	20.2	20.5	20.2	21	20.7	25.5	--
Cabell	**4**	0	0	0	0	0	0	0	NA
Mason	**1**	0	0	0	0	0	0	0	0
Wayne	0	0	0	0	0	0	0	0	0
Total West Virginia Counties	**5**	0	0	0	0	0	0	0	NA
Grand Total (3 States)	**16**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**NA**

Notes:

[a] NA = Not available.

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APPENDIX G
COST BENEFIT ANALYSIS

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APPENDIX G
COST BENEFIT ANALYSIS

G.1 Introduction

This appendix describes the methodology used in preparing the incremental cost benefit analysis that is summarized in Section 7.2.

An incremental cost benefit analysis measures the impacts of each alternative relative to a baseline, which is how things would be if the alternative were not imposed (i.e., the no-action alternative). The baseline used in this analysis assumes full licensee compliance with existing NRC requirements, including current regulations. This is consistent with the *Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission* (NRC, 2004), which state that "...in evaluating a new requirement for existing plants, the staff should assume that all existing NRC and Agreement State requirements have been implemented" (NRC, 2004).

The incremental cost benefit analysis described in this appendix compares the proposed action (construction and operation of the proposed ACP at Piketon, Ohio) with the no-action alternative. For the purposes of this analysis, the no-action alternative is defined as continued operation of the Paducah Gaseous Diffusion Plant at Paducah, Kentucky. This appendix presents full details of construction and operating costs and the results of a net present value analysis estimating the economic impact of implementing the proposed action compared to the no-action alternative under different discount rates and production capacity assumptions.

G.2 Methodology and Assumptions

The incremental cost benefit analysis presented in Section 7.2 considers a limited number of costs and benefits in assessing the net present value of implementing the proposed action compared to the no-action alternative. Specifically, the analysis quantitatively assesses direct costs such as construction costs, manufacturing costs, and decontamination and decommissioning costs. The only benefits assessed are those resulting from operating cost savings associated with implementing the proposed action compared to the no-action alternative. Some of the indirect impacts and costs described in Section 7.1.1 are not included as part of this comparative analysis because the effect of these impacts is assumed to be either (1) equal for the proposed action and the no-action alternative as defined above, or (2) too small an impact to materially affect the comparative cost benefit analysis.

The estimates in this analysis reflect costs and benefits to the U.S. economy and not to USEC**.** All costs and benefits in this analysis are measured in 2005 real dollars (denoted hereafter as 2005$). Costs and benefits are assumed to accrue at the beginning of the calendar year over which they actually occur.

G.3 Costs of the Proposed Action

Construction Costs: The construction phase of the proposed alternative is estimated to cost $1,449 million between calendar years 2006 and 2010 (USEC, 2005b). Construction costs are assumed to accrue evenly in each of the calendar years of the construction phase of the proposed action. The construction cost figure USEC provided is not expressed in constant dollars. To be conservative, NRC staff treat these costs as 2005$. This approach overestimates costs, and is therefore a conservative assumption.

Manufacturing Costs: The manufacturing and assembly phase of the proposed alternative is estimated to cost $1,423 million between calendar years 2004 and 2013 (USEC, 2005b). Manufacturing costs are assumed to accrue evenly in each of the calendar years of the manufacturing phase of the proposed action. Again, the USEC cost estimates are not expressed in constant dollars. Similar to the assumption made for construction costs, the costs derived from the manufacturing and assembly phase are treated as 2005$ in the cost benefit analysis. This is a conservative assumption that likely overstates costs.

Decontamination and Decommissioning Costs: Decontamination and decommissioning of the proposed alternative is estimated to cost $435 million (2004$) (USEC, 2005b). These costs are adjusted to reflect 2005$ (NASA, 2005). Decontamination and decommissioning costs are assumed to accrue evenly over six years, commencing 30 years after the first year of operation. The cost benefit analysis does not factor in costs associated with tails disposition. It is assumed that for a given production level, the amount of tails generated by the proposed ACP will be equivalent to the amount of tails that would have been generated using Paducah Gaseous Diffusion Plant (USEC, 2005b). Therefore, no incremental tails disposition costs result from the proposed action relative to the no-action alternative.

G.4 Costs of the No-Action Alternative

No construction or manufacturing costs are associated with the no-action alternative.

The decontamination and decommissioning schedule and costs associated with the Paducah Gaseous Diffusion Plant are considered independent of the proposed alternative and are not included in this analysis.

In addition, this section does not consider the costs and benefits associated with actions pertaining to the Portsmouth Gaseous Diffusion Plant. USEC closed the Portsmouth Gaseous Diffusion Plant in May 2001 to reduce operating costs. The NRC staff do not believe that there has been any significant change in the factors that were considered by USEC in its decision to cease uranium enrichment at Portsmouth. For the purposes of this cost benefit analysis, actions pertaining to the Portsmouth Gaseous Diffusion Plant, such as decontamination and decommissioning, are considered unrelated to the no-action alternative and the proposed action.

G.5 Benefits of the Proposed Action Relative to the No-Action Alternative

Benefits in a given year are computed as the difference between the operating costs per separative work unit of the no-action alternative and the proposed alternative multiplied by the level of production substituted in that year. Two scenarios are assumed:

(i) the proposed action substitutes 4.6 million separative work units of production at the Paducah Gaseous Diffusion Plant (this figure reflects the anticipated production levels at the Paducah Gaseous Diffusion Plant in 2005); and,

(ii) the proposed action substitutes 7 million separative work units of production at the Paducah Gaseous Diffusion Plant.

In both scenarios, the proposed ACP is assumed to be producing at the 7 million separative work unit capacity level. The difference is that in the first scenario, the proposed ACP is replacing only 4.6 million separative work units that would otherwise have been produced at the Paducah Gaseous Diffusion Plant. This analysis assumes that the proposed ACP's excess production (2.4 million separative work units) substitutes production from sources that are no more expensive than the proposed ACP. Therefore, incremental benefits from the proposed action do not accrue beyond the 4.6 million separative work units

level. In the second scenario, the proposed ACP is substituting 7 million separative work units that would otherwise have been produced at the Paducah Diffusion Gaseous Plant; the benefits are therefore higher in the second scenario.

In both scenarios, separative work unit production at the proposed ACP is expected to phase-in according to USEC's proposed schedule (USEC, 2005b). Specifically, the proposed ACP is expected to reach an annual capacity of 1 million separative work units per year in 2010, and is projected to have an annual capacity of 3.5 million separative work units per year in 2011 (USEC, 2005b). The proposed ACP is assumed to reach full capacity by 2015. These milestones are factored into the cost benefit analysis.

Operating costs under the no-action alternative are estimated to be approximately four times higher than under the proposed action.

G.6 Discount Rates

Three different real discount rates are applied to estimate the net present value of the proposed alternative – zero percent, three percent, and seven percent. These discount rates are consistent with those recommended in NUREG/BR-0184, *Regulatory Analysis Technical Evaluation Handbook* (NRC, 1997). The higher discount rate places a lower value on benefit streams occurring in the future. Net present value estimates are lower under the higher real discount rate because most of the costs associated with the proposed alternative occur up front while benefits are distributed evenly over time.

G.7 Limitations

The cost benefit analysis presented here does not quantitatively estimate potential impacts such as public health effects, occupational health effects, and property value impacts.

Furthermore, certain benefits associated with the proposed alternative, including domestic energy security policy objectives, are not captured in this economic analysis.

As stated in Chapter 7, this analysis does not attempt a dynamic general equilibrium modeling of the economic effects of a cheaper source of enriched uranium for nuclear power plants. No attempt is made to model the effects of reduced enriched uranium prices on the ratio of nuclear and non-nuclear power in the domestic economy, on overall power demand and price, and on the potential economic benefits to consumers and suppliers. Instead, the analysis focuses on estimating the economic savings to society from replacing Paducah Gaseous Diffusion Plant production by a cheaper and less resource-intensive source based on centrifuge technology.

G.8 Results

Table G-1 presents the net present value of implementing the proposed action instead of the no-action alternative for the two scenarios described above at three alternative real discount rates. The figures represent net benefits of the proposed action when compared to the no-action alternative.

Table G-1 Net Present Value of the Net Benefits of Proposed Alternative Relative to the No-action Alternative

Scenario 1: Proposed ACP Substitutes 4.6 Million Separative Work Units of Paducah Gaseous Diffusion Plant Production	
Net Present Value (3 percent) in 2005 in Millions 2005$	$3,630
Net Present Value (7 percent) in 2005 in Millions 2005$	$966
Net Present Value (0 percent) in 2005 in Millions 2005$	$7,992
Scenario 2: Proposed ACP Substitutes 7 Million Separative Work Units of Paducah Gaseous Diffusion Plant Production	
Net Present Value (3 percent) in 2005 in Millions 2005$	$6,417
Net Present Value (7 percent) in 2005 in Millions 2005$	$2,290
Net Present Value (0 percent) in 2005 in Millions 2005$	$13,212

G.9 Conclusions

The analysis indicates that the incremental economic benefits of implementing the proposed action instead of the no-action alternative are substantially positive under both the scenarios and the three discount rates considered, even after accounting for all project-related costs.

G.10 References

(NASA, 2005) National Aeronautics and Space Administration. "Gross Domestic Product Deflator Inflation Calculator." <http://www1.jsc.nasa.gov/bu2/inflateGDP.html> May 25, 2005.

(USEC, 2005a) United States Enrichment Corporations. "Additional Responses to Request for Additional Information Regarding the Environmental Report (TAC No. L32307) - Proprietary Information." April 21, 2005.

(USEC, 2005b) United States Enrichment Corporation. "Environmental Report for the American Centrifuge Plant in Piketon, Ohio." Revision 3. NRC Docket No. 70-7004. July 2005.

(NRC, 1997) U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research. "Regulatory Analysis Technical Evaluation Handbook, Final Report," NUREG/BR-0184. January 1997.

(NRC, 2004) U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research. "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," NUREG/BR-0058. September 2004.

APPENDIX H
ACCIDENT ANALYSIS FOR THE PROPOSED ACP

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The text in this appendix is being withheld pursuant to 10 CFR 2.390.

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APPENDIX I
GLOSSARY

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APPENDIX I
GLOSSARY

Acid rain: Rain with a pH of less than 5.6.

Agreement State: A state that has signed an agreement with the Nuclear Regulatory Commission under which the state regulates the use of byproduct, source, and small quantities of special nuclear material in that state.

Air pollutant: Any substance in air which could, if in high enough concentration, harm humans, other animals, vegetation, or material. Pollutants may include almost any natural or artificial composition of matter capable of being airborne.

Air quality: A measure of the quantity of pollutants, measured individually, in the air. These levels are often compared to regulatory standards.

ALARA: Acronym for "as low as (is) reasonably achievable." An approach to keep radiation exposures (both to the workforce and the public) and releases of radioactive material to the environment at levels that are as low as social, technical, economic, practical, and public policy considerations allow. ALARA is not a dose limit; it is a practice whose objective is the attainment of dose levels as far below applicable limits as possible.

Alluvium: Loose gravel, sand, silt, or clay deposited by streams or running water.

Alpha particle: A positively charged particle ejected spontaneously from the nuclei of some radioactive elements**.** It is identical to a helium nucleus that has a mass number of 4 and an electrostatic charge of +2. It has low penetrating power and a short range (a few centimeters in air)**.** The most energetic alpha particle will generally fail to penetrate the dead layers of cells covering the skin and can be easily stopped by a sheet of paper**.** Alpha particles are hazardous when an alpha-emitting isotope is inside the body.

Ambient Air Quality Standards: Standards established on a State or Federal level, that define the limits for airborne concentrations of designated “criteria” pollutants (nitrogen dioxide, sulfur dioxide, carbon monoxide, total suspended particulates, ozone, and lead), to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility, and materials (secondary standards).

Aquifer: A permeable body of rock capable of yielding quantities of groundwater to wells and springs.

Area of potential effects: The geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (See 36 CFR § 800.16).

Assay: The qualitative or quantitative analysis of a substance often used to determine the proportion of isotopes in radioactive materials.

***Atomic Energy Act of 1954 as amended*:** A federal law that created the Atomic Energy Commission, which later split into the Nuclear Regulatory Commission and the Energy and Research and Development Administration (ERDA). ERDA became part of the Department of Energy in 1977. This act encouraged the development and use of nuclear energy and research for the general welfare and the security of the United States. This act authorized the Nuclear Regulatory Commission to regulate and license fuel fabrication facilities that seek to receive, possess, use, or transfer special nuclear material.

Attainment area: A region that meets the U.S. EPA National Ambient Air Quality Standards (NAAQS) for a criteria pollutant under the *Clean Air Act*.

Background radiation: Radiation from cosmic sources, naturally occurring radioactive materials, including radon (except as a decay product of source or special nuclear material), and global fallout as it exists in the environment from the testing of nuclear explosive devices. It does not include radiation from source, byproduct, or special nuclear materials regulated by the Nuclear Regulatory Commission. The typically quoted average individual exposure from background radiation is 3.6 millisievert per year (360 millirem per year).

Becquerel (Bq): A unit used to measure radioactivity. One Becquerel is that quantity of a radioactive material that will have one transformation in one second. There are 3.7×10^{10} Bq in one curie (Ci).

Best Management Practices (BMP): Structural, nonstructural, and managerial techniques recognized to be the most effective and practical means to reduce surface water and groundwater contamination while still allowing the productive use of resources.

Beta particle: A charged particle emitted from a nucleus during radioactive decay, with a mass equal to 1/1837 that of a proton. A negatively charged beta particle is identical to an electron. A positively charged beta particle is called a positron. Large amounts of beta radiation may cause skin burns, and beta emitters are harmful if they enter the body. Beta particles may be stopped by thin sheets of metal or plastic.

Bound: To estimate or describe a lower or upper limit on a potential environmental or health consequence when uncertainty exists.

Buffer area: A designated area of land that is designed to permanently remain vegetated in an undisturbed and natural condition in order to protect an adjacent aquatic or wetland site from upland impacts and to provide habitat for wildlife.

Byproduct material: The tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content. See also, Source Material.

Carbon monoxide: An odorless, colorless, poisonous gas produced by incomplete burning of carbon in fuels. Exposure to carbon monoxide reduces the delivery of oxygen to the body's organs and tissues. Elevated levels can cause impairment of visual perception, manual dexterity, learning ability, and performance of complex tasks.

Census tract: An area usually containing between 2,500 and 8,000 persons that is used for organizing and monitoring census data. The geographic dimensions of census tracts vary widely, depending on population density. Census tracts do not cross county borders.

Climatology: The science devoted to the study of the conditions of the natural environment (rainfall, daylight, temperature, humidity, air movement) prevailing in specific regions of the earth.

Cold standby: Cold standby involves placing those portions of the Gaseous Diffusion Plant needed for 3 million separative work units per year production capacity in a non-operational condition. It also includes performing surveillance and maintenance activities necessary to retain the ability to resume operations after a set of restart activities are conducted.

Contamination: Undesired radioactive material that is deposited on the surface of, or inside structures, areas, objects, or people.

Cooling water: Water circulated through a nuclear reactor or processing plant to remove heat.

Cost-benefit analysis: A formal quantitative procedure comparing costs and benefits of a proposed project or act under a set of preestablished rules.

Council on Environmental Quality: The President's Council on Environmental Quality (CEQ) was established by the enactment of *National Environmental Policy Act* (NEPA). The CEQ is responsible for developing regulations to be followed by all federal agencies in developing and implementing their own specific NEPA implementation policies and procedures.

Criteria pollutants: Common air pollutants for which National Ambient Air Quality Standards have been established by the U.S. EPA under Title I of the *Clean Air Act*. Criteria pollutants include sulfur dioxide, nitrogen oxides, carbon monoxide, ozone, particulate matter (PM_{10} and $PM_{2.5}$), and lead. Standards for these pollutants were developed on the basis of scientific knowledge about their health effects.

Critical habitat: Specific areas within the geographical range of an endangered species that is formally designated by the U.S. Fish and Wildlife Service under the *Endangered Species Act* as essential for conservation.

Cumulative impacts: Potential impacts when the proposed action is added to other past, present, and reasonable foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Curie (Ci): The basic unit used to describe the intensity of radioactivity in a sample of material**.** The curie is equal to 37 billion (3.7×10^{10}) disintegrations per second, which is approximately the activity of 1 gram of radium. A curie is also a quantity of any radionuclide that decays at a rate of 37 billion disintegrations per second. It is named for Marie and Pierre Curie, who discovered radium in 1898.

Day-Night Average Noise Level (DNL): DNL is a noise metric combining the levels and durations of noise events and the number of events over an extended time period. It is a cumulative average computed over a set of 24-hour periods to represent total noise exposure. DNL also accounts for more intrusive night time noise, adding a 10 dB penalty for sounds after 10:00 p.m. and before 7:00 a.m.

Decibel (dB): A standard unit for measuring sound-pressure levels based on a reference sound pressure of 0.0002 dyne per square centimeter. This is the smallest sound a human can hear. In general, a sound doubles in loudness with every increase of slightly more than 3 decibels.

Decibel, A-weighted (dBA): A number representing the sound level which is frequency weighted according to a prescribed frequency response established by the American National Standards Institute and accounts for the response of the human ear.

Decommissioning: The process of closing down a facility followed by reducing residual radioactivity to a level that permits the release of the property for unrestricted use (see 10 CFR 20.1003).

Decontamination: The reduction or removal of contaminating radioactive material from a structure, area, object, or person. Decontamination may be accomplished by (1) treating the surface to remove or decrease the contamination, (2) letting the material stand so that the radioactivity is decreased as a result of natural radioactive decay, or (3) covering the contamination to shield or attenuate the radiation emitted (see 10 CFR 20.1003 and 20.1402).

Depleted uranium: Uranium having a percentage of uranium-235 smaller than the 0.7 percent found in natural uranium. It is obtained from spent (used) fuel elements or as byproduct tails, or residues, from uranium isotope separation.

Depleted uranium hexafluoride (DUF_6): A compound of uranium and fluorine from which most of the uranium-235 isotope has been removed.

Direct jobs: The number of workers required at a site to implement an alternative.

Dose: The absorbed dose, given in rads (or in SI units, grays), that represents the energy absorbed from the radiation in a gram of any material. Furthermore, the biological dose or dose equivalent, given in rem or sieverts, is a measure of the biological damage to living tissue from radiation exposure.

Dosimetry: The theory and application of the principles and techniques involved in the measurement and recording of radiation doses. Its practical aspect is concerned with the use of various types of radiation instruments with which measurements are made (i.e., film badge, thermoluminescent dosimeter, and Geiger counter).

Effluent: A gas or fluid discharged into the environment, treated or untreated. Most frequently, the term applies to wastes discharged to surface waters.

Emissions: Substances that are discharged into the air.

Endangered species: Any species (plant or animal) that is in danger of extinction throughout all or a significant part of its range. Requirements for declaring a species endangered are found in the *Endangered Species Act*.

***Endangered Species Act of 1973*:** An act requiring federal agencies, with the consultation and assistance of the Secretaries of the Interior and Commerce, to ensure that their actions will not likely jeopardize the continued existence of any endangered or threatened species or adversely affect the habitat of such species.

Erosion: The wearing away of the land surface by wind, water, ice, or other geologic agents**.** Erosion occurs naturally from weather or runoff but is often intensified by human land use practices.

Exposure: Being exposed to ionizing radiation or to radioactive material.

Exposure pathways: A route or sequence of processes by which a radioactive or hazardous material may move through the environment to humans or other organisms. Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route.

Floodplain: Low-lying areas adjacent to rivers and streams that are subject to natural inundations typically associated with precipitation.

Fuel cycle: The series of steps involved in supplying fuel for nuclear power reactors. It can include mining, milling, isotopic enrichment, fabrication of fuel elements, use in a reactor, chemical reprocessing to recover the fissionable material remaining in the spent fuel, reenrichment of the fuel material, refabrication into new fuel elements, and waste disposal.

Fugitive Dust: Any solid particulate matter (PM) that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of man. Fugitive dust may include emission from haul roads, wind erosion of exposed soil surfaces, and other activities in which soil is either removed or redistributed.

Geology and Soils: Those Earth resources that may be described in terms of landforms, geology, and soil conditions.

Gray (Gy): The international system (SI) unit of absorbed dose. One gray is equal to an absorbed dose of 1 Joule/kilogram (one gray equals 100 rads) (see 10 CFR 20.1004).

Groundwater: Water, both fresh and saline, that is stored below the Earth's surface in pores, cracks, and crevices below the water table.

Hazardous Air Pollutants (HAPs): A group of 188 chemicals identified in the *1990 Clean Air Act Amendments*. Exposure to these pollutants can cause or contribute to cancer, birth defects, genetic damage, and other adverse health effects.

Hazardous waste: According to the *Resource Conservation and Recovery Act*, a waste that, because of its characteristics, may (1) cause or significantly contribute to an increase in mortality or an increase in serious irreversible illness, or (2) pose a substantial hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Hazardous wastes possess at least one of the following characteristics**:** ignitability, corrosivity, reactivity, or toxicity. Hazardous waste is nonradioactive.

Heels: In the uranium enrichment process, heels refers to the residual solid uranium hexafluoride left after the feed rate declines to a predetermined level.

Highly enriched uranium (HEU): Uranium enriched in the isotope uranium-235 to 20 percent or above, which thus becomes suitable for nuclear weapons use.

Historic and Cultural Resources: Cultural resources include any prehistoric or historic district, site, building, structure, or object resulting from, or modified by, human activity. Historic properties are cultural resources listed in, or eligible for listing in, the National Register of Historic Places.

Holding ponds: Engineered depressions in the land that contain storm-water runoff until it can slowly seep back into the ground or evaporate.

Impacts: An assessment of the meaning of changes in all attributes being studies for a given resource. An aggregation of all of the adverse effects, usually measured using a qualitative and nominally subjective technique.

Indirect jobs: Jobs generated or lost in related industries within a regional economic area as a result of a change in direct employment.

Ingestion: To take in by mouth. Material that is ingested enters the digestive system.

Inhalation: To take in by breathing. Material that is inhaled enters the lungs.

Isotope: Any two or more forms of an element having identical or very closely related chemical properties and the same atomic number but different atomic weights or mass numbers.

Land Use: The way land is developed and used in terms of the kinds of anthropogenic activities that occur (e.g., agriculture, residential areas, industrial areas).

Lead: A heavy metal element formerly added to gasoline and paint for improved performance characteristics. Lead can be inhaled and ingested in food, water, soil, or dust. High exposure to lead can cause seizures, mental retardation, and/or behavioral disorders. Low exposure to lead can lead to central nervous system damage.

Low-enriched uranium (LEU): Uranium enriched in the isotope uranium-235, greater than 0.7 percent but less than 20 percent of the total mass. Naturally occurring uranium contains about 0.7 percent
uranium-235, almost all the rest is uranium-238.

Low-level mixed waste: Low-level waste that also contains hazardous chemical components regulated under the *Resource Conservation and Recovery Act*.

Low-level radioactive waste: Wastes containing source, special nuclear, or byproduct material are acceptable for disposal in a land disposal facility. For the purposes of this definition, low-level waste has the same meaning as in the *Low-Level Radioactive Waste Policy Act*, that is, radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or byproduct material as defined in section 11e.(2) of the *Atomic Energy Act* (uranium or thorium tailings and waste).

Maximally exposed individual (MEI): A hypothetical person who—because of proximity, activities, or living habits—could receive the highest possible dose of radiation or of a hazardous chemical from a given event or process.

Meteorology: The science dealing with the atmosphere and its phenomena, especially as relating to weather.

Microcurie: One millionth of a curie. That amount of radioactive material that disintegrates (decays) at the rate of 37 thousand atoms per second.

Mitigation: A series of actions implemented to ensure that projected impacts will result in no net loss of habitat value or wildlife populations. The purpose of mitigative actions is to avoid, minimize, rectify, or compensate for any adverse environmental impact.

Millirem (mrem): One thousandth of a rem (0.001 rem).

Mixing height: The height above the earth's surface through which relatively strong vertical mixing of the atmosphere occurs.

Modified Mercalli Intensity: A measurement of earthquake intensity based on the effects to people and structures. Ranges from I (low) to XII (total destruction), as opposed to the Richter scale, which measures the energy of the earthquake. Mercalli scale is often used to classify earthquakes that were not recorded on modern seismographs.

***National Environmental Policy Act (NEPA) of 1969*:** A federal law constituting the basic national charter for protection of the environment. The act calls for the preparation of an environmental impact statement (EIS) for every major federal action that may significantly affect the quality of the human or natural environment. The main purpose is to ensure that environmental information is provided to decision makers so that their actions are based on an understanding of the potential environmental and socioeconomic consequences of a proposed action and the reasonable alternatives.

***National Historic Preservation Act (NHPA)*:** A federal law providing that property resources with significant national historic value be placed on the National Register of Historic Places. It does not require permits; rather, it mandates consultation with the proper agencies whenever it is determined that a proposed action might impact a historic property.

National Pollutant Discharge Elimination System (NPDES): A federal permitting system controlling the discharge of effluents to surface waters of the United States and regulated through the *Clean Water Act*, as amended.

National Register of Historic Places (NRHP): A list of districts, sites, buildings, structures, and objects of prehistoric or historic local, state, or national significance. The list is maintained by the Secretary of the Interior.

Nitrogen dioxide: A brownish, highly reactive gas that is present in all urban atmospheres. Nitrogen dioxide can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. The major mechanism for the formation of nitrogen dioxide in the atmosphere is the oxidation of the primary air pollutant nitric oxide. Nitrogen oxides, together with volatile organic carbons, play a major role in the atmospheric reactions that produce ozone. Nitrogen oxides form when fuel is burned at high temperatures. The two major emissions sources are transportation and stationary fuel combustion sources such as electric utility and industrial boilers.

Non-Attainment Areas: An area that has been designated by the Environmental Protection Agency, or the appropriate state air quality agency, as exceeding one or more national or state Ambient Air Quality Standards.

Normal operations: Conditions during which facilities and processes operate as expected or designed. In general, normal operations include the occurrence of some infrequent events that, although not considered routine, are not classified as accidents.

Ozone: A photochemical (formed in chemical reactions between volatile organic compounds and nitrogen oxides in the presence of sunlight) oxidant and the major component of smog. Exposure to ozone for several hours at low concentrations has been shown to significantly reduce lung function and induce respiratory inflammation in normal, healthy people during exercise. Other symptoms include chest pain, coughing, sneezing, and pulmonary congestion.

Outfall: The place where effluent is discharged into receiving waters.

Particulate matter: Materials such as dust, dirt, soot, smoke, and liquid droplets that are emitted into the air by sources such as factories, power plants, cars, construction activity, fires, and natural windblown dust. Exposure to high concentrations of particulate matter can affect breathing, aggravate existing respiratory and cardiovascular disease, alter the body's defense systems against foreign materials, damage lung tissue, and cause premature death.

Personnel monitoring: The use of portable survey meters to determine the amount of radioactive contamination on individuals; or, the use of dosimetry to determine an individual's occupational radiation dose.

Pigtail operations: Refers to the activities related to the connection and disconnection of the valving and hosing associated with feed and withdrawal operations.

Point source: A source of effluents that is small enough in dimensions that it can be treated as if it were a point. A point source can be either a continuous source or a source that emits effluents only in puffs for a short time.

Pollutant: Any material entering the environment that has undesired effects.

Pollution: The addition of an undesirable agent to the environment in excess of the rate at which natural processes can degrade, assimilate, or disperse it.

Pollution prevention: The use of any process, practice, or product that reduces or eliminates the generation and release of pollutants, hazardous substances, contaminants, and wastes, including those that protect natural resources through conservation or more efficient utilization.

Prime farmland: Land with the best combination of physical and chemical characteristics for economically producing high yields of food, feed, forage, fiber, and oilseed crops with minimum inputs of fuel, fertilizer, pesticides, and labor. Prime farmland includes cropland, pastureland, rangeland, and forestland.

Rad: The special unit for radiation absorbed dose, which is the amount of energy from any type of ionizing radiation (e.g., alpha, beta, gamma, neutrons, etc.) deposited in any medium (e.g., water, tissue, air). A dose of one rad means the absorption of 100 ergs (a small but measurable amount of energy) per gram of absorbing tissue (100 rad = 1 gray).

Radiation (ionizing radiation): Alpha particles, beta particles, gamma rays, x-rays, neutrons, high-speed electrons, high-speed protons, and other particles capable of producing ions. Radiation, as used in 10 CFR Part 20, does not include non-ionizing radiation, such as radio- or microwaves, or visible, infrared, or ultraviolet light. (see also 10 CFR 20.1003)

Radiation standards: Exposure standards, permissible concentrations, rules for safe handling, regulations for transportation, regulations for industrial control of radiation, and control of radioactive material by legislative means.

Radioactivity: The spontaneous decay or disintegration of unstable atomic nuclei, accompanied by the emission of radiation. Eventually the unstable nuclei reach a stable state.

Radionuclide: An atom that exhibits radioactive properties. Radionuclides can be man-made or naturally occurring, can have a long life, and can have potentially mutagenic or carcinogenic effects on the human body.

Region of influence (ROI): The physical area that bounds the environmental, sociological, economic, or cultural features of interest for the purpose of analysis. A site-specific geographic area that includes the counties where approximately 90 percent of the site's current employees reside.

Rem: The acronym for roentgen equivalent man is a standard unit that measures the effects of ionizing radiation on humans. The dose equivalent in rems is equal to the absorbed dose in rads multiplied by the quality factor of the type of radiation (see 10 CFR 20.1004).

Remediation: Action taken to permanently remedy a release, or threatened release, of a hazardous or radioactive substance to the environment, instead of or in addition to removal.

***Resource Conservation and Recovery Act (RCRA*):** A federal law that provides for a "cradle-to-grave" regulatory program for hazardous waste, including a system for managing hazardous waste from its generation to its ultimate disposal.

Restricted area: Any area to which access is controlled for the protection of individuals from exposure to radiation and radioactive materials.

Roentgen: A unit of exposure to ionizing radiation. It is the amount of gamma or x-rays required to produce ions resulting in a charge of 0.000258 coulombs/kilogram of air under standard conditions. Named after Wilhelm Roentgen, the German scientist who discovered x-rays in 1895.

Runoff: The portion of rainfall that is not absorbed by soil, evaporated, or transpired by plants, but finds its way into streams directly or as overland surface flows.

Sanitary/industrial waste: Nonhazardous, nonradioactive liquid and solid waste generated by normal housekeeping activities.

Sediment: Eroded soil particles that are deposited downhill or downstream by surface runoff.

Shielding: Any material or obstruction that absorbs radiation and thus tends to protect personnel or materials from the effects of ionizing radiation.

Sievert (Sv): A unit of radiation dose used to express a quantity called equivalent dose**.** This relates the absorbed dose in human tissue to the effective biological damage of the radiation by taking into account the kind of radiation received, the total amount absorbed by the body, and the tissues involved. Not all radiation has the same biological effect, even for the same amount of absorbed dose**.** One sievert is equivalent to 100 rem.

Site characterization: An onsite investigation at a known or suspected contaminated waste or release site to determine the extent and type(s) of contamination.

Source material: Uranium or thorium ores containing 0.05 percent Uranium or Thorium regulated under the *Atomic Energy Act*. In general, this includes all materials containing radioactive isotopes in concentrations greater than natural and the byproduct (tailings) from the formation of these concentrated materials

Special nuclear material: Plutonium, uranium-233, or uranium enriched in the isotopes uranium-233 or uranium-235.

State Historic Preservation Officer (SHPO): The state officer charged with the identification and protection of prehistoric and historic resources in accordance with the *National Historic Preservation Act*.

Subsidence: The process of sinking or settling of a land surface due to natural or artificial causes.

Sulfur dioxide: A gas emitted largely from stationary sources such as coal and oil combustion, steel and paper mills, and refineries. It is a primary contributor to acid rain and contributes to visibility impairments in large parts of the country. Exposure to sulfur dioxide can affect breathing and may aggravate existing respiratory and cardiovascular disease.

Surface water: Water located on the surface of the Earth in water bodies such as lakes, rivers, streams, ponds, wetlands, and the ocean.

Tails: In the uranium enrichment process, tails refers to gas with a reduced concentration of the uranium-235 isotope.

Threatened Species: Plant and wildlife species that are likely to become endangered in the foreseeable future.

***Toxic Substances Control Act (TSCA)*:** A federal law authorizing the U.S. Environmental Protection Agency to secure information on all new and existing chemical substances and to control any of these substances determined to cause unreasonable risk to public health or the environment. This law requires that the health and environmental effects of all new chemicals be reviewed by the EPA before such chemicals are manufactured for commercial purposes.

Uranium: A radioactive element with the atomic number 92 and, as found in natural ores, an atomic weight of approximately 238. The two principal natural isotopes are uranium-235 (0.7 percent of natural uranium), which is fissile, and uranium-238 (99.3 percent of natural uranium), which is fissionable by fast neutrons and is fertile. Natural uranium also includes a minute amount of uranium-234.

Visual Resource Management (VRM): A process devised by the Bureau of Land Management to assess the aesthetic quality of a landscape and to design proposed activities in a way that would minimize their visual impact on that landscape. The process consists of a rating of site visual quality followed by a measurement of the degree of contrast between the proposed development activities and the existing landscape.

Visual and Scenic Resources: Natural or developed landscapes that provide information for an individual to develop their perceptions of the area. The size, type, gradient, scale, and continuity of landforms, structures, land use patterns, and vegetation are all contributing factors to an area's visual character and how it is perceived.

Volatile Organic Compounds (VOCs): Organic compounds that easily volatize or evaporate and can break down through photodestructive mechanisms. VOCs contribute to air pollution, especially the generation of tropospheric ozone (O_3).

Waste management: The planning, coordination, and direction of functions related to generation, handling, treatment, storage, transportation, and disposal of waste. It also includes associated pollution prevention and surveillance and maintenance activities.

Waste minimization: An action that economically avoids or reduces the generation of waste by source reduction and recycling; or reduces the toxicity of hazardous waste, improving energy usage.

Water resources: This term includes both freshwater and marine systems, wetlands, floodplains, and ground water.

Well field: Area containing one or more wells that produce usable amounts of water.

Wetlands: Land or areas exhibiting the following characteristics: hydric soil conditions; saturated or inundated soil during some part of the year and plant species tolerant of such conditions; also, areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, under normal circumstances, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

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APPENDIX J
PUBLIC COMMENTS ON THE DRAFT
ENVIRONMENTAL IMPACT STATEMENT

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APPENDIX J
PUBLIC COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

J.1 Introduction

The U.S. Nuclear Regulatory Commission (NRC) staff published a notice in the Federal Register requesting public review and comment on the Draft Environmental Impact Statement (Draft EIS) on September 8, 2005 (70 FR 53396) in accordance with Title 10, Parts 51.73, 51.74, and 51.117 of the U.S. Code of Federal Regulations (10 CFR § 51.73, 51.74, and 51.117). The official public comment period began with publication of the Environmental Protection Agency's Notice of Availability on September 9, 2005 (70 FR 53657). The NRC staff established October 24, 2005 as the deadline for submitting public comments on the Draft EIS, consistent with the cited NRC regulations. Approximately 15 commenters (one commenter submitted letters and statements from 8 individuals and one commenter provided two submittals) provided nearly 25 documents (i.e., letters, facsimiles, and e-mails) to the NRC. In addition, oral comments were received from 17 individuals at a public meeting conducted by the NRC staff on September 29, 2005.

Public Participation

Public participation is an essential part of the environmental review process. This section discusses the process for public participation during the NRC staff's development of the EIS for the proposed American Centrifuge Plant (ACP). The NRC conducted an open, public EIS development process consistent with the requirements of the National Environmental Policy Act of 1969 (NEPA) and the NRC's regulations (detailed discussions follow). The NRC held a public scoping meeting early in the environmental review process (January 18, 2005) and a public meeting on the Draft EIS during the public comment period (September 29, 2005). The NRC provided a 48 day public comment period for agencies and the public to review the Draft EIS and provide comments. This EIS considers and addresses the nearly 300 individual comments the NRC staff identified from letters, facsimile transmittals, and e-mails received from approximately 15 individuals and from oral comments given by approximately 17 individuals.

Initial Notification and Notice of Formal Proceeding

Upon receipt of USEC's application for the proposed ACP and completion of an initial acceptance review, the NRC published a notice in the Federal Register (69 FR 61411) of receipt of the application and notice of hearing on October 18, 2004.

Public Scoping

The NRC's public scoping process for the EIS began on October 15, 2004, with the publication in the Federal Register (69 FR 61268) of a Notice of Intent to prepare an EIS (NOTE: An amended Notice of Intent was published on December 29, 2004 (69 FR 78058) that described a revised meeting time and location). As part of this process, the NRC conducted a public scoping meeting in Piketon, Ohio, on January 18, 2005. At this meeting, the NRC staff provided a description of NRC's role, responsibilities, and mission; gave a brief overview of its environmental and safety review processes; discussed how the public could effectively participate in the environmental review process; and solicited input from the general public on environmental concerns related to the proposed ACP. The NRC postponed the originally scheduled public scoping meeting in Piketon, Ohio from November 15, 2004 to January 18,

2005 after removal of public documents from the NRC public reading room and website for several weeks in November 2004 due to security concerns. Due to this delay, the public scoping comment period was extended from December 6, 2004 until February 1, 2005.

Issuance and Availability of the Draft EIS

On September 8, 2005, in accordance with NRC regulations, the NRC staff published a Notice of Availability for the Draft EIS in the Federal Register (70 FR 53396). In the notice, the NRC staff provided information on how to obtain a free copy of the Draft EIS. Additionally, copies of the Draft EIS were mailed to approximately 70 individuals including Federal, Tribal, State, and local government officials as well as members of the general public. An electronic version of the document and supporting information was made accessible through the NRC's project-specific web site (http://www.nrc.gov/materials/fuel-cycle-fac/usecfacility.html) and through the NRC's Agencywide Documents Access and Management System database on the NRC's web site.

Public Comment Meeting

On September 29, 2005 in Piketon, Ohio, the NRC staff conducted a public meeting to receive oral comments on the Draft EIS from members of the public. The NRC staff selected the city of Piketon as the location for the meeting because it is a few miles from the proposed ACP site. The NRC staff advertised this meeting in the local and regional newspapers including the Portsmouth Daily Times and the Columbus Dispatch as well as on several radio stations including WXIZ.

Seventeen people provided oral comments during the meeting. A certified court reporter recorded the oral comments and prepared a written transcript. The transcript is provided in Appendix K of this EIS. The transcript is part of the public record for the proposed project and was used in the development of the comment summaries contained in Appendix J.

Comments Received on the Draft EIS

As discussed above, the NRC staff received both oral and written comments on the Draft EIS during the comment period. The NRC staff identified approximately 300 comments in the more than 18 letters, facsimiles, and e-mails received and from the oral comments.

Comment Review

The NRC staff reviewed each comment letter and the transcript of the public meeting. Comments relating to similar issues and topics were grouped, as permitted by NRC regulations in 10 CFR § 51.91 and the Council on Environmental Quality's NEPA regulations at 40 CFR § 1503.4(b). Appendix J presents the comments, or summaries of comments, along with the NRC staff's corresponding responses. When comments have resulted in a modification to the Draft EIS, those changes are noted in the staff's response. In cases for which the comments do not warrant a detailed response, the NRC staff provides an explanation as to why no further response is necessary. In all cases, the NRC staff sought to respond to all comments received during the public comment period.

Appendix J provides summaries of all substantive comments received on the Draft EIS. The NRC staff prepared responses for each of the comments or for summaries of comments.

Major Issues and Topics of Concern

The majority of the comments received specifically addressed the scope of the environmental reviews, analysis, and issues contained in the Draft EIS, including existing conditions, potential impacts, proposed mitigation, and the NRC's environmental review process. However, other comments addressed topics and issues that were not part of the review process for the proposed action. Those comments included questions about the NRC's safety evaluation of the proposed uranium enrichment facility, security concerns, general statements of support or opposition to nuclear power, and observations regarding past USEC activities.

Comments on Out-of-Scope Topics

Some commenters raised issues that were not related to the NRC staff's environmental review of USEC's application to construct, operate, and decommission the proposed ACP. These issues are identified below. Because these issues did not directly relate to the environmental effects of the proposed action and were outside the scope of the NEPA review of the proposed action, the NRC staff did not prepare detailed responses to these comments.

Public Hearing

By law, a license to construct and operate the proposed ACP cannot be issued until completion of a hearing before the NRC's Atomic Safety and Licensing Board. Notice of the hearing, including guidance on certain aspects, was provided by the Commission in a notice published in the Federal Register on October 18, 2004 (69 FR 61411). Thereafter, a Licensing Board comprised of three administrative judges was established to conduct the hearing. Mr. Geoffrey Sea and Portsmouth/Piketon Residents for Environmental Safety and Security were granted standing by the Commission on May 12, 2005 (CLI-05-11). The Licensing Board made a decision on October 7, 2005 that neither intervenor had submitted an admissible contention on the proposed ACP. Currently, this ruling has been appealed to the NRC Commission. Nonetheless, the Licensing Board will conduct a mandatory hearing. Following completion of these hearings, the Licensing Board will issue a final decision as to whether the requested license should be issued. The evidence submitted during the hearing and the decisions of the Licensing Board are publically available except to the extent that they contain proprietary or sensitive security information.

Public Participation in the NRC Environmental Review Process

The NRC's environmental review began with the receipt and docketing of an application, which is described above. Pursuant to 10 CFR § 51.60, an applicant for an NRC license to construct and operate a uranium enrichment facility must submit an environmental report to the NRC with the application. In support of its licensing decision for a uranium enrichment facility, the NRC is required under 10 CFR § 51.20(b)(10) to prepare an EIS, and pursuant to 10 CFR § 51.26, to issue a Notice of Intent to prepare the EIS, which is published in the Federal Register. In the Notice of Intent, the NRC staff described, among other things, the scoping process proposed for the requested action. A public meeting on the scoping process was held in Piketon, Ohio on January 18, 2005 to receive both oral and written comments from interested parties. Pursuant to 10 CFR § 51.28, the NRC staff invited designated persons to participate in the scoping process, including any person who requested to participate.

Once the NRC staff has completed the scoping process, defined the proposed action, and determined the scope of the EIS, the staff prepares a Draft EIS. During the development of the Draft EIS, NRC sought

input from a number of sources, including State government agencies, Tribal governments, and individuals identified as consulting parties. Pursuant to 10 CFR § 51.74, the NRC staff then made the Draft EIS publicly available, published notice of the Draft EIS's availability in the Federal Register, and requested public comment on it. As specified in 10 CFR § 51.73, the minimum public comment period is 45 days. The NRC staff also distributed copies of the Draft EIS to the persons or organizations identified in 10 CFR § 51.74 including the U.S. Environmental Protection Agency (EPA), certain State and local agencies, Indian Tribes, and, upon written request and to the extent copies are available, to any other person. After receipt and consideration of public comments on the Draft EIS, the NRC staff prepares a Final EIS pursuant to 10 CFR § 51.90 and 51.91.

NRC Safety Review Process

The NRC staff evaluates a license application to determine whether an applicant has demonstrated compliance with the regulatory requirements which pertain to the type of license being sought. In the case of the present license application from USEC to construct, operate, and decommission a uranium enrichment facility, the NRC staff evaluated the application against the Commission's regulations found at 10 CFR Part 70. The NRC staff's evaluation of an applicant's demonstration of compliance with the regulations is documented in a Safety Evaluation Report. The NRC staff evaluates an applicant's attempt to demonstrate compliance with the regulations by reviewing the license application against the regulations. Requests by the NRC staff for additional information from the applicant are made publicly available. However, there is no requirement for a formal public comment resolution process for Safety Evaluation Reports.

Commenter and Comment Identification

The NRC staff received 15 comment documents (one commenter submitted letters and statements from 8 individuals and one commenter provided two submittals). The NRC staff assigned an identification number to each commenter, which will aid the reader in locating comments submitted by individual commenters and the NRC staff’s corresponding responses. Comment numbers beginning with the letters PMT refer to comments summarized from the transcript of the public meeting held in Piketon, Ohio on September 29, 2005. All remaining comment numbers reflect written comments received during the public comment period on the Draft EIS (e.g., 001).

Commenter Name	Affiliation	Commenter Number	Section(s)
Arnold, E.D.	Member of the Public	012	J.7
Arnold, Kathy	Member of the Public	PMT-015	J.4, J.7, J.9, J.11
Baker, Deborah	Member of the Public	PMT-002	J.2, J.4, J.11, J.19
Beegle, Charles W.	Member of the Public	010-2	J.11
Beekman, Blaine	Member of the Public	PMT-013; 011	J.3, J.11
Cheznik, Michael T.	United States Department of Interior	013	J.11
Cimprich, John and Vickie	Member of the Public	001	J.2
Colley, Vina	Member of the Public	PMT-003	J.2, J.4, J.7, J.11, J.19
Cowan, Frank	Member of the Public	010-8	J.19
Feight, Andrew	Member of the Public	PMT-017	J.11, J.19
Galanti, Maria	Ohio Environmental Protection Agency	005	J.9, J.10, J.11, J.15
Hancock, John	Member of the Public	010-5; 010-8	J.19
Kaniatobe, Karen	Absentee Shawnee Tribe of Ohio	010-6	J.19
Kennedy, MarJean	Governor's Office	PMT-011	J.2, J.10
Kennedy, Roger G.	Member of the Public	010-4	J.19
King, Thomas	Member of the Public	008	J.8, J.10, J.11, J.17
Kite, Fred	Member of the Public	PMT-001	J.3
Manuta, Dr.	Member of the Public	PMT-007	J.3, J.11, J.14, J.18, J.19
Marida, Pat	Central Ohio Sierra Club	PMT-014; 009	J.7, J.11, J.19
McCosker, Loraine	Member of the Public	004	J.2, J.4, J.7, J.9, J.11, J.19
Newman, Judy on behalf of Congressman Ted Strickland	State Elected Official	PMT-012	J.3
Pope, Chief Hawk	Shawnee Nation, United Remnant Band	010-7	J.19
Proctor, Robert N.	Member of the Public	010-1	J.8, J.9
Puchstein, Jean	Member of the Public	PMT-006	J.2, J.4, J.7, J.9, J.11
Rainey, Carol	Member of the Public	PMT-008; 006	J.2, J.11

Commenter Name	Affiliation	Commenter Number	Section(s)
Sea, Geoffrey	Member of the Public	PMT-010; 010[a]	J.6, J.8, J.11
Snyder, David	Ohio Historic Preservation Office	002	J.9, J.10, J.11
Swain, Lorry	Member of the Public	PMT-004; 007	J.2, J.4, J.11, J.19
Tinianow, Jerome C.	Audubon Ohio	010-3	J.19
Toelle, Steven A.	USEC	015	J.5, J.9, J.10, J.11, J.13, J.14, J.15, J.16
Wahley, Lois	Member of the Public	PMT-009	J.6, J.9
Walker, Nancy	Member of the Public	PMT-016	J.11
Weiner, Alan	Member of the Public	PMT-005	J.9, J.11, J.19
Westlake, Kenneth A.	United States Environmental Protection Agency	014	J.5, J.6, J.7, J.8, J.9, J.10, J.11, J.13, J.18
Young, Elisa	Member of the Public	003	J.2, J.4, J.11, J.19

Notes:
[a] Commenter number 010 submitted as part of their comments a series of attachments from other commenters which are numbered 010-1 through 010-8.

J.2 General Opposition

Comment: PMT-002-4
A commenter stated that although the proposed ACP at Piketon apparently has a better than average Occupational Safety and Health Administration safety record, a whistleblower was reportedly fired and the commenter questioned whether this would lead to safety concerns possibly not being openly discussed and addressed at the plant or by NRC.

Response: In evaluating applications, the NRC conducts a safety review, which is documented in a Safety Evaluation Report. The purpose of a Safety Evaluation Report is to evaluate the safety of an applicant's proposed action. NRC encourages any safety concerns to be openly discussed and addressed at all times. The proposed ACP would only be licensed if the NRC finds that public health and safety and the environment would be adequately protected.

Additionally, operation of the proposed ACP would be subject to inspections and reviews of operating procedures and required reports. Thus, the NRC would continue to review compliance with applicable NRC requirements, should NRC grant a license and the proposed ACP be constructed and operated.

Comment: PMT-002-7; PMT-003-1; PMT-003-2; PMT-003-8
Several commenters expressed concern over liability and sovereign immunity issues. Commenters asked who would be responsible for compensating workers after an illness such as cancer was discovered, which may occur long after a company has been at the site. They questioned whether the liability resides with the U.S. Department of Energy (DOE), USEC, NRC or companies, and noted that many smaller companies are out of business by the time an illness is determined. The commenters stated that there are

ill workers currently not being compensated. The commenters also challenged NRC to sign a legal document stating the proposed plant would not cause harm to workers or the community.

Response: The NRC shares the commenters' concerns about worker health and safety. The NRC occupational health and safety review is designed to limit exposure to radiological and non-radiological materials. Further, the proposed ACP would only be licensed if the NRC finds that public health and safety would be adequately protected. Section 4.2.12 of the EIS addresses the potential impacts to worker health. The analysis indicates that impacts associated with occupational exposures in the workplace should be small.

Comment: PMT-006-5; 001-1; 004-9; 007-5; 003-10; 006-4
Commenters expressed their opposition to granting an NRC license to USEC for the proposed project. Commenters stated their general belief that safety issues are not adequately addressed in the Draft Environmental Impact Statement and enriched uranium is not a safe product. Therefore, NRC should deny issuing a license to USEC for the proposed ACP at Piketon because the potential benefits do not outweigh the potential damage. Another commenter stated that no license should be granted because the site has not yet been cleaned up from operation of the gaseous diffusion plant and that the plant is not healthy for the environment of southern Ohio or anywhere else.

Response: The proposed ACP would only be licensed if the NRC finds that public health and safety and the environment would be adequately protected. The conclusions regarding environmental impacts provided in section 4.2.12 of the Draft EIS have not changed. Safety issues that are not within the scope of the EIS are addressed in the NRC's Safety Evaluation Report.

J.3 General Support

Comment: PMT-007-2; PMT-007-6; PMT-011-3; PMT-012-1; PMT-013-1
Several commenters expressed general support for the proposed ACP. One commenter viewed NRC involvement and licensing process as an improvement compared to the gaseous diffusion "era" when little to no information was provided to workers. One commenter noted the potential benefit of power generation that does not use carbon-bearing chemicals. One commenter stated the facility would be beneficial to the economy and expressed support about the deployment of advanced enrichment technology in southern Ohio. Several commenters praised NRC involvement and wanted to ensure that NRC regulators were getting correct information.

Response: The NRC acknowledges the comments in support of the proposed action.

J.4 NEPA Process

Comment: PMT-001-1
A commenter questioned when would an NRC license be granted if the Final EIS were issued by April 2006.

Response: The NRC Commission has issued an order for a 30-month review process from the submittal of the application to the final decision. Based on this 30-month schedule, a final decision on the license application would be made in February 2007. The NRC would only approve the license application after the EIS and Safety Evaluation Report are complete and the Atomic Licensing and Safety Board has completed its hearing process, and it has been concluded that the construction, operation, and decommissioning of the proposed ACP would meet its environmental and safety requirements.

Comment: PMT-002-3
A commenter requested the names of the Judges who will oversee the hearing process for the license application.

Response: The Atomic Licensing and Safety Board conducts hearings for the NRC and performs some other regulatory functions. On October 7, 2004, the board for the proceeding was announced, and includes the following members: The Chief Administrative Judge is Lawrence G. McDade. The two Associate Chief Administrative Judges are Richard E. Wardwell and Paul B. Abramson.

Comment: PMT-006-1
A commenter questioned if all scoping comment letters were going to be made available in their entirety instead of in a summary format.

Response: The letters that were submitted during the scoping period are a matter of public record and are available from NRC's public document room which is available online at http://www.nrc.gov/reading-rm/adams/web-based.html. *Select the "Web-based access" link and on the following webpage, select the "Begin ADAMS Search" link. To find all publicly available documents type in "Docket 07007004" and click the "Search" link. This search may be narrowed by selecting the "Advanced Search" link, typing in "07007004" in the Docket Number field and any other appropriate keyword related to the subject of interest in the various fields that are present.*

Comment: PMT-015-4; 004-2
Commenters expressed concern that per 40 CFR 1503, the NRC staff has been negligent to respond in a satisfactory manner to the scoping comments submitted by opponents of the proposed ACP on the Draft EIS.

Response: All comments received during the scoping process are a matter of public record and are available from NRC's public document room which is available online at http://www.nrc.gov/reading-rm/adams/web-based.html. *Select the "Web-based access" link and on the following webpage, select the "Begin ADAMS Search" link. To find all publicly available documents type in "Docket 07007004" and click the "Search" link. This search may be narrowed by selecting the "Advanced Search" link, typing in "07007004" in the Docket Number field and any other appropriate keyword related to the subject of interest in the various fields that are present.*

Section 1 of the EIS identifies the issues raised by public scoping comments that relate to implementation of the proposed action. Issues determined to be within the scope of the EIS were studied in detail. A summary of scoping comments also is provided in Appendix A Section 2. As required under the NRC's regulations at 10 CFR 51.29, the NRC has considered all scoping comments from the public and prepared a concise summary of the determinations and conclusions reached.

Comment: 003-2
A commenter requested that a separate EIS be conducted that would address additional depleted uranium tailings that may be generated by USEC. The commenter noted the EIS states that additional tailings generated by ACP would be processed on site, and questioned whether this activity has been approved. The commenter questioned if an additional 200,000 tons either from Ohio or New Mexico (in the Louisiana Energy Services application) would be enough to trigger an additional EIS because the conversion facility is not constructed or operational. The commenter also noted NRC has not provided a formal response to this query.

Response: NRC performs environmental reviews for each of our licensing and regulatory actions and actively seeks public input on environmental impacts during the reviews.

In accordance with NEPA, its implementing regulations, and NRC regulations for implementing NEPA, NRC reviewed the impacts of reasonable foreseeable future actions associated with the development of the proposed ACP.

As stated in Section 2.1.4.3 Facility Operation, USEC proposes to transport the depleted UF_6 generated at the proposed ACP to this new UF_6 conversion facility on the DOE reservation in Piketon. This plan is based on Section 3113 of the 1996 United States Enrichment Corporation Privatization Act that states the DOE "shall accept for disposal low-level radioactive waste, including depleted uranium if it were ultimately determined to be low-level radioactive waste, generated by [...] any person licensed by the Nuclear Regulatory Commission to operate a uranium enrichment facility under Sections 53, 63, and 193 of the Atomic Energy Act of 1954 (42 U.S.C. 2073, 2093, and 2243)." On January 18, 2005, the Commission issued its ruling that depleted uranium is considered a form of low-level radioactive waste (NRC, 2005). The Commission also stated that disposal of depleted uranium tails at a DOE facility represents a plausible strategy for the disposition of depleted uranium tails (NRC, 2005).

In addition, DOE analyzed the impacts of the operation of a conversion facility in the "Final Environmental Impact Statement for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Portsmouth, Ohio site." DOE/EIS-0360, Oak Ridge Operations, Office of Environmental Management, U.S. Department of Energy, June, 2004. Should a new conversion facility be developed an environmental review in accordance with NEPA would be completed. DOE has maintained that, with routine facility and equipment maintenance, periodic equipment replacements, or upgrades, the conversion facility could be operated safely beyond the 18-year planned life-time period to process the additional depleted UF_6 from the proposed ACP. In addition, DOE indicates the estimated impacts that would occur from prior conversion facility operations would remain the same when processing the proposed ACP wastes. The overall cumulative impacts from the operation of the conversion facility would extend proportionately with the increased life of the facility (DOE, 2004a).

Comment: 003-11
A commenter requested additional time to review the Draft EIS and submit comments.

Response: The NRC reviewed the comments requesting additional time to comment and concluded that the participation process had provided sufficient time and opportunities for the public to bring forward issues and concerns for the NRC's consideration. The NRC provided a 48-day comment period on the Draft EIS. A 45-day period is generally provided under NRC regulations (10 CFR § 51.73). In view of the NRC staff efforts to solicit public involvement in the EIS scoping process, and public meeting held during the comment period, the NRC staff concluded that an additional extension of the comment period was not warranted. The NRC received hundreds of written comments from 15 commenters plus 17 public commenters at the public meeting by the October 24, 2005, comment period closing date. Additional information on the opportunity for comment during the public comment period is provided in section J.1.

Role of the NRC

Comment: PMT-003-4
A commenter questioned who would regulate special nuclear material and transuranic waste at the site.

Response: The NRC is responsible for regulating the use of special nuclear material which consists of enriched uranium and plutonium. USEC's possession limits for these two radionuclides are provided in Table 1.2-1 of the ACP License Application. Transuranic wastes are regulated by the EPA which develops environmental standards and Federal radiation protection guidance for offsite radiation due to the disposal of spent nuclear fuel and high-level and transuranic radioactive wastes. (http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/radwaste.html)

Comment: PMT-004-2
A commenter questioned whether the NRC has ever not licensed an applicant for any type of facility, other than Louisiana Energy Services, which was denied in a couple of places, but is still under application.

Response: Throughout the NRC's regulatory history, there have been cases where an application has not been approved. An application will be approved only after it has undergone technical and environmental review and has successfully demonstrated that it satisfies the NRC's regulatory requirements. If deemed necessary, the NRC will impose additional conditions on a license for the license applicant to improve safety or to meet regulations. In some instances this has resulted in the applicant withdrawing their application. With regard to Louisiana Energy Services, an application has never been denied. Louisiana Energy Services withdrew the application for a site in Louisiana, and is currently under review for a site in New Mexico.

J.5 Introduction and Background

Comment: 014-42
A commenter suggested that (Introduction, Section 1.5 Applicable Regulatory Requirement, Pages 1 -11 through 1-33) Executive Directive and Presidential Orders that make specific requirements on all Federal Agencies that would apply or impact the ACP project need to be included.

Response: Section 1.5.2 addresses all the applicable Executive Orders that were identified as having an impact on the proposed actions of this EIS.

Comment: 014-43
A commenter noted that (Introduction, Table 1-3, Pages 1-20 through 1-29) Table 1-3 is incomplete and suggested that all potential applicable requirements for the construction of the ACP have not been included and need to be thoroughly re-evaluated.

Response: The NRC conducted a complete review of state, local and federal requirements for the construction and operation of the ACP. No further requirements were identified in the preparation of the Final EIS.

Comment: 014-47
A commenter noted that (Page 1-4, Line 23) the Draft EIS states that the Portsmouth Gaseous Diffusion Plant is currently in "cold standby" mode (possible to restart in 18 to 24 months). The commenter suggested the Final EIS should include a schedule for when the facility will be placed into "cold iron"

mode (unable to be restarted) and become ready for decontamination and demolition work to proceed.

Response: The purpose of this EIS is to evaluate the potential environmental impacts of the construction, operation, and decommissioning of the proposed ACP. Thus, an evaluation of the status of the Portsmouth Gaseous Diffusion Plant is beyond the scope of this analysis.

Comment: 015-1
Commenter suggested changing "municipal" to "public" on line 30 of page 1-13.

Response: The NRC staff revised the text to reflect the commenter's suggestion.

Comment: 015-02
Commenter suggested changing "United States Enrichment Corporation" to "USEC Inc." on lines 23 and 26 of page 1-35.

Response: The NRC staff revised the text to reflect the commenter's suggestion.

J.6 Purpose and Need

Comment: PMT-009-1
A commenter wanted to know how much fuel from the proposed ACP would be produced, enough to supply five power plants, 10, or 100.

Response: The amount of enriched fuel that would be produced by the ACP would depend on the market for commercial nuclear power reactor fuel. The USEC Environmental Report indicated that it plans to produce 3.5 million separative work units (SWUs) initially with the capability of up to 7.0 million (SWUs) annually if the market warrants. According to USEC, it takes on the order of 100,000 SWU of enriched uranium to fuel a typical 1,000 megawatt commercial nuclear reactor for a year. Thus, the ACP at maximum capacity (i.e., 7 million SWU) could produce enough nuclear fuel to supply 70 commercial reactors for a year.

Comment: PMT-010-1
A commenter noted the Draft EIS states that one of the main justifications for the proposed ACP is that Paducah would be shut down and yet, the document states that Paducah would be needed to stay in operation to meet the total domestic demand for enriched uranium. The commenter suggested that acquiring cleaner technology and more efficient technology as the document purports is irrelevant if Paducah is not shut down.

Response: The Draft EIS does not state that Paducah needs to stay in operation to meet future demands. At the initial licensed capacity of 3.5 million SWUs, the proposed ACP would provide roughly 29 percent of the U.S. enrichment needs. Additionally, the NRC is evaluating the Louisiana Energy Services' proposed National Enrichment Facility as part of a separate proposed action with an output of an additional 3 million SWUs (25 percent). The combined output from the proposed ACP and National Enrichment Facility (6.5 million SWUs or 54 percent of U.S. demand) could offset the current output from the aging Paducah Gaseous Diffusion Plant (which currently supplies 14 percent of U.S. demand) and allow the Paducah plant to be retired. In addition, if USEC were to expand to a 7 million SWU capacity, USEC could contribute up to 58 percent of U.S. enrichment needs, in addition to the 25 percent that Louisiana Energy Services could produce.

Comment: 014-5
A commenter noted that (Page xix, line 41 and Page 1-5, Line 34) the justification of the rationale used for the Purpose and Need of the proposed project is insufficient and asked NRC to re-evaluate the aspect related to national security. The Draft EIS states, the commenter noted, that the proposed ACP is needed because only one uranium enrichment plant currently operates in the United States, the Paducah Kentucky Gaseous Diffusion Plant (Paducah Plant). A supply disruption with the Paducah Plant would leave the nation's commercial nuclear reactors fully dependent on foreign sources for enriched uranium-a situation which could impact national security. However, the Draft EIS also states that the Paducah Plant would be shut down, decontaminated, and decommissioned after ACP begins operating. Therefore, ACP would not satisfy the national security facet of the purpose and need of the proposed project, because the project would merely replace, instead of supplement, the nation's only operating uranium enrichment plant.

Response: The EIS does state that by 2020, the U.S. is estimated to need about 393 gigawatts or 393,000 megawatts of new generating capacity, and that enriched uranium will have to come from one or more new sources, such as the proposed ACP, to fulfill the shortfall in supply that may exist after that time. The shortfall is based on the projected growth in demand combined with the potential closure of the Paducah plant. The proposed action would help meet U.S. energy supply and national security goals by providing an additional reliable and economical domestic source of enriched uranium and to replace existing aging and less efficient uranium enrichment facilities.

Currently the Paducah Gaseous Diffusion Plant supplies approximately 14 percent of the U.S. enrichment needs. At a 3.5 million SWU capacity the proposed ACP would provide approximately 29 percent of the U.S. enrichment needs and at a 7 million SWU capacity would provide approximately 58 percent of the U.S. enrichment needs. In addition the NRC is evaluating the Louisiana Energy Services' National Enrichment Facility as part of a separate proposed action (NRC, 2005) with a proposed capacity of 3.0 million SWU or 25 percent of the U.S. enrichment needs. Combined these proposed facilities could provide up to 83 percent of future U.S. enrichment needs, thus reducing the dependence on foreign suppliers of enriched uranium.

Comment: 014-6
A commenter (Page 1 -2, Line 38 and footnote of Page 4-53) suggested there is a lack of a justification in the Draft EIS for the need to enrich uranium up to 10 percent by weight of uranium-235. According to the Draft EIS, the commenter stated, the license issued by NRC would authorize USEC Inc. (USEC) to produce enriched uranium up to 10 percent by weight of uranium-235. However, the Draft EIS also states that most power plants use enriched uranium with less than 5.5 percent of uranium-235 by weight, and that it would be unlikely for USEC to enrich uranium up to the higher weight. Finally, the Draft EIS states that, of the cylinders used to ship enriched uranium, none of them are certified to ship uranium enriched to higher than 5 percent by weight of uranium-235. Given that it would not be feasible for USEC to enrich uranium above 5 percent by weight of uranium-235 (for civilian use), the commenter suggested that NRC should explain why the proposed license would authorize a higher level of enrichment. If the project proponents foresee a scenario under which USEC would need to enrich uranium up to 10 percent of uranium-235, then that scenario should be documented in the Purpose and Need Section of the Final EIS. The commenter urged NRC to reconsider the limit of uranium enrichment cited in its license for USEC.

Response: The NRC staff evaluates a license application to determine whether an applicant has demonstrated compliance with the regulatory requirements which pertain to the type of license being sought. In the case of the present license application from USEC to construct, operate, and decommission a uranium enrichment facility, the NRC staff evaluated the application against the

Commission's regulations found at 10 CFR Part 70. The NRC's mandate is to ensure the safe use of nuclear materials and, as such, it must consider the issuance of licenses to applicants who wish to conduct operations involving these materials. Because USEC submitted an application for a license to enrich uranium up to 10 percent by weight of uranium-235, the NRC staff must evaluate that application as submitted.

The NRC is analyzing both the safety and environmental impacts of issuing a license that would allow enrichment to 10 percent. USEC has stated that they wish to maintain the operational flexibility for future business opportunities. Even if USEC demonstrates that they can safely enrich to 10 percent they would not do so until customers are found and then USEC would have to receive NRC approval for the larger shipping casks for transporting the product in a cost-effective manner as noted on page 4-53 of the EIS.

Comment: 014-7
A commenter noted (Executive Summary, Purpose and Need For the Proposed Action, Page xx, paragraph 1) the description appears to be incomplete and does not address the range or possibilities of materials that can be reasonably assumed to be produced at the proposed ACP citing the type and range of enrichments that have been conducted in past operations at the gaseous diffusion facility at the site.

Response: As described in Section 1.2, page 1-2 of the EIS, the proposed ACP would produce only low-enriched uranium for shipment to commercial nuclear power fuel fabricators; expected product recipients are listed in Section 2.1.4.3, page 2-27. The production of highly-enriched uranium for the Department of Defense is not considered part of the proposed action and is not under consideration in the NRC licensing review (see Section 1.3.1).

Comment: 014-8
A commenter noted that (Introduction, Section 1.3.2 The Need for Domestic Supplies of Enriched Uranium for National Energy Security, page 1-5, paragraph 1) it is unclear whether future inclusion of additional nuclear power plants and their needs for enriched fuel is taken into account. The commenter suggested to include at least one or two new plants and their potential needs to assure that a "more representative range" of possible customers for this facility's output is evaluated.

Response: At a capacity of 3.5 million SWUs, the proposed ACP would provide roughly 25 percent of the projected U.S. enrichment needs and allow the Paducah plant to be retired. However, as noted in the EIS, the USEC Environmental Report indicated that it plans to produce up to 7.0 million separative work units (SWUs) annually. This would allow the ACP to be a larger contributor to the nation's nuclear fuel needs and would help compensate for the addition of one or two new power plants. In addition, the NRC is evaluating the Louisiana Energy Services' National Enrichment Facility as part of a separate proposed action that would generate approximately 3 million SWUs (NRC, 2005).

J.7 Scope of the Environmental Analysis

Comment: PMT-003-3; PMT–015-1; 004-1; 009-3
Commenters suggested that the Draft EIS is not the result of an independent investigation and uses data that may not be accurate. Commenters cited the results the Piketon and Portsmouth Residents for Environmental Safety and Security analyses of contamination in Big Run Creek Water and questions DOE, USEC and Ohio EPA data from offsite sampling locations. The commenter urged NRC to conduct an independent investigation and conduct a critical analysis, and not rely on USEC or contractors at the facility, and suggested not to rely solely on the USEC application.

Response: The NRC has conducted an independent analysis of environmental impacts associated with the proposed action. The Energy Reorganization Act of 1974 established the NRC as an independent government agency whose mission is the protection of public health and safety and the environment from the commercial uses of nuclear materials. As an independent Federal agency, the NRC reports to Congress rather than the Executive Branch.

The NRC regulates licensees by conducting a thorough and independent review of each application for a license, consistent with its congressional mandate and the NRC's regulations for safety and environmental review. These regulations establish an independent review process to consider factual issues and contentions brought before the NRC. The NRC staff completed the environmental review described in the EIS and that review was consistent with NEPA as well as the Council on Environmental Quality implementing regulations (40 CFR Part 1500-1508) and the NRC's implementing regulations (10 CFR Part 51). Those regulations specify the procedures for reviewing potential environmental impacts and soliciting public review of the draft results and recommendations.

Throughout this review process, the NRC's only relationship with the applicant is the formal and open exchange of factual information about the application, safety evaluation, and environmental report. This exchange is completed through a process in which the applicant submits the license application, the NRC reviews the application and issues requests for additional information, and the applicant responds to the requests for additional information. All requests for additional information and responses are documented and are publicly available.

For the proposed ACP, the NRC staff were required to prepare an EIS. The EIS was based on the best scientific information available about the potential environmental impacts. This EIS was completed by the NRC staff and their consultants, independently of the applicant. When the applicant provided information, the NRC reviewed and verified the information, and conducted its own analysis of potential impacts. If comments on the Draft EIS provided specific corrections or additional information, the staff evaluated, considered, and addressed this information in this EIS, as appropriate.

Comment: PMT-003-5; PMT-015-1
A commenter suggested that the Draft EIS may not have adequately captured the costs of the proposed ACP, is not an independent investigation and is not fully open to public scrutiny due to relying on classified and proprietary information.

Response: Certain information that represents security or business proprietary concerns has been withheld from the EIS pursuant to 10 CFR 2.390. Although this information is not available to the public, it is reviewed and evaluated by the NRC in the Safety Evaluation Report and the EIS and will be considered in the NRC's final decision.

Comment: PMT-006-3
A commenter questioned the results of the Draft EIS analysis and the use of broad categories - small, medium, and large - to describe environmental effects. The commenter cited page xxii, and noted that no mention is made of centrifuges failing and the commenter questioned whether radiological impacts from routine transportation and transportation accidents is a "small" impact. The commenter indicated that NRC had done little in the way of independent investigation of the USEC application.

Response: The EIS specifically did evaluate the impacts of failed centrifuges in section 4.2.12.3. A much more detailed evaluation of the potential impacts of centrifuge failure is contained in the Safety

Evaluation Report. Section 4.1 of the EIS describes the process of determining the significance of potential environmental impacts.

Based on the Council of Environmental Quality's regulations and NRC guidance provided in NUREG-1748, each environmental impact is to be assigned a significance level of small, moderate, or large.

A discussion of NRC's approach to conducting an independent review is provided in the response to comment numbers PMT-003-3; MPT-015-1; 004-1; and 009-3 in this appendix.

Comment: 012-1
A commenter suggested the Draft EIS seems to omit any information or analysis about the product of the Centrifuge Facility, and the impacts of its use, and therefore, NRC cannot provide the favorable finding as described in the Draft EIS.

Response: The purpose of this EIS is to evaluate the potential environmental impacts of the construction, operation, and decommissioning of the proposed ACP. As the EIS indicates, the enriched uranium produced by the facility would be ultimately used in commercial nuclear power plants, which are licensed by NRC and are also subject to a NEPA review.

Comment: 014-1
A commenter stated the Draft EIS appears to evaluate this project as a generic case and recommended the Final EIS be focused on site-specific analyses, impacts, and mitigation. Some of the general descriptions, the commenter stated, of how the materials, source materials, product materials, and the waste materials will be handled and controlled at DOE's Portsmouth, Ohio Reservation (Portsmouth Reservation) appear to be incomplete and fragmented, which the commenter said made it difficult to properly evaluate whether or not requirements under other Federal regulations can be met with the necessary degree of completeness to authorize this project.

Response: The EIS is an analysis of the environmental impacts associated with the proposed action and is necessarily site-specific and based on anticipated construction and operational activities. For example, in Section 4.2.13 Waste Management Impacts, NRC analyzes the impacts associated with construction and operation. The waste management associated with construction analyzes site-specific impacts including the refurbishment of specific buildings, volumes of specific types of waste (sanitary, low-level radioactive, and recyclable), and the use of specific landfills, while the waste impacts associated with operation analyzes the use of specific depleted uranium storage cylinders, specifies the number of cylinders, the locations of the onsite storage yards, and reviews various long-term storage options. Further, aside from any NRC license issued to the applicant, the applicant is still responsible for complying with all other Federal, State, and local regulations and requirements. Tables 1-2 and 1-3 list the regulations that would apply for the construction and operation of the ACP. Granting a license does not excuse USEC from its obligations to comply with other Federal and state requirements.

Comment: 014-9
A commenter noted (Page 2-1, Line 44) the scope of the Draft EIS does not include decommissioning and related activities of the Paducah, Kentucky Gaseous Diffusion Plant and should. The scope, the commenter suggested, should include the cessation of all uranium enrichment operations at Paducah because the start of ACP's uranium enrichment operations and the cessation of uranium enrichment operations at the Paducah Plant are closely related.

Response: As discussed in Section 2.1 of the EIS, cessation of uranium enrichment activity is included, but decommissioning of the Paducah Gaseous Diffusion Plant, changes to any other activities at that site, or any alternate uses of the site in the future are considered out of the scope of this analysis. The decommissioning of the Paducah facility would be the subject of future DOE decisions and NEPA analysis which is beyond the scope of licensing the proposed ACP. These actions would be the subject of other decisions by agencies such as the DOE, and other environmental reviews under NEPA.

Comment: 014-10
A commenter suggested the Final EIS should discuss the former Portsmouth, Ohio gaseous diffusion plant, and any ACP interactions with it, considering that the Portsmouth plant is either in cold standby or cold iron and that the ACP will be in close proximity to it.

Response: The EIS discusses the Portsmouth Gaseous Diffusion Plant appropriately (e.g., use of ancillary facilities and cumulative impacts) but does not discuss the infrastructure of the plant because the operation of the proposed ACP is not dependent on this infrastructure.

Comment: 014-11
A commenter (Introduction, Section 1.2, The Proposed Action, Page 1-2, paragraph 5) noted the potential range of produced materials does not include the possibility of production for the Department of Defense. If this is potentially a reasonably assumed product, the commenter suggested it needs to be included for evaluation.

Response: As described in Section 1.2, page 1-2 of the EIS, the proposed ACP would produce only low-enriched uranium for shipment to commercial nuclear power fuel fabricators; expected product recipients are listed in Section 2.1.4.3, page 2-27. The production of highly-enriched uranium for the Department of Defense is not part of the proposed action and is not under consideration in the NRC licensing review.

Comment: 014-12
A commenter suggested (Introduction, Section 1.4, Scope of the Environmental Analysis, Page 1-7, paragraph 3) the scope of the environmental analysis may not meet the actual needs to be addressed for the new facility to be created and put into operation. The scope may need to be expanded to assure that all of the environmental issues are adequately addressed.

Response: The EIS analyzes impacts and actions considered to be within the scope of the proposed action as described in section 1.2. As described in Section 1.4.1, a public scoping process was used by the NRC to help identify the relevant issues to be discussed in detail and to help identify issues that are beyond the scope of the EIS, that do not warrant a detailed discussion, or that are not directly relevant to the assessment of potential impacts from the proposed action. Therefore, the NRC staff believes that the scope of the EIS adequately considers issues related to the proposed action that could have short- or long-term impacts on the environment.

Comment: 014-13
A commenter stated (Introduction, Section 1.4.4 Issues Outside the Scope of the EIS, Page 1-9) that this section artificially narrows the scope of this evaluation to exclude security issues relevant to this facility. Safety and Security, Credibility and Terrorism must be addressed in any project of this type. The Draft EIS is incomplete and inadequate to properly address these issues.

Response: Safety and security issues associated with the proposed ACP will be evaluated in the NRC staff's safety review. The results of that evaluation will be documented in the Safety Evaluation Report.

Any facility licensed by the NRC is required to fully comply with NRC regulations and license conditions, including those that relate to security.

Additionally, in The Matter of Private Fuel Storage, LLC *(Independent Spent Fuel Storage Installation), 56 NRC 340 (2002), the Commission held that it is not appropriate to address issues of terrorism within the context of NEPA. But, as stated in Commission Memorandum and Order CLI-02-24 (dated 12/18/2002), although the NRC has declined to consider terrorism in the context of NEPA, the NRC is devoting substantial time and attention to terrorism-related matters. For example, as part of fulfilling its mission to protect public health and safety and common defense and security pursuant to the Atomic Energy Act, the NRC staff is conducting vulnerability assessments of commercial uses of radioactive material. The NRC has assessed potential vulnerabilities of radioactive dispersal devices, dirty bombs, and other diversion type activities. The NRC has issued interim compensatory measures and a number of other orders imposing enhanced security requirements on its licensees. Also, the NRC has acted to increase security awareness in its applicants.*

Comment: 014-14
A commenter (Page 2-2, Line 26) suggested the Final EIS should identify: 1) all of the uranium enrichment projects expected for the facility; 2) all of the projects that the facility is capable of performing; 3) whether this facility will be reprocessing feed materials from spent nuclear fuel; and 4) whether this Final EIS encompasses all of the activities that an enrichment facility may be called to perform.

Response: NRC regulations for implementing NEPA require consideration of only those activities that are reasonably foreseeable under the proposed action. Section 1.2 and Section 2.1.4 provide details on the proposed action and the expected activities under each of the phases of the proposed action. Any potential activities of an enrichment facility that are possible but not within the scope of the proposed action, are out of the scope of this analysis. USEC intends to use natural uranium in the form of UF_6 for the proposed ACP. The intention is to not introduce feedstock contaminated with significant concentrations of other nuclides into the process. Feed material that meets the American Standards for Testing and Materials specification for recycled feed may be used, and may contain small quantities of radionuclides such as uranium-236 and technetium-99.

Comment: 014-15
A commenter suggested that (Page D-5) considering the amount of depleted uranium that will be generated by ACP operations, and since it's a credible option, the Final EIS should also assess the transportation of depleted uranium and other radioactive wastes to Andrews, Texas, and the location of another disposal facility that should have an Agreement State license for disposal within the next year.

Response: NRC identified and evaluated reasonable transportation points and corridors, including Gainesville, Florida; Clive, Utah; and the Nevada Test Site for processing and disposal of low-level radioactive waste. The analysis indicated that there would be no significant impacts. The sites analyzed in the EIS reasonably represent a range of radioactive waste disposal sites and present results that are representative of the impacts associated with the transportation of depleted uranium and other low-level radioactive wastes.

J.8 Agencies and Persons Consulted

Comment: PMT-010-5
A commenter said NRC was not fulfilling its obligation under section 106 of the National Historic Preservation Act because NRC had not included persons, including the owner of the Rittenour home, who asked to be consulted on the project. In addition, the commenter suggested that NRC needs to include a letter written to NRC from the owner of the Rittenour home in the Draft EIS.
Response: A letter from the owner of the Rittenour home was included in a petition for intervention, but did not include a request to be consulted on the project. The letter describes the writer's property as "the major portion is on the west side of State Route 23 and goes to the Scioto River."

Comment: 008-22
A commenter stated that Appendix B of the Draft EIS contains several form letters to Indian tribes asking them about "specific knowledge of any sites" that they believe "have traditional religious and cultural significance." The text indicates that the Absentee Shawnee reported knowledge of such a site -- the Scioto Township Works -- though the documentation expressing this concern, supposed to be in Appendix B, is not there. In any event, the letters do not reflect any sort of real consultation with the tribes; they are mere formletters that do not seem to have been followed up in any way. The commenter suggested NRC review the findings of the Tenth Circuit Court of Appeals in Pueblo of Sandia v. United States, 50 F3d 856 (10th Cir. 1995), as well as pertinent Advisory Council, National Register, and EPA guidance, and initiate real consultation with tribes.

Response: A letter from the Absentee Shawnee was included in a petition for intervention, but no specific information was included. The NRC staff made several attempts to establish consultation ties with the Absentee Shawnee Tribe (see response to Comment 008-11 in Section J.10) but never received any response. The Ohio Historic Preservation Office has received all Section 106 correspondence and did not object to NRC's efforts in its letter dated October 5, 2005, included in Appendix B.

Comment: 008-23
The commenter stated that Appendix B also includes correspondence with the State Historic Preservation Officer in which the State Historic Preservation Officer suggests a variety of representations, studies and consultations that NRC should undertake. It is not clear what, if anything, NRC has done in response to these suggestions.

Response: The NRC responded to the suggestions in the February 2005 letter from the State Historic Preservation Officer by including information in the EIS about previous ground disturbance in the area of proposed new construction, considering public concerns expressed in the petition for intervention and provided in scoping meetings, and explaining the basis for its conclusions that the project would have no effect on historic properties. Appendix B has been updated to include all available consultation correspondence, including the Ohio Historic Preservation Office letter dated October 5, 2005, which reaffirms Ohio Historic Preservation Office's interpretation that the proposed ACP will not adversely affect historic properties.

Comment: 008-24
The commenter stated that Appendix B also contains a letter to the Advisory Council on Historic Preservation in which NRC mentions, rather in passing, that it intends to "use the NRC's NEPA review processes for Section 106 purposes," and later indicates that the former will be used "in lieu of" the latter. The commenter indicated that this suggests an attempt by NRC to comply with 36 CFR 800.8(c) and substitute its NEPA compliance for completion of standard Section 106 review, but the commenter

suggested that NRC has done what 36 CFR 800.8(c) requires in order to effect such a substitution. It has notified the Advisory Council of its attempt to substitute, however the commenter indicated that there is no evidence that NRC has similarly notified the State Historic Preservation Officer. The notification to the Advisory Council came only very late in the NEPA process, the commenter suggested, and in such a manner (a short, vague paragraph buried in the middle of a longer missive) that it is easy to imagine the Council misunderstanding its intent. More importantly, NRC has engaged in virtually none of the consultation with interested parties required by 36 CFR 800.8(c), and there are, as indicated above, many questions about the quality of its efforts to identify and address historic preservation issues. The commenter suggested that NRC should not substitute NEPA compliance for standard Section 106 review, and initiate proper consultation with all concerned parties in accordance with 36 CFR 800.4.

Response: The NRC notified the State Historic Preservation Officer of its intent to coordinate NEPA and National Historic Preservation Act compliance in a December 2004 letter, included in Appendix B of the Draft EIS. The commenter is referred to the response to comment 008-11 in Section J.10 for descriptions of NRC's consultation efforts with tribes. The commenter is referred to the response to comment PMT-010-4 in Section J.11 regarding a request for consulting party status.

Comment: 008-25
The commenter stated that beyond properly complying with Section 106 of the National Historic Preservation Act, NRC should attend to Section 110(d) of the same statute, to the requirements of the Archaeological and Historic Preservation Act of 1974, the American Indian Religious Freedom Act, the Native American Graves Protection and Repatriation Act and its implementing regulations (43 CFR 10), Executive Order 13175, and Executive Order 13352, and to the requirement of 40 CFR 1508.27(b)(3) and (8) that effects on cultural resources -- NOT only National Register eligible historic properties -- be considered in determining the significance of environmental impacts.

Response: Section 110(d) applied to this case requires that the NRC, consistent with its mission and mandates, carry out its licensing process in accordance with the purposes of the National Historic Preservation Act and give consideration to projects and programs that will further the purposes of the Act, which are to expand the preservation of historic resources on federal and private lands. The Archeological and Historic Preservation Act of 1974 emphasizes preservation of archaeological and historical sites and data. As indicated in the EIS, NRC has not identified threats to preservation of historic resources by the proposed project.

The American Indian Religious Freedom Act and the Native American Graves Protection and Repatriation Act and its implementing regulations set forth policy and requirements that a federal agency shall avoid interference with exercise of Native American religious practices, effects to or access to religious sites, and shall consult with tribes to identify and avoid impacts to places and things of traditional cultural value, including cultural items, as defined under the Native American Graves Protection and Repatriation Act. The NRC has addressed these in its consultation effort. Executive Order 13175 applies to consultation in the context of agency policymaking and is not applicable to this NRC process. Executive Order 13352 mandates efforts by the Departments of the Interior, Agriculture, Commerce, Defense and the Environmental Protection Agency to facilitate cooperative conservation, to take into account the interests of persons with ownership of lands and to properly accommodate local participation in Federal decision making. Although the order does not apply to the NRC specifically, the NRC has received and taken into account the interests of persons with ownership of nearby lands in its review. The paragraphs of the regulations implementing NEPA that the commenter cites mention the need to consider "proximity to historic or cultural resources" and the degree to which an action "may cause loss or destruction of significant scientific, cultural, or historical resources." The EIS did evaluate

possible effects on cultural resources outside the construction zone and area of operations of the proposed plant, but identified no likelihood of change in the existing conditions of these resources that would be associated with construction or operation of the plant.

Comment: 014-37
A commenter suggested that (Alternatives, Section 2.4 Comparison of Predicted Environmental impacts, Table 2-8, Page 2-60) the National Emission Standards for Hazardous Air Pollutants 40 CFR 61 Subpart H evaluation has not been submitted for determination of appropriateness and to demonstrate potential compliance status of this type of facility to the regulating agency. However, the Draft EIS characterized impacts as "SMALL." The commenter stated that until this determination is made under Subpart H, classifying impacts, is premature. The commenter encouraged NRC to involve EPA and other appropriate Federal, agencies earlier in the determination process.

Response: As described in Section 4.2.12.3 and Appendix C of the EIS, the NRC staff have determined that public doses from emissions of radioactivity to the atmosphere from the ACP would be well below both the 10 CFR 20 dose limits of 100 millirem per year (approximately 1 millirem per year), and the 10 CFR 20.1101(d) dose constraint of 10 millirem per year. For this reason, staff estimates that the public dose impacts would be "SMALL."

Aside from the question of the anticipated level of public dose impact, the question of whether USEC, Inc. must either request a permit from EPA or show EPA by analysis that a permit is not required pursuant to EPA regulations in 40 CFR Part 61, Subpart H, for the DOE-owned ACP is a matter which USEC must address with EPA, not NRC. NRC has no role in EPA's determination on this matter.

Comment: 014-50
A commenter noted that (Introduction, Section 1.5.5 Cooperating Agencies, Page 1-19) the Draft EIS states that during the scoping process, no Federal, State, or local agencies were identified as potential cooperating agencies in the preparation of the Draft EIS. The commenter said the Draft EIS, however, does not address whether there was any contact with other regulating Agencies at any level that could have been considered cooperating Agencies. The commenter suggested all of the current Federal, as well as State and Local regulators for this site would have been potential Cooperating Agencies in the development of this document and process.

Response: NRC did not request any agencies to be a cooperating agency in the preparation of the EIS. In accordance with NEPA, NRC consulted with several Federal and State agencies as described in section 1.5.6, and none of the agencies consulted requested or indicated interest in being a cooperating agency in the preparation of the EIS.

Comment: 014-51
A commenter (Introduction, Section 1.5.6 Consultations, Page 1-19) noted that when the NRC was first given some regulatory authority at this site, a consultative procedure was to have been used with U.S. EPA, to assure that the site could be "certified" for their regulation. A similar process, the commenter suggested, should have been used with all current regulating Agencies of this facility prior to preparation of this document.

Response: As indicated in Section 1.5.6, and in accordance with NEPA and cross-cutting Acts and regulations, NRC consulted with Federal and State regulatory agencies throughout the development of the EIS.

Comment: 001-1-1
Another commenter argued that a member of the public who has done important work evaluating the history and significance of the Piketon site should be consulted in any effort to assess the potential impact of the centrifuge plant construction.

Response: NRC engaged members of the public, to include those who have done important work evaluating the history of the Piketon site through hosting public scoping and comment meetings. In addition, in accordance with the National Historic Preservation Act, NRC consulted with the State Historic Preservation Officer, Federally recognized tribes, and a member of the public who is familiar with the local historic setting.

J.9 Proposed Action and Alternatives

Proposed Action

Comment: PMT-006-2
A commenter stated that the Draft EIS glossary defines special nuclear material, plutonium, uranium-233, or uranium enriched in the isotope, ores containing 0.05 percent uranium or thorium, regulated under the Atomic Energy Act. In general, this includes all materials containing radioactive isotopes concentrations greater than the natural and the byproduct tailings from the formation of this concentrated material, and byproduct materials is defined as the tailings or waste products produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content. The commenter noted that these very broad definitions seem to include any and all radioactive materials that USEC will be authorized to possess and use if NRC grants this license, and suggested that the NRC include a list of the nuclear material that will not be used at the site, such as weapons-grade material.

Response: Source material and special nuclear material are accurately defined in the EIS glossary (Appendix I) in accordance with the definitions in 10 CFR Part 20, 40 and 70. The purpose of the glossary is to depict the terminology used in the EIS. The use of weapons-grade material is not part of the terminology used for the proposed action.

Comment: PMT-009-2
A commenter wanted clarification on the purpose of the Megatons-to-Megawatts program, and whether dismantled Russian nuclear warheads would be used as feed material at the ACP. The commenter also wanted confirmation that the plant would not use material from dismantled U.S. warheads as feed material.

Response: The EIS clearly states the proposed action is for the NRC to issue a license that would authorize USEC to possess and use special nuclear, source material, and byproduct material at the proposed ACP, a gas centrifuge uranium enrichment facility proposed to be located on the DOE reservation near Piketon, Ohio. The proposed action is not part of the Megatons- to-Megawatts program, which is discussed in section 1.3.1, nor does the proposed action involve dismantlement of U.S. warheads.

Comment: PMT-005-4
A commenter asked about the potential of recreational opportunities on the surrounding waterways, such as the Mill Creek and along the Ohio and Scioto rivers, and urged that these waterways be kept or made clean.

Response: The EIS assesses the potential impacts on surface and ground water quality and water use due to the proposed action and alternatives. Impacts to local receiving waters from proposed ACP facility operation wastewater discharges, including action levels will be based on discharge monitoring as described in section 6.1.4. The cumulative impact of the proposed action on local water resources is expected to be small as described in section 4.3.4 as all discharges for operation would have to meet EPA and State National Pollutant Discharge Elimination System standards, as well as DOE and NRC standards, which are designed to protect human health and the environment. During site preparation and construction (section 4.2.6.1), cumulative impacts could result in a moderate short-term cumulative impact on surface water quality due to increased erosion and storm water flows (not taking into account USEC's proposed Best Management Practices to mitigate surface water impacts) during operations. During operations, no liquid discharges of licensed radioactive materials are anticipated from the proposed ACP as described in section. 4.2.6.2. Any effluents potentially containing radioactive material would have to meet NRC standards in 10 CFR Part 20 prior to being discharged or would have to be disposed at a licensed facility.

Comment: PMT-015-2
A commenter stated that the Draft EIS offers "bad advice" by suggesting, for example, on page 2-18, that the Gas Centrifuge Enrichment Plant documents from the 1980s be destroyed. This would make it more difficult, the commenter stated, to determine what contaminants have historically polluted the groundwater at the site, thereby, impeding cleanup.

Response: Any Gas Centrifuge Enrichment Plant records relating to contaminants are the property of the DOE (DOE). These records are retained by DOE and housed in appropriate storage locations in accordance with DOE requirements and environmental regulations.

Comment: PMT-015-8
A commenter suggested that USEC has not adequately explained why it requires the license of 10 percent enrichment. The commenter noted that a competitor in New Mexico has only asked for a five percent license and the power industry does not require fuel enriched above five percent.

Response: The National Enrichment Facility that Louisiana Energy Services has proposed to build near Eunice, New Mexico is being evaluated by NRC in a separate proposed action.

The NRC staff evaluates a license application to determine whether an applicant has demonstrated compliance with the regulatory requirements which pertain to the type of license being sought. In the case of the present license application from USEC to construct, operate, and decommission a uranium enrichment facility, the NRC staff evaluated the application against the Commission's regulations found at 10 CFR Part 70. The NRC's mandate is to ensure the safe use of nuclear materials and, as such, it must consider the issuance of licenses to applicants who wish to conduct operations involving these materials. Because USEC submitted an application for a license to enrich uranium up to 10 percent by weight of uranium-235, the NRC staff must evaluate that application as submitted.

Comment: 002-3
A commenter noted that the Draft EIS provides information on the size of the Reservation in several places. For instance, on Page 2-2 the Reservation is described as encompassing 3,700 acres with 1,300 acres inside the perimeter loop road while on Page 3-1(and also Page 3-5) the report states that within the Reservation there are 750 security-fenced acres with 550 acres in the central area surrounded by the Perimeter Road.

Response: Perimeter Road encompasses 1,300 acres. Within Perimeter Road there are approximately 750 security fenced (i.e. controlled access) acres, 550 acres are occupied by the Gaseous diffusion plant, and approximately 200 acres would be occupied by the ACP facilities. Not all of these areas are continuous. Inconsistencies describing the size of the Reservation were corrected throughout the EIS.

Comment: 004-3
A commenter stated the annual number of feed cylinders is different on page 2-22 than it is on page 4-47.

Response: The proposed number of shipments of feed cylinders to the proposed ACP is 1,100 annually. This number has been changed in Table 4-10.

Comment: 005-5
A commenter stated the Draft EIS (Page 2-14, Section 2.1.3.2 Secondary Facilities) does not discuss the potential to utilize additional buildings currently leased by USEC, Inc. The commenter questioned what other facilities may be used including those currently leased by USEC, Inc. to support the centrifuge program.

Response: All facilities proposed to support the proposed action are discussed in the EIS.

Comment: 005-6
A commenter asked (Page 2-29, Solid Waste Handling, Storage, and Transport, Line 30) what the NRC regulatory requirements for the management of low level mixed wastes are and where are they cited in the CFR.

Response: Low level mixed waste is regulated under the Resource Conservation and Recovery Act (RCRA). As stated on page 2-30 of the EIS, "low level mixed waste is exempted from the storage requirements of the RCRA as defined in Ohio Administrative Code (OAC) 37455-103. Low level mixed waste is eligible for this conditional exemption as it is a hazardous waste and would be generated and managed by USEC as described in 40 CFR Part 266, Subpart N and OAC 3745-266."

Comment: 005-7
A commenter suggested (Page 2-30 and 2-31, Management and Disposal of Depleted UF_6 from Facility Operation, line 45) that if USEC-ACP and DOE have reached agreement concerning the management of UF_6 cylinders, the information should be discussed. Additionally, the USEC-ACP and DOE should discuss the potential to insert a fourth process line within the conversion facility to limit the amount of time needed to complete the conversion process for the number of cylinders USEC will create over time. The DOE and USEC should be proactive in this matter and associated cost should be examined in this EIS.

Response: As stated in Section 2.1.4.3 Facility Operation, USEC proposes to transport the depleted UF_6 generated at the proposed ACP to this new UF_6 conversion facility on the DOE reservation in Piketon. This plan is based on Section 3113 of the 1996 United States Enrichment Corporation Privatization Act that states the DOE "shall accept for disposal low-level radioactive waste, including depleted uranium if it were ultimately determined to be low-level radioactive waste, generated by [...] any person licensed by the Nuclear Regulatory Commission to operate a uranium enrichment facility under Sections 53, 63, and 193 of the Atomic Energy Act of 1954 (42 U.S.C. 2073, 2093, and 2243)." On January 18, 2005, the Commission issued its ruling that depleted uranium is considered a form of low-level radioactive waste. The Commission also stated that disposal of depleted uranium tails at a DOE facility represents a plausible

strategy for the disposition of depleted uranium tails (NRC, 2005).

In addition, DOE analyzed the impacts of the operation of a conversion facility in the "Final Environmental Impact Statement for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Portsmouth, Ohio site." DOE/EIS-0360, Oak Ridge Operations, Office of Environmental Management, U.S. Department of Energy, June, 2004.

Comment: 014-21
A commenter observed (Page 2-12, Line 48) the Draft EIS states that UF_6 cylinders may be stored in any storage yard. The commenter suggested it should be clarified whether all of the cylinders will have comparable management and security whether they are depleted uranium or enriched product. The commenter questioned whether there will be any long-term staging of enriched materials for subsequent blending made between UF_6 cylinders that are tails/waste (suitable for processing and disposal), UF_6 product, and UF_6 materials that support production. Otherwise, mixing these UF_6 materials up in any of the storage yards seems to provide an opportunity for negative impacts related to UF_6 management.

Response: There are seven cylinder storage yards that would support the ACP. The ACP cylinder storage yards would provide storage for feed uranium, depleted (tails) uranium, and enriched (product) uranium. These cylinders may be stored in any storage yard regardless of use, although it is anticipated that cylinders of a certain type will be routinely stored in a particular yard. For example, the X-745G-2 yard is identified as the storage yard typically used for tails cylinders. All storage yards will have management and security appropriate to the material being stored. It is possible that USEC could mix product to achieve a desired enrichment (e.g., USEC could blend 4 percent enriched product with 6 percent product to achieve a 5 percent product). In its license application, USEC is seeking authorization to enrich uranium up to a maximum level of 10 percent. No mixing or blending of materials contained in cylinders will take place in any of the storage yards. Any classified low-level mixed waste will remain on-site and be managed in accordance with the rules in Ohio Administrative Code 3745-266 until shipments can be scheduled to an approved Treatment, Storage, Disposal, Recycling Facility.

Comment: 014-22
A commenter noted (Page 2-19, Line 29) the Draft EIS text and Table 2-3 provide information that approximately 8,000 cubic meters of low-level waste will be generated during refurbishment and construction activities. The commenter suggested the Final EIS should discuss its waste disposition, where the low-level waste is being shipped for processing and disposal, and whether any of this low-level waste is considered "mixed waste" under RCRA.

Response: Section 4.2.13.1 of the EIS states that low-level mixed waste generated during the site preparation activities would be shipped to a licensed low-level radioactive waste disposal facility, such as Envirocare in Utah, which is subject to regulatory controls to limit radiological releases and exposure. Low-level mixed wastes anticipated to be generated during operation of the proposed ACP are described in section 2.1.4.3. Any low-level mixed waste generated will remain on-site and be managed in accordance with the rules in Ohio Administrative Code 3745-266 until shipments can be scheduled to an approved Treatment, Storage, Disposal, Recycling Facility.

Comment: 014-23
A commenter suggested (Page 2-27, Line 18) this section of the Final EIS should discuss: 1) at what point the depleted uranium tails are considered a waste or a product; 2) who has the authority to make the determination that the depleted uranium tails are waste (especially considering that DOE may be the

recipient of these materials); 3) at what time the waste determination is made; 4) how much tailings/waste is expected to be generated annually; 5) whether there will be sufficient capacity on-site to process the tailings/waste for use or disposal; and 6) the disposal options currently available and potentially available in the future for the off-site storage or disposal of the tailings/waste.

Response: A complete discussion of the depleted uranium tails is provided on page 2–30 through 2-34 of the EIS as well as on pages 4-75 through 4-78. The NRC has no authority to make a classification as to whether the tails are a waste or a resource. Section 3113(a) paragraph 4 of the USEC Privatization Act states that DOE must take title/possession of the depleted uranium tails if requested, regardless of whether a determination as to the material being a waste or resource has been made. For NEPA purposes, the NRC staff considers this material as waste due to the large volume of depleted uranium that is currently in storage in the United States. As discussed in the EIS on page 4-76, DOE is required to take title to the depleted uranium if requested. A 7 million SWU plant would produce 19,040 metric tons of depleted uranium tails annually (page 2-34 of NRC EIS). DOE has previously considered the long-term disposal of depleted uranium from their conversion facilities as noted on page 4-77 of the NRC EIS. Included in the DOE analysis were the two disposal sites: Envirocare of Utah and the Nevada Test Site.

Comment: 014-24

A commenter observed (Page 2-30, Line 45) the United States has produced depleted UF_6 since the early 1950s as part of the process of enriching natural uranium for both civilian and military applications. DOE's Paducah Depleted UF_6 conversion facility will process that site's estimated 450,000 metric tons of depleted UF_6 over a 25 year processing period. DOE's Portsmouth Depleted UF_6 conversion facility will process that site's estimated 250,000 metric tons of depleted UF_6 that is currently stored in about 16,000 cylinders on the Portsmouth Reservation, as well as process an additional 4,800 cylinders that will be transferred from the Oak Ridge East Tennessee Technology Park facility to the Portsmouth Reservation; the overall processing period is expected to be 18 years. DOE expects the conversion of all its stored depleted UF_6 to cost approximately $2.6 billion, excluding costs for the decontamination and decommissioning of the conversion facilities.

The Draft EIS states that 571,000 metric tons of depleted UF_6 will be generated during ACP operations, in 30 years generating as nearly as much depleted UF_6 as DOE has over nearly 50 years. The commenter stated this is a large amount of depleted UF_6 material that should be fully characterized in the Final EIS. Detailed information should be provided on depleted UF_6 management and disposal including: how long the ACP-generated depleted UF_6 will be stored on site prior to conversion; whether the Portsmouth Depleted UF_6 conversion facility has the capacity to process ACP-generated depleted UF_6 in an expedient timeframe; whether there are off-site facilities that have the capacity to process ACP-generated Depleted UF_6, cost data, financial responsibilities and liabilities; and any NRC requirements for financial assurance or surety funds that will ensure that depleted UF_6 and other wastes generated due to ACP activities are properly managed, processed and disposed, without the cost passed on to other federal agencies and the public. Specifically, the commenter stated the Final EIS should include and address the following:

a) Detailed information on the Portsmouth Depleted UF_6 conversion facility since conversion of Depleted UF_6 is really an integral part of the overall enrichment process, with conversion of the mostly unmarketable depleted UF_6 being necessary for the long-term stability and management of that waste stream. Does the Portsmouth Depleted UF_6 conversion facility have adequate capacity to process the depleted UF_6 that the ACP will generate, in addition to the depleted UF_6 already in DOE's inventory? Is there off-site Depleted UF_6 conversion capacity in case that the Portsmouth Depleted UF_6 conversion facility cannot meet demand?

b) Section 3113 of the 1996 United States Enrichment Corporation Privatization Act that states the DOE "shall accept for disposal low-level radioactive waste, including depleted uranium if it were ultimately determined to be low-level radioactive waste, generated by [...] any person licensed by the Nuclear Regulatory Commission to operate a uranium enrichment facility under Sections 53,63, and 193 of the Atomic Energy Act of 1954 (42 U.S.C. 2073, 2093, and 2243)." If the gas centrifuge facility proposed by Louisiana Energy Services near Eunice, New Mexico is licensed by the NRC, is DOE obligated to accept its waste and Depleted UF_6? Could accepting Louisiana Energy Services wastes impact the capacity of the Portsmouth Depleted UF_6 conversion facility and the ACP's ability to deal with the depleted UF_6 that it generates?

c) How long is the ACP-generated depleted UF_6 expected to be stored or accumulate on the Portsmouth Reservation prior to its conversion and off-site disposal? Information should be provided on a total inventory and per cylinder basis.

d) Considering the number of depleted UF_6 cylinders stored on the Portsmouth Reservation, and the number that will be generated by the ACP, is the Portsmouth Reservation the most suitable environment for the long-term storage of depleted UF_6, whether prior to or after conversion?

e) What are all of the facilities available for the off-site storage and/or disposal of the post-conversion depleted UF_6, both currently available and anticipated for licensing in the future? Will they have the capacity to accept all of the post-conversion depleted UF_6 generated as a result of ACP and historic ACP operations? Are there any issues that could affect DOE's ability to dispose of post-conversion Depleted UF_6 off-site from the Portsmouth reservation?

f) The Portsmouth Depleted UF_6 conversion facility is stated to have an operating life of 18 years, while the ACP is expected to operate for 30 years. Where will the ACP-generated depleted UF_6 be converted after operation of the Portsmouth depleted UF_6 conversion facility ceases? Does DOE have an obligation to operate a conversion facility to accommodate depleted UF_6 generated by the ACP and other enrichment facilities licensed by the NRC?

Response: a) DOE has stated that, with routine facility and equipment maintenance, periodic equipment replacements, or upgrades, the Portsmouth conversion facility could be operated safely beyond the 18-year planned life-time period to process the additional depleted UF_6 from the proposed ACP (DOE Portsmouth site specific EIS, 2004a). In addition, DOE indicates the estimated impacts that would occur from prior conversion facility operations would remain the same when processing the proposed ACP wastes. The overall cumulative impacts from the operation of the conversion facility would extend proportionately with the increased life of the facility. The NRC believes that this added inventory of depleted UF_6 coming from the proposed ACP should not change the nature or magnitude of the impacts from the DOE conversion facility operations, but it would extend those impacts for some additional years.

b) Under the USEC Privatization Act, DOE must accept the depleted uranium tails if Louisiana Energy Services reqests such transfer under the USEC Privatization Act. However, Louisiana Energy Services has stated that its preferred disposal option is to utilize a private deconversion facility. If Louisiana Energy Services does use the DOE option, however, DOE would have options for the management of depleted UF_6 conversion from outside sources. DOE could apply both the Paducah and Portsmouth conversion facilities to process the depleted UF_6 from the proposed National Enrichment Faclity. The Portsmouth conversion facility could process 129,600 metric tons (142,860 tons) of depleted UF_6 waste from 2024 to 2036 at its planned capacity of 10,800 metric tons (11,800 tons) per year. The Paducah conversion facility could process 71,500 metric tons (78,815 tons) of depleted UF_6 from 2031 to 2036 at

its planned capacity of 14,300 metric tons (15,800 tons) per year. Combined, both DOE conversion facilities could process over 200,000 metric tons (220,500 tons), which exceeds the 197,000 metric tons (217,000 tons) from the proposed National Enrichment Facility. Therefore, DOE could process the depleted UF_6 prior to the end of the proposed National Enrichment Facility license of 2036 if DOE processed only the proposed National Enrichment Facility wastes. If DOE must also process USEC-generated depleted UF_6, which would amount to 571,000 metric tons (629,420 tons) then DOE would have to install additional conversion lines at either or both the Paducah and Portsmouth conversion facilities to complete the conversion prior to the end of both the proposed ACP and National Enrichment Facility licenses, 2039 and 2036, respectively.

c) Detailed numbers are not available for the exact length of time depleted uranium cylinders would be stored on site prior to conversion and disposal. The DOE could take title to the depleted uranium and store the tails onsite until conversion capacity is available. If it is assumed that all USEC tails are converted at the Portsmouth conversion facility it would extend this facility's operating life from 2024 to 2077 at its planned capacity of 10,800 metric tons (11,800 tons) per year.

d) Section 3.14 of the EIS addresses waste management issues at the DOE reservation at Piketon, Ohio. All of the depleted uranium is the responsibility of DOE under memoranda of agreement between USEC and DOE. The depleted uranium stored at the DOE reservation is managed in accordance with applicable requirements, including those found in 40 CFR Part 266 and the Ohio Administrative Code 3745-266. The depleted uranium generated by operation of the ACP would be added to the existing inventory. As noted in EIS section 4.2.13, DOE has begun construction of a facility at the DOE reservation to convert depleted uranium into a more stable form for long-term storage and disposal. Impacts to the public associated with depleted uranium conversion and disposal are MEDIUM to SMALL. Impacts associated with storage are SMALL. As noted in EIS section 2.4, Table 2-8, overall waste management impacts are expected to be SMALL.

e) As discussed above, DOE has previously analyzed at least two disposal sites for the depleted uranium tails after the tails have been converted to a more stable form. The two sites previously analyzed were Envirocare (DOE's proposed disposition site) and the Nevada Test Site (DOE's optional disposal site). Additionally, the NRC reviewed the DOE's analysis and looked at the licensing requirements of Envirocare as well as the capacity impacts at Envirocare, approximately 11 percent of remaining capacity.

f) Under the USEC Privatization Act, DOE must accept the depleted uranium tails as waste if USEC requests such transfer under the USEC Privatization Act. DOE could apply both the Paducah and Portsmouth conversion facilities to process the depleted UF_6 from the proposed National Enrichment Facility. Additionally, DOE has stated that, with routine facility and equipment maintenance, periodic equipment replacements, or upgrades, the Portsmouth conversion facility could be operated safely beyond the 18-year planned life-time period to process the additional depleted UF_6 from the proposed ACP (DOE Portsmouth site specific EIS, 2004).

Comment: 014-25

A commenter observed (Page 2-48, Line 23) the Draft EIS states: "The NRC staff has determined that unless USEC can demonstrate a use for uranium in the depleted tails as a potential resource, the depleted UF_6 generated by the proposed ACP should be considered a waste product." The commenter noted the Final EIS should state who has the authority to make the waste determination: NRC, DOE or USEC? The Final EIS should state when that determination is required to be made, or whether that determination should be made immediately upon depleted UF_6 generation. The Final EIS should define "depleted

uranium" in terms of its uranium-235 content for the purposes of management and waste disposition. The commenter questioned that although depleted uranium is commonly referred to as uranium having a percentage of uranium-235 smaller than the 0.7 percent found in natural uranium, does that definition hold true for the purposes of management and waste disposition, and DOE's acceptance of depleted uranium materials generated by NRC-licensed enrichment plants.

Response: The NRC has no authority to make this classification. Currently, there is no specific regulatory requirement for when this determination must be made. Section 3113(a) paragraph 4 of the USEC Privatization Act states that DOE must take title/possession of the depleted uranium tails if requested, regardless of whether a determination as to the material being a waste or resource has been made. The NRC does not have the regulatory authority to set a precise definition for depleted uranium relative to the USEC Privatization Act, nor does the Act itself place specific limits on uranium-235 in depleted uranium.

Comment: 014-31
A commenter suggested (Page 2-28, Line 20) considering the emissions from the former gaseous diffusion plant, the processing of recycled material and the processing of former Russian materials, ACP emissions should also be analyzed for transuranic radionuclides routinely.

Response: USEC intends to initially use natural uranium in the form of UF_6 for the proposed ACP. Feed material that meets the American Standards for Testing and Materials specification for recycled feed may be used in the future, and may contain small quantities of radionuclides such as uranium-236 and technetium-99. Based on USEC's license application, no transuranic elements such as plutonium, americium, or neptunium are expected to be processed by the ACP in other than trace quantities. USEC does plan on analyzing effluents for technetium-99 because of the isotope's historic presence on the reservation. Analysis of expected dose from air releases of isotopes of the transuranic elements can not be performed in the EIS because there is no expected release source of the isotopes from the ACP.

Comment: 014-32
A commenter observed (Page 2-28, Line 20) that the Draft EIS states that recycled feed may be used, and that four radionuclides will be analyzed, in the ACP emissions routinely, although this paragraph discusses five radionuclides (uranium-234, uranium-235, uranium-236, uranium-238 and technetium-99). The commenter suggested that the Final EIS should clearly state which radionuclides will be analyzed, as well as any non-radioactive hazardous emissions.

Response: Feed material that meets the American Standards for Testing and Materials specification for recycled feed may be used, and may contain radionuclides such as uranium-236 and technetium-99. Due to historic contamination of the nuclear feed cycle and of the site, however, technitium-99 may eventually appear in some gaseous effluents. The radionuclides anticipated to be present in liquid effluents are, uranium-234, -235, -238, and technitium-99 due to historic contamination of the site. Consequently, ACP emissions will be analyzed for these four nuclides routinely.

Comment: 014-44
A commenter stated (Alternatives, Section 2.1.4.3 Facility Operations, Air Emissions Monitoring and Treatment Systems, Page 2-28, paragraph 3) that the appropriate regulations should include 40 CFR 61, Subpart H for this facility. The commenter noted this facility is subject to this regulation and must meet all of the requirements of this rule before construction of this project can begin.

A commenter stated (Alternatives, Section 2.1.4.3 Facility Operations, Liquid Effluent Collection and Treatment Systems, Page 2-29, paragraph 4) the appropriate regulations have not included 40 CFR 61, Subpart H for this facility. The commenter noted this facility is subject to this regulation and must meet all of the requirements of this rule before construction of this project can begin.

Response: The EIS states the applicability of the National Emission Standards for Hazardous Air Pollutants regulations of 40 CFR Part 61, Subpart H in several locations. The commenter is referred to Table 1-3, Section 4.2.4.1, 4.2.4.2, Section 4.2.12.3, and Section 4.3.2 which specifically reference the appropriate National Emission Standards for Hazardous Air Pollutants regulations of 40 CFR 61 Subpart H. For clarity, a reference to 40 CFR 61 Subpart H was added in Section 2.1.4.3.

Comment: 014-48
A commenter stated that (Page 2-6, Line 1) under DOE's RCRA Corrective Action activities, various facilities across the Portsmouth Reservation had their environmental assessment and restoration activities "deferred" until the time when the gaseous diffusion plant decontamination and decommissioning work is performed. The commenter stated the Final EIS should state whether any of the facilities under Table 2-1 are considered "deferred," and if so, whether RCRA corrective actions have been performed at those facilities. This table should also state which facilities will have NRC-licensed activities occurring.

Response: The purpose of Table 2-1 is to list the facilities and their size that would be associated with the ACP. Section 2.1.4.1, Refurbishment, Site Preparation, and Construction states that all construction activities would comply with all applicable permits; therefore, should any of the facilities be considered "deferred" the applicable RCRA corrective actions would be completed at such facilities, as appropriate, prior to construction of the ACP.

Comment: 014-49
A commenter stated (Page 2-7, Line 2) the Final EIS should list and describe the primary facilities, and areas leased by DOE for the proposed ACP.

Response: A list of primary facilities along with descriptions were provided in the EIS from pages 2-7 through 2-13. All facilities are leased from DOE.

Comment: 015-03
A commenter suggested changing "48X source cylinder" on lines 13 and 23 of page 2-10 to "10-ton source cylinder," as shown on page 105 of the License Application, Revision 1.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-04
A commenter suggests changing "The X-7725B building..."on line 47 of page 2-14 to "The X-7725C building..." as shown on page 2-5 of the Environmental Report.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-05
A commenter suggests adding clarity to the text so that it cannot be misinterpreted as saying that the vent monitors have the capacity to monitor hydrogen fluoride gas in realtime. The commenter indicates that the text should state that the "gas flow monitoring instrumentation with local readouts" refers to total gas flow and accumulated radioactivity in the sample traps on lines 40-42 of page 2-27.

Response: NRC agrees with the commenter that the sentence referring to the "gas flow monitoring instrumentation with local readouts" could be misinterpreted to imply a real-time effluent release monitoring system as opposed to an integral readout for those instruments. The follow-on sentence on lines 42 and 43 of page 2-27 of the EIS should reduce much of that potential for misinterpretation, as it explicitly refers to additional analytical instrumentation that will continuously monitor, sample, and alarm if UF_6 should escape in the effluent gas stream. Section 9.2.1.2.1 of the USEC's License Application provides the reference for these airborne effluent monitoring systems. The EIS text was revised to include the word "integral" before the phrase "gas flow monitoring."

Comment: 015-06
A commenter noted that the description of the emission control systems on lines 43 to 2 on pages 2-27 and 2-28 is correct only for the X-3346, X-3356, and X-3366 buildings (the feed and withdrawal buildings). The commenter explained that the process building emission controls do not directly connect to process gas piping, do not have cold traps, and the alumina traps can be bypassed by the Evacuation Vacuum system.

Response: NRC agrees with the commenter that the description on pages 2-27 and 2-28 of the EIS is most applicable to the feed and withdrawal buildings. In particular, the air emissions monitoring and treatment systems in the process buildings do not include cold traps. It is also true that the EV system can be used to bypass the alumina traps, but the USEC License Application on page 9-4, section 9.2.1.2.1, states that this mode of alignment for the system is only used during the initial pump down of the centrifuges prior to their exposure to UF_6. If this protocol is adhered to then this bypass should not be a potential release pathway for UF_6 during operation. The EIS should therefore not be concerned with this potential system alignment when describing the airborne emissions control systems. The EIS text was revised to provide greater clarification.

Comment: 015-07
A commenter pointed out that the liquid effluent As Low As Reasonably Achievable goal USEC proposed in the License Application is different than that for gaseous radioactive effluent releases, and is ten percent of the value presented (0.05 mrem/year) on lines 32-36 of page 2-29.

Response: For liquid effluents, the applicant proposes an As Low As reasonably Achievable goal of 10 percent of the air effluent goal, or 0.05 mrem/year to the most exposed member of the public. This is much less than the 10 mrem/year goal recommended in NRC Regulatory Guide 8.37, Regulatory Position C.1.2. This change has been made in section 2.1.4.3.

Comment: 015-08
A commenter suggested that lines 40 to 43 of page 2-29 should state, "Satellite accumulation areas would be established throughout the proposed ACP as necessary... Waste is then moved to the XT-847 Waste Management Staging Facility to be sampled and measured..."

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-09
A commenter suggested changing "OAC 37455-103" to "OAC 3745-51-03" on line 33 of page 2-30.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-10
A commenter suggested changing “19,040" to “19,030" and changing “(21,000 tons)” to “(20,980 tons)” on line 33 of page 2-34 as indicated on page 4-130 of the Environmental Report, Revision 5.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-11
A commenter suggested changing “42,800" to “41,105" and “571,200" to “512,730" on line 34 of page 2-34 as indicated on page 4-130 of the Environmental Report, Revision 5.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-12
A commenter suggested changing “(630,000 tons)” to “(535,200 tons)” on line 35 of page 2-34.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-13
A commenter suggested changing “$1,433 million” to “$1,842 million” and delete the footnote on line 39 of page 2-34, reflecting Revision 5 of the Decommissioning Funding Plan that assumes $4.83/kg U for disposal cost of tails.

Response: The NRC staff has revised the text of the EIS to reflect a tails disposal cost as $1.8 billion.

Alternatives Considered but Eliminated

Comment: PMT-015-6; 014-16
Two commenters stated the Draft EIS does not adequately address alternatives. One commenter suggested the potential benefits of cleaning the site and using Enterprise Zone incentives to reindustrialize the site. Another alternative, the commenter suggested, would be to locate laser isotope separation units at major power stations. A commenter stated the Final EIS should either (1) document a detailed analysis for the Paducah site, or (2) offer a more thorough justification for why the Paducah site was not studied in detail in the Draft EIS.

Response: As discussed in Section 2.3 of the EIS, USEC undertook a site selection process to identify viable locations for the proposed ACP. The purpose of the NRC staff’s review of USEC’s site selection process is to determine whether an alternative site the applicant considered is obviously superior to the proposed ACP. The staff specifically considered Paducah site in Section 2.3.1. The NRC staff has determined that the ACP site selection process has a rational, objective structure and appears reasonable and that none of the candidate sites were obviously superior to the USEC preferred site in Piketon, Ohio; therefore no other site was selected for further analysis.

Comment: PMT-017-1
A commenter encouraged the Federal government to consider the alternative of developing the site as an historic site.

Response: NRC evaluated a range of reasonable alternatives in the EIS. However, the alternatives considered were those that satisfied the purpose and need for the facility, which is to produce enriched

uranium. Because the potential development of the site as an historic site would not satisfy the need for the facility, it was not considered a reasonable alternative.

Comment: 002-2
A commenter noted that on Page 2-42, the Draft EIS states that Alternate Locations B and C within the Reservation were graded during construction of the Gaseous Diffusion facility. The commenter suggested the majority of both of these areas lie outside of the area that was disturbed by previous construction, and therefore, supports the selection of Location A as the preferred site.

Response: As discussed in Section 2.3 of the EIS, USEC undertook a site selection process to identify viable locations for the proposed ACP. The purpose of the NRC staff's review of USEC's site selection process is to determine whether an alternative site the applicant considered is obviously superior to the proposed ACP. The staff specifically considered alternate locations within the Piketon site in Section 2.3.2. The NRC staff has determined that the ACP site selection process has a rational, objective structure and appears reasonable and that none of the candidate sites were obviously superior to the USEC preferred site in Piketon, Ohio; therefore no other site was selected for further analysis.

Comment: 014-17
A commenter noted that the Draft EIS states: "The DOE-USEC Agreement stipulates that USEC deploy the ACP at either the DOE reservation in Piketon or Paducah. Also, no other sites offered the unique combination of (1) readily accessible environmental data; (2) past history and experience in uranium enrichment; and (3) the availability of skilled labor with uranium enrichment industry experience." The commenter asked whether the DOE-USEC Agreement was the appropriate legal means for determining the location of the ACP in the absence of an EIS. Considering that the Piketon plant ceased enrichment operations in 2001, the ACP would not begin operations until 2009, and that the gas centrifuge facility proposed by Louisiana Energy Services near Eunice, New Mexico would be located at a "green field" site where there have been no prior enrichment operations, are the three reasons provided for siting the ACP at Piketon truly valid for the purposes of an EIS?

Response: The reasons stated in the DOE-USEC agreement are not within the NRC's regulatory authority. As discussed in Section 2.3 of the EIS, USEC undertook a site selection process to identify viable locations for the proposed ACP. The purpose of the NRC staff's review of USEC's site selection process is to determine whether an alternative site the applicant considered is obviously superior to the proposed ACP. The staff specifically considered alternate locations within the Piketon site in Section 2.3.2. The NRC staff has determined that the ACP site selection process has a rational, objective structure and appears reasonable and that none of the candidate sites were obviously superior to the USEC preferred site in Piketon, Ohio; therefore no other site was selected for further analysis.

Comparison of Predicted Environmental Impacts

Comment: 010-1-2
A commenter strongly challenged the Draft EIS statement that "the impacts to historic and cultural resources identified onsite and around the site's perimeter would be small" (p. 2-38) and stated the document does not address the impacts in a way that is "historically responsible." The commenter suggested that substantial potential exists for the development of historical attractions, tourism, and sites of economically sustained commemoration at Sargents.

The commenter suggested several reasons for the Federal government to seriously consider the site's historical importance. The commenter cited the three historic homes of the Barnes, Sargent and Rittenour

families, the Scioto River history, the site's "unique" geological features, the passenger pigeon history (centered on the Barnes home), and the long-standing Native American presence, including a number of significant prehistoric earthworks as historically significant. The commenter also noted that there is no national memorial to the passenger pigeon and there are no current plans for building X-326. The commenter stated the building and operating of a uranium enrichment plant over the fence-line from the Barnes Home would severely impact prospects for a public center for education, tourism, and long term commemoration. Among the impacts listed by the commenter: fences; roads; traffic; security surveillance (including security gates and closed access to some roads); restrictions on movement; diminishment of attractiveness to visitors; risk of terrorist attack (keeping people away); compromises from noise; diminishment of the aesthetics of the site, public worries (real or justified) to the dangers of uranium enrichment near such a site; vulnerability of buildings, land and people to catastrophic accidents, toxic emissions and potential damage from decontamination activities.

Response: The NRC staff considered the effects of construction and operations activities on the attributes that contribute to the historic significance and cultural values of historic structures and archaeological sites near the proposed ACP facility within the reservation fence-line as well as houses, other historic structures, archaeological sites and earthworks beyond the fenceline. The analysis found that constructing and operating the ACP "over the fence-line from the Barnes Home" would not harm the cultural, historical or architectural values of the Barnes Home or other individual sites, structures and places that may be linked in the future by an effort to commemorate and promote tourism associated with local history. The NRC staff also considered the potential impacts from land use changes, but did not identify any land use conflicts with existing zoning or formal development plans.

General Comments

Comment: 015-14
A commenter suggested changing "United States Enrichment Corporation" to "USEC Inc." on lines 13,16, 19, 22, and 25 of page 2-64.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-15
A commenter suggested changing "NRC Docket No. 70-2004" to "NRC Docket No. 70-7004" on lines 14, 17, and 20 of page 2-64.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-16
A commenter suggested changing the text on line 27 of page 2-88 to read as, "...activity would involve a filament winding process, which will not..."

Response: The NRC staff has revised the text in Chapter 4 to reflect the commenter's suggestion.

J.10 Affected Environment

Historic and Cultural Resources

Comment: 008-2
One commenter asked NRC to explain the basis for the definition of the term cultural resources (Section 3.3). The commenter stated that the definition is important since it limits the range of phenomena upon which impacts are analyzed. The commenter stated that it does not appear that the definition is based on any United States or international guidance. The commenter noted that NRC should look at the concerns expressed and recommendations provided by the United Nations Educational, Scientific, and Cultural Organization in its Convention for the Safeguarding of the Intangible Cultural Heritage -- 2003.

Response: The definition is not intended to be exclusive of intangibles such as those identified in the cited convention (oral traditions, performing arts, social practices, knowledge and practices concerning nature, traditional craftsmanship). By pursuing consultation with tribes that might have information or concerns, NRC attempted to identify elements of intangible cultural heritage that might be affected by ACP construction or operation, but no further information was provided by the tribes that provided initial expressions of concern. NRC described the proximity to the DOE reservation boundary of the kill site and exhibition site of the last passenger pigeon and considered the effects of ACP construction and operation on those locations in its analysis.

Comment: 008-3
A commenter stated that the review process under Section 106 of the National Historic Preservation Act is inaccurately characterized as a process "done in consultation with the State Historic Preservation Officer (page 3-5);" later, passing reference is made to "provid(ing) Indian tribes the opportunity to identify concerns." The commenter stated that, in fact, the Section 106 regulations (36 CFR 800) make it abundantly clear that the process is done in consultation with the State Historic Preservation Officer, Tribal Historic Preservation Officers, Indian tribes, and other interested parties. The commenter indicated that the failure of NRC to engage in such consultation is at the heart of the Draft EIS' inadequacies. The commenter suggested that NRC re-read the Section 106 regulations and relevant guidance from the Advisory Council on Historic Preservation and the Secretary of the Interior, and recast the discussion in the EIS to accurately reflect their direction.

Response: The NRC staff agrees with the commenter that the Section 106 consultation potentially involves multiple parties. The NRC staff has attempted to consult with many Indian tribes with possible ties to southern Ohio as indicated by the Ohio Historic Preservation Office and the National Park Service. The NRC takes its Section 106 responsibilities seriously. The text of the EIS (sections 3.3.5 and 1.5.6.2) was updated to reflect the NRC's efforts at communicating and consulting with the various tribes.

Comment: 008-4
A commenter stated that page 3-6 of the Draft EIS discusses an "area of potential effects" defined by the NRC staff for the project. The commenter believed the Area of Potential Effect appears to be based solely on the potential for direct and selected indirect physical effects and sees no evidence that direct or indirect visual, auditory, olfactory, or other non-physical effects were given any consideration, nor any evidence that cumulative effects on "cultural resources" of any kind were considered, in defining the Area of Potential Effect. The commenter requested that NRC reconsider the Area of Potential Effect with reference to all types of potential effects.

Response: The Area of Potential Effect was selected to include the potential for effects that would alter the feeling or setting of cultural resources. This is why the Area of Potential Effect extends beyond the direct footprints for new construction which fall into two areas within the perimeter road, and includes the entire DOE reservation. Noise and visual effects of construction and operations, including associated vehicular traffic, were considered in the evaluation.

Comment: 008-5
A commenter noted that the discussion of historic properties is overwhelmingly weighted toward specific archaeological sites and historic structures. The commenter argued that, particularly given the proximity of the project site to the Scioto Township Works, and the extensive cultural landscape modifications represented by such earthworks, it seems strange that so little consideration seems to have been given to cultural landscapes, and to relict landforms that may reflect such landscapes amid the damage caused to the area in the past by the DOE Reservation. The commenter requested that NRC consider attempting a more coherent, landscape-based approach to analysis of the area's historic properties.

Response: As indicated in the EIS, the Scioto Township Works at its closest is within 250 meters from the reservation boundary and approximately 1 kilometer from the Perimeter Road, within which construction and operations activities will take place. As also indicated therein, the earthworks had suffered substantial damage by 1902 and the 1997 archaeological survey report indicated that "recent gravel quarrying and cultivation has destroyed virtually all of this earthwork complex." The EIS demonstrates that no ground disturbing effects will extend to land this far from the ACP and there will be no noticeable change to the visual or aural setting during operations. Thus, this remnant landform and others that might be linked in a historic or cultural landscape analysis will not be harmed by the ACP. Because of the distance of these from the Area of Potential Effect, consideration of a landscape that includes them and others even more distant is outside the scope of the EIS analysis.

Comment: 008-6
A commenter indicated that page 3-9 of the Draft EIS describes unidentified “(i)nvestigators” who determined that 22 of the 36 previously unidentified archaeological sites “did not meet National register eligibility criteria.” The commenter questioned the basis for these determinations, and the “investigator’s” qualifications to make them. The commenter also asked how Indian tribes and other interested parties were consulted in the course of these evaluations. The commenter had the same questions pertaining to the evaluation discussed in the final paragraph on page 3-9.

Response: The investigators were professional archaeologists working as contractors to the DOE under the direction of the authors of the reports cited in the text, i.e., Schweikert 1997, DuVall and Associates 2003.

The reports cited in the Draft EIS provide professional evaluations of eligibility with reference to National Register of Historic Places Criterion D. The bases for the reports' determinations of ineligibility include site integrity, potential informational value, and site type. Some of the sites were sparse lithic scatters with no culturally diagnostic artifacts and others were considered ineligible site types (cemeteries and isolated finds were not considered eligible under Criterion D). The reports did not indicate any consultation with tribes, but did indicate contact and coordination with the Ohio Historic Preservation Office. The NRC provided information from the Schweikert report in its initial consultation letters to tribes and local government agencies and provided copies of the report to those parties that requested it.

Comment: 008-7
A commenter asked NRC to explain how it has completed its responsibilities under the Archaeological and Historic Preservation Act of 1974 (16 USC 469-469c-2) with respect to the individual archaeological sites discussed in section 3.3.3, and with respect to the prehistoric cultural landscape of which they are arguably parts.

Response: As discussed in 4.2.2, the NRC determined that none of these sites would be adversely affected by its action in licensing the project. None of these sites fall within the construction footprint and so are not within the area of potential effect for direct effects. The vast majority of new construction falls entirely on lands that were previously cleared and graded during construction of the Portsmouth Gaseous Diffusion Plant in the 1950s.

Comment: 008-8
A commenter asked how interested parties were consulted during the evaluation of the Gaseous Diffusion Plant discussed on page 3-10.

Response: The evaluation of the Gaseous Diffusion plant was carried out by the DOE and their contractor. The NRC is not aware of the specifics of how DOE consulted interested parties. It is noted that the Ohio Historic Preservation Office expressed the opinion that the proposed ACP would not adversely affect the Portsmouth Gaseous Diffusion Plant historic property (see Ohio Historic Preservation Office letter on page B-3).

Comment: 008-9
A commenter requested that NRC address the possible impacts of the proposed ACP on the landscape in the area of the location where the last passenger pigeon was killed, arguing that the location would likely be eligible for inclusion in the National Register of Historic Places.

Response: As indicated in Section 4.2.2, ACP-related construction and operations activities will not change the existing setting or feeling of the DOE reservation or lands outside it. New construction would be consistent with existing buildings and facilities, and operation of the ACP would not result in noticeable changes in auditory environment from processing noise.

Comment: 008-10
A commenter indicated that the discussion of the Barnes House is confusing in section 3.3.4. The commenter stated that if it is adjacent to the boundary of the reservation, it would seem that it must be subject to at least possible visual, auditory, or other non-physical effects, and impacts on its use, if not long-term physical impacts. The commenter asked for an explanation as to why NRC has not evaluated its eligibility for the National Register, and considered possible effects on it. The commenter further asked for an explanation of the relevance of the Ohio Historic Preservation Office's recommendation to the property owner regarding nomination of the site for the National Register of Historic Places.

Response: The NRC assumed that the property is eligible for the National Register for purposes of its analysis based in part on the feedback from members of the public and the letter from the Ohio Historic Preservation Officer. The potential impacts to the Barnes Home were considered in the context of its assumed eligibility under Criteria A and C, as described on page 4-6 of the Draft EIS. The Draft EIS neglected to state explicitly that the topography (rolling hillside with trees) between the Barnes Home and the construction locations within the Perimeter Road means that a person in the Barnes Home would not see the new construction. Furthermore, the new construction is consistent with the existing setting and feeling of the DOE reservation and the Portsmouth Gaseous Diffusion Plant Historic District within it; so

even a person viewing the ACP from the fence line behind the Barnes Home would not see a landscape setting and feeling different from present conditions.

Comment: 008-11

This commenter noted that Section 3.3.5 of the Draft EIS states that the Absentee Shawnee Tribe has indicated a concern about the Scioto Township Works and perhaps other earthworks in the area, but there is no evidence that the Tribe has been consulted about this concern. The commenter stated that there are copies of letters to various tribes appended to the Draft EIS (Appendix B), but these do not represent consultation; they merely inquire about whether the tribes have "specific knowledge of any sites that you believe have traditional religious and cultural significance." The commenter requested that NRC review pertinent guidance from the Advisory Council on Historic Preservation, the National Register of Historic Places, and the U.S. Environmental Protection Agency's Interagency Native American Environmental Justice Task Force, and explain the consultation with potentially concerned Indian tribes with reference to such guidance.

Response: The staff has attempted to consult with many Indian tribes with possible ties to southern Ohio as indicated by the Ohio Historic Preservation Office and the National Park Service. The NRC agrees that the initial letters do not constitute consultation; rather they are the first step in finding additional information and consulting parties. The NRC staff followed up the letters with numerous phone calls to elicit information from the Tribes regarding their interest in participating in the Section 106 consultation process. The vast majority of these tribes indicated that they had no specific information or were not interested. Though the Absentee Shawnee never responded to our letter or phone messages the NRC designated them a consulting party based on a letter submitted on their behalf. The NRC also designated the Seneca Nation as a consulting party based on their interest in the project. The NRC is well aware of its responsibilities under the National Historic Preservation Act and the commenter's reference to various tribal consultation guidance. The NRC takes these responsibilities very seriously as noted by the amount of staff effort that was expended in seeking information in this Section 106 consultation process. However, the NRC can not force a tribe to participate. After the initial letters were sent to the tribes, a follow-up phone call in June 2005 was placed to each tribe that had not responded or electronic communication was continued with some tribes that requested such methods. This process was repeated in August 2005. Through these various phone and electronic communications the NRC was able to determine that 13 of 15 recognized tribes either had no additional information or no interest in participating in the Section 106 process. The Seneca Nation expressed interest and the Absentee Shawnee never responded. The NRC staff's efforts to communicate and consult with the various tribes is consistent with the guidance the commenter references.

Comment: 008-12

A commented stated that the purpose of Section 3.3.6 of the Draft EIS is unclear. The commenter asked for an explanation of what information this section, as opposed to those sections preceding it, is supposed to convey. The commenter also asked for clarification of the phrase "potential historic property," and a description of properties that are not "potentially" historic.

Response: The purpose of Section 3.6.6 is to present a list of properties identified as historic properties (properties listed on the National Register) as well as properties that NRC would consider to be eligible for Register listing in its assessment of project effects. NRC has revised the section heading to read "Historic Properties and Properties Considered Eligible for Listing on the National Register."

Climatology, Meteorology, and Air Quality

Comment: 014-20
A commenter expressed concern about the use and/or disposal of chlorofluorocarbons at the Portsmouth Reservation. The commenter stated there was a large use of chlorofluorocarbons at the reservation, and that a significant amount of the Nation's chlorofluorocarbons emissions came from the reservation. Therefore, the commenter suggested the Final EIS should describe the types and amounts of chlorofluorocarbons at the reservation, and it should describe the planned use and/or disposal of chlorofluorocarbons at the reservation. The commenter requested that this discussion describe how chlorofluorocarbons management will comply with the Clean Air Act.

Response: USEC has indicated that it will not use Freon TA (or other chlorofluorocarbons).

Comment: 014-38
A commenter observed (Affected Environment Section 3.5 3.1 Current Emissions at the DOE Reservation, Radiological Emissions, Page 3-20) that the regulations for the radionuclide National Emission Standards for Hazardous Air Pollutants are dose standards from emissions, so the notation of the becquerel and/or curie emissions is misleading. A variety of radionuclides are potential contributors, each with different doses associated with each becquerel or curie amount. The standard is a maximum dose to the potential Maximally Exposed Individual of 10 millirem per year in excess of background exposures. The 2004 values should be referenced, since this is an annual compliance demonstration and earlier demonstrations are not relevant to the current compliance status of the Portsmouth Reservation.

Response: Using the released activity as a number can be misleading when trying to compare that to a dose-based standard, but in all cases for the Portsmouth site the values are well below the regulatory limits in the National Emission Standards for Hazardous Air Pollutants during the period of 2001-2003. According to the DOE Site Environmental Report for 2003 (DOE, 2004b), DOE emissions of radionuclides to the air in 2003 comprised a total of 0.00016 curies. This resulted in a maximum estimated dose of 0.0066 millirem. DOE also estimates the dose attributable to airborne releases from those facilities leased to USEC, the gaseous diffusion facilities and associated support buildings. The maximum estimated dose resulting from airborne releases in 2003 at the USEC operated facilities was approximately 0.033 millirem, providing a total maximum estimated dose from all sources of 0.04 millirem per year. The comparable value for 2002 was 0.031 millirem per year, consistent with the estimate for 2003. Both of these values are far below the 10 millirem per year limit in the National Emission Standards for Hazardous Air Pollutants rule. Based on the similarity of results for the period 2001-2003, which reflect a negligible dose well below regulatory limits, NRC does not believe changes were needed in the EIS.

Geology, Minerals, and Soil

Comment: 015-17
A commenter noted that technetium-99 is misspelled on line 19 of page 3-24.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Water Resources

Comment: 015-18
A commenter noted that the Draft EIS is misleading when it states on line 40 of page 3-25 that Little Beaver Creek receives "treated process wastewater...ditch)." The commenter indicated that "process wastewater" is not received there, and the only treatment the water (except the groundwater) receive is a settling period in the X-230J-7 East Holding Pond; thus no decontamination solutions, or a comparable material are discharged to the creek.

Response: The text of the EIS has been changed to reflect this comment.

Comment: 015-19
A commenter suggested deleting the word "process" on line 40 of page 3-25.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-20
A commenter suggested changing "612" to "012" on line 49 of page 3-25.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-21
A commenter suggested changing "19 permits" to "19 permitted outfalls" on line 15 of page 3-27.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-22
A commenter suggested changing "19 permits" to "19 permitted outfalls" on line 16 of page 3-27.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-23
A commenter suggested changing "permits" to "permitted outfalls" on line 28 of page 3-27.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-24
A commenter suggested changing "1" to "001" on line 5 of page 3-28 in the Outfall Column.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-25
A commenter suggested changing "2" to "002" on line 7 of page 3-28 in the Outfall Column.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-26
A commenter suggested changing “0.125" to “003" on line 9 of page 3-28 in the Outfall Column.

Response: The NRC staff has revised the text on page 3-28 *to reflect the commenter’s suggestion.*

Comment: 015-27
A commenter suggested changing “4" to “004" on line 11 of page 3-28 in the Outfall Column.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-28
A commenter suggested changing “5" to “005" on line 13 of page 3-28 in the Outfall Column.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-29
A commenter suggested changing “0.375" to “009" on line 15 of page 3-28 in the Outfall Column.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-30
A commenter suggested changing “0.4167" to “010" on line 17 of page 3-28 in the Outfall Column.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-31
A commenter suggested changing “11" to “011" on line 19 of page 3-28 in the Outfall Column.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-32
A commenter suggested changing “0" to “012" on line 21 of page 3-28 in the Outfall Column.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-33
A commenter suggested changing “0.042" to “013" on line 22 of page 3-28 in the Outfall Column.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-34
A commenter suggested changing “0.125" to “015" on line 23 of page 3-28 in the Outfall Column.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-35
A commenter suggested deleting “manganese” from the Parameters column on line 7 of page 3-30.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-36
A commenter suggested adding "Cadmium" to the Parameters column on line 7 of page 3-30.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-37
A commenter suggested deleting "Fluoride, manganese," from the Parameters column on line 9 of page 3-30.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-38
A commenter suggested adding "Cadmium, mercury," to the Parameters column on line 9 of page 3-30.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-39
A commenter suggested changing "weekly composite" to "monthly grab" on line 8 of page 3-31.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-40
A commenter suggested adding "are taken quarterly" to the end of the sentence on line 11 of 3-31.

Response: This information has been updated to reflect the correct information pertaining to sampling.

Comment: 015-41
A commenter suggested adding "are taken quarterly" to the end of the sentence on line 15 of page 3-31.

Response: This information has been updated to reflect the correct information pertaining to sampling.

Ecological Resources

Comment: 005-8
A commenter noted (Page 3-36, Section 3.8 Ecological Resources, line 1) that all ecological resources should be managed appropriately. The ACP should limit disturbance to only those areas in and around the facilities needed for production.

Response: The purpose of Section 3.8 is to define the ecological resources potentially affected by the proposed action. Section 4.2.7, Ecological Impacts, discusses the potential impacts which would be limited to only those areas in and around the facilities needed for production.

Comment: 005-9
A commenter noted (Page 3-40, Section 3.8.3 Rare, Threatened, and Endangered Species, line 42) Ohio EPA has recently completed a stream survey of the creaks and streams surrounding the facility. The commenter suggested the EIS should include the recent data in the report for evaluations.

Response: NRC consulted with the Ohio Department of Natural Resources, Division of Wildlife and Division of Natural Areas and Preserves and with the U.S. Fish and Service to identify both State and

Federally-listed threatened and endangered species. Through the publication and review of the EIS, the Ohio EPA and the Ohio Department of Natural Resources, Division of Wildlife and Division of Natural Areas and Preserves and with the U.S. Fish and Service all had the opportunity to comment on the Draft EIS. Those agencies did not indicate any deficiencies in the data that would alter the analysis or conclusions.

Comment: 015-42
A commenter suggested changing "X-611a" to "X-611A" on line 34 of page 3-40.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-43
A commenter suggested changing "X-611b" to "X-611B" on line 35 of page 3-40.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-44
A commenter suggested deleting the Q1 and Q4 on line 37 of page 3-41 in Table 3-12 since they are not used.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Environmental Justice

Comment: 014-45
A commenter (Affected Environment Section 3.10.2 Low-Income Populations, Table 3-25, Page 3-59) observed there appears to be a typographical error in the Weighted Average Threshold for "One Person" in the table. The commenter suggested this needs to be clarified for any type of comparability.

Response: NRC has revised the text accordingly.

Comment: 008-20
A commenter asked why the environmental justice analysis gave no consideration to disproportionate adverse environmental impacts to the cultural interests of such minority groups as the Absentee Shawnee and other tribes. The commenter suggested that NRC review pertinent EPA guidance and address these impacts.

Response: The NRC staff used both demographic data and scoping to identify minority and low-income populations. The analysis used to identify the location of minority and low-income persons and the results are presented in Section 3.10 of the EIS. The environmental justice guidance provided by the Executive Order 12898, the NRC, or the Council on Environmental Quality requires that any disproportionate impacts to minority and low-income populations near the site be identified and addressed. The NRC staff also examined environmental pathways to determine if any minority or low income populations appear to be disproportionately at risk. None of the impacts that were greater than SMALL were found to disproportionately affect minority or low income populations as detailed in Section 4.2.9 of the EIS.

Public and Occupational Health

Comment: **014-46**
A commenter stated (Affected Environment Section 3.13.1 Background Radiological Exposure, Page 3-65 paragraph 1) the standard is a maximum dose to the potential Maximally Exposed Individual of 10 millirem per year in excess of background exposures. The 2004 values should be referenced since this is an annual compliance demonstration and earlier demonstrations do not reflect the current compliance status of the facility. The commenter stated that neither of the new proposed facilities at the Portsmouth Reservation has submitted information to demonstrate their potential compliance status in an opening status to date. The estimates provided cannot be considered to be adequate until such time as they have been fully evaluated.

Response: Data from 2002 and 2003 show no significant changes in the compliance status for the site under National Emission Standards for Hazardous Air Pollutants. USEC included expected operating releases in their license application to NRC, and these numbers were used by the NRC staff to model the expected maximum doses from operation of the ACP. These results are discussed in Chapter 4 of the EIS. Future compliance for the ACP will be demonstrated by an annual National Emission Standards for Hazardous Air Pollutants report filed by USEC.

Comment: 015-45
A commenter suggested changing "healthy work effect" to "healthy worker effect" on line 24 of page 3-69.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Waste Management

Comment: 014-26
A commenter observed (Page 3-71, Line 42) the Draft EIS states: "Section 3113(a) of the USEC Privatization Act (Public Law 42 104-134) requires DOE to accept low-level radioactive waste, including depleted uranium that has been determined to be low-level waste, for disposal, upon the request of, and reimbursement of costs by, the United States Enrichment Corporation. To date, this provision has not been invoked, and the form in which the depleted uranium would be transferred to DOE has not been specified."

The commenter stated the Final EIS should state who makes the low-level waste determination. Considering that during its operation the ACP is expected to generate about 571,000 metric tons of depleted UF_6, nearly as much as DOE generated during its 50 years of enrichment operations, the Final EIS should clearly specify how ACP will manage depleted UF_6 throughout the full term of the NRC license, including the form in which the depleted uranium would be transferred to DOE. The Final EIS should describe an implementable and legally defensible disposition path for all of the wastes that the ACP will generate.

Response: On January 18, 2005, the Commission issued its ruling that depleted uranium is considered a form of low-level radioactive waste. The Commission also stated that disposal of depleted uranium tails at a DOE facility represents a plausible strategy for the disposition of depleted uranium tails. The tails most likely will be transferred to DOE in the form of depleted UF_6.

Comment: 014-27
A commenter observed (Page 3-75, Line 5) the Draft EIS states: "Classified/sensitive waste is any waste considered as such for security reasons. These materials may be classified due to configuration, composition, contamination, or contained information. Classified waste may be categorized as non-hazardous waste or as low-level radioactive depending upon its point of and method of generation."

A commenter stated the ACP will be a commercial facility operating on leased federal property for commercial production purposes. The Final EIS should state and describe: 1) who will have the authority at the ACP to make "classified/sensitive" determinations; 2) third party federal reviews of the "classified/sensitive" waste determinations that are made; 3) whether any of the "classified/sensitive" wastes are exempt in any way from U.S. Environmental Protection Agency, Ohio Environmental Protection Agency, or NRC regulatory authority; 4) whether it is possible for ACP personnel to make "classified/sensitive" waste determinations; 5) whether ACP personnel will have authorities delegated to it by DOE, such as under the Atomic Energy Act; 6) whether there will be activities at the ACP that are subject to DOE oversight and exempt from NRC regulation; and 7) why a commercial facility with a civilian mission would generate "classified/sensitive" wastes requiring "classified/sensitive" determinations. Also, the Final EIS should state whether RCRA-regulated mixed wastes could be generated that are considered classified.

Response: The classified/sensitive waste is primarily classified machine parts from the ACP process equipment and secondarily documents and electronic or other media containing classified/sensitive information. The machine parts may be radioactively contaminated (i.e., low-level waste), but are not expected to be a hazardous waste. The documents and media are normal office waste except for the classified/sensitive information and will be disposed of as such, following destruction in accordance with the ACP Security Program.

There is no regulatory time limit associated with accumulation and disposal of classified/sensitive waste. Classified material that is to be shipped off-site to an approved facility for disposal is placed in, and accumulated within, approved secure storage containers or attended until such time that the shipping off-site is deemed necessary (i.e., until an economically practical amount for a shipment to a disposal facility is available). The current generation rate for classified/sensitive waste is very low, so it is anticipated that a single shipment may require an extended period to accumulate. Consequently, the storage time could range from a month to years before USEC Inc. accumulates enough classified waste to fill a single disposal container. Classified/Hazardous waste will have a 90-day accumulation time limit. Shipments of low-level mixed waste will occur approximately every 90 days. Any classified Low-level mixed waste will remain on-site and managed in accordance with the Low-level mixed waste rules in Ohio Administrative Code 3745-266 until shipments can be scheduled to an approved Treatment, Storage, Disposal, Recycling Facility.

Comment: 014-28
A commenter observed (Page 3-75, Line 12) the Draft EIS states: "Classified waste is stored onsite prior to disposal in classified offsite disposal facilities." The Final EIS should state the duration that classified waste is stored on site prior to offsite disposal and who has the regulatory authority for classified waste generated by ACP personnel or any other personnel at the USEC-leased areas.

Response: Classified wastes would be stored in accordance with the appropriate security and regulatory requirements and would be disposed at an appropriate site in accordance with regulatory requirements.

Comment: 015-46
A commenter suggested changing “16,190" to “16,109" on line 38 of page 3-74 in Section 3.14.3.1 in order to be consistent with Table 3-31.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-47
A commenter suggested changing “XT847" to “XT-847" on line 13 of page 3-74.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-48
A commenter suggested changing “United States Enrichment Corporation” to “USEC Inc.” on lines 33, 36, and 42 of page 3-80.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-49
A commenter suggested adding “NRC Docket No. 70-7003" before the date on line 34 of page 3-80.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

General Comments

Comment: PMT-008-1
A commenter asked what happened with the centrifuge plant in the seventies and were there environmental impacts then.

Response: Section 2.1 briefly discusses the former gas centrifuge plant that was developed in the 1970's in terms of dismantling the former facility and disposing of the material. The environmental impacts of the development and operation of the former gas centrifuge plant were discussed in the Final Environmental Statement, Portsmouth Gaseous Diffusion Plant Expansion, Piketon, Ohio. (ERDA-1549, September 1977, section 5.1.3 pages 5-8 through 5-39).

J.11 Environmental Impacts

Historic and Cultural Resources

Comment: PMT-010-2
A Commenter expressed frustration over the description of the Barnes home in the Draft EIS as qualifying under criteria A and C, and then not explaining from where those criteria came.

Response: The National Register eligibility criteria are listed in the second paragraph of Section 3.3.

Comment: PMT-010-4
A commenter expressed concern that he was not made a consulting party with respect to historic and cultural resources review during the development of the Draft EIS even though the commenter had made his interests known to the NRC starting in December 2004. The commenter noted that he had information that he would make available to the NRC and would also be happy to give NRC a tour of his property.

Response: The NRC used the information supplied by the commenter in its analysis of effect on historic properties. For example, the commenter provided extensive scoping comments in February 2005 as well as multiple submittals to the NRC's Atomic Safety and Licensing Board in the ongoing formal hearing. The commenter requested to be a consulting party on August 9, 2005. The NRC, as required by the Section 106 regulations, consulted with the Ohio Historic Preservation Office who concurred with making the commenter a consulting party. The NRC transmitted notice of the commenter's consulting party status in a formal letter dated September 6, 2005. Further attempts were made to solicit information from the commenter in emails dated October 24, November 23 and December 7, 2005.

Comment: PMT-010-4-1
A commenter noted that there were only three properties listed in the Draft EIS as being historic properties. The commenter stated that information submitted to the Atomic Safety and Licensing Board with detailed information about all the historic properties in the affected area, including the Sargent Home, and the Rittenour home.

Response: The NRC focused its identification and evaluation effort on the Area of Potential Effect (see box on page 4-5). The Sargent home and Rittenour home fall outside the Area of Potential Effect.

Comment: PMT-010-4-2
A commenter stated that the importance of the Rittenour estate were the numerous Indian earthworks. The commenter noted that one of the earthworks, a long, linear earthwork seized by DOE in 1983 by eminent domain and is one of the places where DOE and then USEC has placed their water field from which they will draw the water to supply ACP. The commenter stated that the Draft EIS lacks data on the earthworks located on the water field site, called the Gas Centrifuge Enrichment Plant water field down along the Scioto river. The commenter indicated that there is a statement available from three experts certifying that there is an earthwork there, right underneath the wells from which USEC will draw water.

The commenter stated that the problem in the Draft EIS analysis is that it follows the USEC model of analyzing only the overall water usage of the plant. The commenter stated that the real question is what is the impact of water usage at the earthworks site where the earthworks are located. The commenter stated that the National Historic Preservation Act mandates that studies be done when such a cultural resource is found on Federal land. The commenter argued that part of the Section 106 review that the Draft EIS completely neglects and overlooks is the requirement to mandate studies of the hydrological impacts on those cultural resources that have been identified on Federal land.

Response: The commenter is referred to Sections 4.2.2.2 and 4.2.6.2 of the Draft EIS for discussion of the potential that subsidence and associated alterations in ground surface would occur around water wells used to supply ACP operations. It is also noted that, subsequent to publication of the Draft EIS, the NRC received a statement from Mr. Blaine Beekman, a local resident and President of the Piketon Chamber of Commerce, who described construction of three levees along the Scioto River after a 1959 floo (see comment 011-1 in the Water Resources section). Two levees were constructed to protect agricultural fields. One, in and around the area of the Gas Centrifuge Enrichment Plant well field, was constructed in the 1980s and 1990s of quarry overburden to clear space for additional excavation and to protect the lower terrace against flooding for future quarrying activities.. From this information, it appears that the earthworks of concern to the commenter are flood control levees constructed within the past 50 years. The NRC agrees with the commenter that Section 106 does require identification of historic properties and a good faith effort to carry out appropriate identification efforts within the Area of Potential Effects The NRC does not agree that it is required to either fund or carry out further studies if

adequate information is available to identify historic properties. The NRC believes adequate information is available about these flood control levees to determine that they are not historic properties. It is still the NRC's position that there would be no effect on these structures from continued pumping at this DOE well field .

Comment: PMT-017-2
A commenter stated that the extinction of the passenger pigeon is an incredible historical tale and right here, in Pike County, at the site of the Barnes house, and on that property, is where that last bird was shot, and that makes this location quite important in the history of the environment of the United States, the history of Pike County, the history of southern Ohio, the history of Ohio, the history, really, of our nation. The commenter noted that the Draft EIS states that there are no large impacts on historic and cultural resources. The commenter believes that the proposed ACP would have a large impact and that the facility will continue to desecrate Native American sacred spaces.

Response: The NRC does not disagree with the commenter about the importance of the passenger pigeon extinction; however, there is no evidence, either through the NRC's review or presented by the commenter, that there are any possible effects on the attributes that would make the passenger pigeon kill site eligible for the National Register. The existing DOE Gaseous Diffusion Plant is part of the cultural landscape and has been for over 50 years. The proposed ACP would not change that landscape as all proposed structures are similar in stature, color, shape, to the existing Portsmouth Gaseous Diffusion Plant. ,The proposed ACP would serve the exact same purpose as the Portsmouth Gaseous Diffusion Plant and operations activities would not be noticeably different from previous activities at the plant, when viewed or heard from outside plant buildings. With regard to Native American concerns, as indicated on pages 3-9 and 4-9 of the Draft EIS, the distance of the Scioto Township Works from the construction area and the fact that new operations activity would not be noticeably different lead to the conclusion that ACP construction and operations would not change the existing setting and feeling of this site that was mentioned in a letter from the Absentee Shawnee Tribe of Oklahoma .

Comment: 002-1
A commenter stated that throughout the discussions of cultural resources and consultation with the Ohio Historic Preservation Office, the Draft EIS offers the impression that there is concurrence that there will be no historic properties affected by the proposed and cumulative project development. The commenter noted: 1) the inset table on Page xxii defines "Small" as "...effects that are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource;" 2) Table 2-7 (Page 2-38), presents the finding that the impacts to historic and cultural resources would be small. This finding is repeated in Table 2-8 (Page 2-50); 3) on Pages 4-5 and 4-6, the Draft EIS states that there is concurrence with the OHPO on a finding of "no effect" for the undertaking and that the impacts would be "SMALL." The commenter stated that it was the intent of the letter dated May 20, 2004, to set forth as part of ongoing consultation the commenter's interpretation that the proposed project would not adversely affect historic properties. That is, there are historic properties in the Area of Potential Effects, but the proposed project will not diminish the qualities and characteristics that make them significant. The commenter believed that the changes will be noticeable and in some ways the immediate impacts from the proposed undertaking are perhaps more along the lines of MODERATE as compared to SMALL impacts. The commenter stated that from a philosophical perspective, as the Gaseous Diffusion technology is replaced there will be changes to the Cold War buildings but since science is not static we shouldn't expect our recognition of significance based on science and technology to require static preservation.

Response: NRC did not intend to imply that there are no historic properties in the Area of Potential Effects. We agree that there are historic properties within the APE, and we agree with the commenter

that "the proposed project will not diminish the qualities and characteristics that make them significant," or, as the regulations specify in the definition of "effect" at 800.16(i), there will be no project-related "alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register."

The document has been changed to reflect commenter's interpretation that the proposed project would not adversely affect historic properties.

The characterization of impacts on a scale from SMALL to LARGE is a departure from National Historic Preservation Act Section 106 evaluation of effect, referring rather to Council on Environmental Quality guidance as explained on DEIS page 4-1. NRC believes that under those definitions, "important" attributes equate to "characteristics of a historic property qualifying it for eligibility for the National Register," or, in the terms of the commenter, "the qualities and characteristics that make a property significant." Thus a characterization of MODERATE would apply if an undertaking were to noticeably alter "important" attributes, that is, attributes that qualify a property for the National Register. Given the commenter's statement that "there are historic properties in the Area of Potential Effects, but the proposed undertaking will not diminish the qualities and characteristics that make them significant," NRC believes that the characterization of a SMALL level of impact under the CEQ guidance is appropriate.

Comment: 002-5
The commenter noted that on Page 3-7, the Draft EIS states that an initial archaeological survey of the DOE reservation was completed in 1952 and reportedly found no evidence of archaeological materials with reference to a 1977 Environmental Impact Statement. The commenter requested a copy of relevant portions of this 1977 document. The commenter suggested that it might be helpful to include copies of selected portions in the Final EIS report for this undertaking. The commenter further stated that it can be difficult to compare meaningfully work completed in 1952 when there was no authority to take into account affects of undertakings on historic properties with work being conducted today (and since 1986) under authority of the National Historic Preservation Act of 1966, as amended, and its implementing regulations at 36 CFR 800.

Response: NRC agrees that it is difficult to rely on early work as a basis for archaeological inventory but included the 1952 information in the EIS for completeness.

Comment: 002-6
A commenter stated that there are several places where the Draft EIS refers to sites, buildings, structures, and districts with potential National Register eligibility. For instance, the Draft EIS states that identified archaeological sites that have not yet been fully evaluated for National Register eligibility (and refers to them as potentially eligible) be treated as eligible for inclusion in the National Register (Page 4-5 - inset text box). There are also references to the potentially eligible Barnes Home and potentially contributing elements within the historic district. The commenter believed that there is a slight and subtle shift in the meaning of the word potential differentiating potential effects and potential impacts from potential significance and potential eligibility, and that this shift in meaning could lead to some confusion if not clarified. Regarding the 14 identified archaeological sites that have not been fully evaluated for National Register eligibility, the commenter suggested that NRC consider language that establishes the specific measures that will be taken to protect the sites from effects during this undertaking until such time as sufficient information is available to complete the evaluation; that is, treat them as archaeological sites that are being protected not as historic properties that are being protected. For the Bames House, and for the listed Scioto Township Works I archaeological site, the commenter suggested assessing the potential

for the undertaking to have effects based on those qualities and characteristics that are known and understood to contribute to the importance of these properties recognizing that we may have a better understanding of these properties in the future.

Response: The NRC agrees that the use of "potential historic properties" appeared to confuse readers, and the heading of Section 3.3.6 will be revised to read "Historic Properties and Properties Considered Eligible for Listing on the National Register." The NRC chose to treat unevaluated sites as if they were Register-eligible in order to provide decision makers with a conservative estimate of project effects. As indicated in the evaluation, there are no expected direct effects on these sites, and indirect effects of worker vandalism would be controlled through standard best management practices. Thus, the ACP project will have no effect on these unevaluated sites, and the DOE and State Historic Preservation Officer can continue to define what is needed to complete their evaluation. NRC attempted in its impact assessment for the Barnes Home and the listed Scioto Township Works site to address precisely what the commenter suggests, the qualities and characteristics currently known to contribute to their importance (architectural and associational qualities of the Barnes Home; informational values and traditional cultural values of the Scioto Township Works). The basis for NRC's finding that the project would not alter the characteristics currently known to qualify the sites for listing or eligibility for the National Register - the distance of the sites from project-related changes from existing conditions - should encourage those who expect that the understanding of these properties will be improved in the future, for it means that this project is unlikely to jeopardize other characteristics that may come to be known as significant.

Comment: 002-7
A commenter stated that the Draft EIS carefully considers the use of existing wells and finds that this will not result in changes to the ground around the wells and will not result in increased maintenance activities around the wells that has the potential to adversely affect historic properties. The commenter further noted that if the wells immediately west of the Reservation are on an embankment that is part of an earthwork complex dating to some 2,000 years ago and if this archaeological site meets National Register criteria, the commenter would agree with NRC's inclusion of this area with the project's finding, that the use of the existing wells will not adversely affect historic properties, provided that sufficient safeguards and conditions are in place to continue consultation if future work is proposed around these wells, or becomes necessary around these wells, that would have the potential to adversely affect historic properties. The commenter recommended that NRC develop appropriate conditions to provide for preservation the areas around the wells until such time as these areas can be more fully evaluated.

Response: Subsequent to publication of the Draft EIS, the NRC received a statement from Mr. Blaine Beekman, a local resident and President of the Piketon Chamber of Commerce, who described construction of three levees along the Scioto River (see comment 011-1 under Water Resources). Two levees were built to protect agricultural fields after a 1959 flood.The embankment to which the commenter is referring was constructed of quarry overburden dumped between the DOE wells and the riverbank to free space for more excavation and to protect the adjacent terrace for future quarrying. Thus it appears that there is no need for additional evaluation of the embankment around the wells.It is still the NRC's position that there would be no effect on this embankment from continued pumping at this DOE well field.

Comment: 002-8
The commenter is in general agreement with the conclusions and findings presented in the Draft EIS. Within the integrated NEPA review process, this reaffirms the commenter's interpretation that the proposed ACP undertaking will not adversely affect historic properties. The commenter noted that there

are some places in the Draft EIS where it would be helpful for the documentation to provide greater clarity and precision to facilitate the discussion of archaeological sites, architectural properties and other kinds of cultural resources, within the overall assessment of effects. The commenter believes it would also be helpful to reinforce language that establishes conditions to restrain effects from rising to adverse levels.

Response: For greater clarity, the NRC staff has created a summary table of the historic properties and properties considered eligible for listing on the National Register, and the historic values associated with them. All of these properties were evaluated within the overall assessment of effects regardless of whether or not they are actually listed on the National Register.

The NRC has established no formal conditions for USEC regarding effects on historic and cultural resources; however, USEC would only be licensed to conduct activities in the form described in Chapter 2 of the EIS. In other words, site preparation and construction would only be permitted in the southwest quadrant of the central area of the DOE reservation and in the cylinder storage yard area just north of the Perimeter Road in the northeast part of the DOE reservation. Operations activities would only take place in the primary and secondary facilities described in Chapter 2. The net result is that USEC's proposed action would not cause ground disturbance in areas where there are properties potentially eligible for the National Register under Criterion D, and would not cause any change in feeling or setting in areas where there are properties potentially eligible under Criteria A or C.

Table J-1 Historic Properties and Properties Considered Eligible for Listing on the National Register

Resource Name	Description of Historic Value
Portsmouth Gaseous Diffusion Plant Historic District	This site is eligible for listing on the National Register under Criterion A, "associated with events that have made a significant contribution to the broad patterns of our history." The specific buildings and other elements that contribute to the district's eligibility under Criterion A and the precise boundaries of the district have not yet been defined.
Prehistoric lithic scatter (33 Pk 210)	This site was thought to be eligible for listing on the National Register under Criterion D, "have yielded, or may be likely to yield information important in prehistory or history." However, further archaeological survey results indicated that the site does not meet this criterion and thus is not Register-eligible (DuVall & Associates, 2003; DOE, 2003a). For the purposes of this impact analysis, however, the site was treated as if it were eligible.
Thirteen historic farmsteads	These sites may be eligible for listing on the National Register under Criterion D, "have yielded, or may be likely to yield information important in prehistory or history," but a final determination has not been made. For the purposes of this impact analysis, the site was treated as if it were eligible.
Scioto Township Works	This site is listed on the National Register under Criterion D for its archaeological values. In addition, the Absentee Shawnee Tribe has indicated that this site has cultural values.
Barnes Home	This site may be eligible for listing on the National Register under Criterion A for the historical significance associated with the Sargent's Passenger Pigeon and Criterion C for the property's architectural significance. However, a final determination has not been made. For the purposes of this impact analysis, the site was treated as if it were eligible.
Bailey Chapel	Portsmouth Gaseous Diffusion Plant Historic District

Comment: 008-13
A commenter stated that Section 4.2.3; Page 4-5 again includes NRC's definition of Area of Potential Effect but provides no justification for the definition (denying the possibility of other-than-physical impacts). The commenter again asked NRC to reconsider its Area of Potential Effect definition with reference to contemporary best practice.

Response: The Area of Potential Effect was selected to include the potential for effects that would alter the feeling or setting of cultural resources. This is why the Area of Potential Effect extends beyond the direct footprints for new construction which fall into two areas within the perimeter road, and includes the entire DOE reservation. Noise and visual effects of construction and operations, including associated vehicular traffic, were considered in the evaluation.

Comment: 008-14
A commenter stated that Section 4.2.2.1 of the Draft EIS first suggests that various activities could have effects on historic properties by destroying or altering contributing elements of the Gaseous Diffusion Plant, but then vaguely implies that such effects will be "properly controlled" and hence will have "no effect." The commenter argued that this is not a possible determination under the Section 106 regulations. The regulations permit "conditional" determinations of "no adverse effect," but not conditional determinations of "no effect" (strictly speaking, determinations of "no historic properties subject to effect"). The commenter stated that if actual procedures are to be put in place, developed in consultation with the SHPO and other interested parties, by which to "properly control" damage or destruction of historic properties and their elements, then perhaps a determination can be made that there will be no adverse effect, but not no effect. The commenter suggested that NRC review the requirements contained in 36 CFR 800.5 and reconsider this section of the EIS.

Response: The NRC did not include conditions in its conclusion that there would be no direct or indirect effect on the contributing elements of the Portsmouth Gaseous Diffusion District. Language in the second sentence of Section 4.2.2.1 has been clarified to remove the reference to "control" of construction activities. Nevertheless, in response to Comment 002-1, NRC has changed the finding in the FEIS to "no adverse effects on historic properties." Please see the response to Comment 002-1 for discussion of the change.

Comment: 008-15
A commenter suggested that NRC's determination with respect to the archaeological sites continues to express ignorance of any cultural landscape values or traditional cultural values that may be ascribed to the landscape by Indian tribes or others. The commenter requested that NRC review the pertinent regulations and guidance and reconsider this analysis.

Response: The EIS demonstrates that no ground disturbing effects will extend to land outside of the construction footprint and there will be no noticeable change to the visual or aural setting during operations. Thus, Scioto Township Works and other earthworks that might be linked in a historic or cultural landscape would not be harmed by the ACP. Because of the distance of these from the Area of Potential Effect, consideration of a landscape that includes them and others even more distant is outside the scope of the EIS analysis.

Comment: 008-16
A commenter stated that on page 4-6 of the Draft EIS, NRC concludes that there will be no effect on the Scioto Township Works, but it does so (a) without any clear definition of the actual boundaries of the Works or their possible relationship to other cultural landscape features, and (b) without any consultation

with the Absentee Shawnee or other tribes that may (and in the case of the Absentee Shawnee, say they do) ascribe cultural significance to the Works and other landscape features in the area. The commenter requested that NRC review pertinent Advisory Council, National Register, and EPA guidance and reconsider this casual dismissal of effects on the site.

Response: Distance to the closest portion of the Scioto Township Works is specified on pages 3-9 and 4-5 of the EIS. The NRC staff has attempted to consult with many Indian tribes with possible ties to southern Ohio as indicated by the Ohio Historic Preservation Department and the National Park Service. The NRC staff sent letters and made phone calls to elicit information from the Tribes regarding their interest in participating in the Section 106 consultation process. The vast majority of these tribes indicated that they had no specific information or were not interested. Though the Absentee Shawnee never responded to our letter or phone messages, the NRC designated them a consulting party based on a letter submitted on their behalf. No further comments were received from the Absentee Shawnee Tribe of Oklahoma after the initial letter submitted as part of a petition for intervention, although two letters were sent to the attention of the Ohio Historic Preservation Office at the address provided on the initial letter.

Comment: 008-17
A commenter expressed concern over the discussion of the Barnes Home. The commenter stated that NRC has provided no evidence that it has performed any sort of analysis of the Barnes Home's eligibility -- suggesting instead that it is the property owner's responsibility to nominate the place to the National Register. The commenter argued that NRC has developed no basis whatever to say anything about the eligibility of the Barnes Home, the elements that may contribute to that eligibility, or the effects of the project (direct, indirect, or cumulative) on such elements. The commenter requested that NRC develop such a basis, in consultation with interested parties and in a manner consistent with pertinent guidance.

Response: As indicated on EIS page 3-10, correspondence from the Ohio Historic Preservation Office indicated that the property may be eligible under criteria A and C. Information about the property was also provided as part of a submittal in support of an intervention. Although it is not the responsibility of NRC staff to nominate it, the staff treated it as eligible for purposes of analysis.

Comment: 008-18
A commenter noted that Section 4.2.2.2 of the Draft EIS seems to be predicated on the assumption that the only possible “indirect” effects of facility operation would be vandalism by workers within the facility boundaries. Please explain the rationale for this assumption. The commenter asked if there will be no other long-term indirect or cumulative effects on the local environment that might alter historic properties, and why should vandal workers stay within the fence? The commenter also questioned why NRC considers only the “information values” of the Scioto Township Works, considering that the Absentee Shawnee Tribe, at least, has indicated concerns that may well go beyond information values?

Response: Section 4.2.2.2 is a series of paragraphs exploring potential operations effects to different site types. Sources of effects are identified as regular presence of operations personnel on the DOE reservation and movement of trucks in and out and within the reservation. Of these sources, it is expected that truck movements would not affect archaeological sites, workers might. The NRC considered both the effects on information values at Scioto Township Works, and also effects on existing setting or feeling of the site; please see the entire first paragraph on page 4-7 of the EIS.

Comment: 008-19
A commenter noted that throughout the discussion of impacts on historic and cultural resources, potential impacts are referred to as "SMALL." The commenter asked what this means with reference to (a) the significance of impacts under NEPA and (b) the criteria of adverse effect found in 36 CFR 800?

Response: The characterization of impacts on a scale SMALL to LARGE is a departure from National Historic Preservation Act Section 106 evaluation of effect, referring rather to Council on Environmental Quality guidance as explained on EIS page 4-1."

Comment: 008-26
The commenter argued that NRC simply dismissed the potential impacts to cultural resources in the Draft EIS, making a determination that no significant impacts would occur, and then writing the Draft EIS to justify this assertion.

Response: The NRC takes its responsibilities under National Historic Preservation Act and related guidance very seriously. The NRC believes that it identified cultural resources within the area of potential effect and objectively evaluated possible project-related impacts. As discussed in 4.2.2, the NRC determined that its action in licensing the project would have no effect as defined at 36 CFR 800.4.d.1 on cultural resources within the Area of Potential Effect.

Comment: 010-2-1
A commenter stated that no analysis was ever done on the potential historic properties in the area in accordance with the National Historic Preservation Act.

Response: The NRC identified both properties listed on the National Register and properties that may be eligible for listing. The NRC focused its identification effort to the Area of Potential Effect, which excluded some historic structures in the surrounding area that some of the commenters brought to NRC's attention.

Comment: 010-2-2
A commenter stated that the existing site has been a detriment to the community and enlarging it will continue that degradation. The commenter went on to state that, in the process, it will destroy more Hopewell Indian relics and more of the early history of Ohio will be lost.

Response: The analysis did not identify Hopewell Indian sites in any area where there will be ground disturbance. As discussed in 4.2.2, the NRC determined that none of the archaeological sites discussed in the EIS would be adversely affected by its action in licensing the project.

Visual and Scenic Resources

Comment: PMT-010-3
A commenter disagreed that the Draft EIS states there are no aesthetic or visual impacts to the commenter's personal property.

Response: As indicated in Section 4.2.2, ACP-related construction and operations activities will not change the existing setting or feeling of the DOE reservation or lands outside it. New construction would be consistent with existing buildings and facilities, and operation of the ACP would not result in noticeable visible changes. The topography (rolling hillside with trees) between the Barnes Home and the construction locations within the Perimeter Road prevents a direct line of sight between the Barnes

Home and the new construction sites. Furthermore, since the new construction is consistent with the existing setting and feeling of the DOE reservation and the Portsmouth Gaseous Diffusion Plant Historic District within it, a person viewing the ACP from the fence line behind the Barnes Home would not see a landscape setting and feeling different from present conditions.

Climatology, Meteorology, and Air Quality

Comment: 014-29
A commenter (Page 4-11, Table 4-1) expressed concern that modeling data for air contaminants was missing from the Draft EIS. The Draft EIS provides predicted concentrations for some criteria pollutants during site preparation and construction activities at the project site. The Draft EIS, however, omits data for ozone and lead. The commenter recommended that the Final EIS should include this information. The ozone forecast data should be presented as an 8-hour average, and the lead forecast data should be presented as a quarterly average, in order to compare the data to the National Ambient Air Quality Standards for these pollutants.

Response: The proposed action will not emit any lead emissions to the atmosphere. Thus no modeling for lead is needed. The Piketon facility is located in an attainment region for ozone. Ozone is formed as a result of precursor emissions of nitrous oxide (NO_x) and volatile organic compounds. The maximum rate of emissions that may occur is the operation of the facilities twenty-six 900 horse power diesel-powered emergency generators and daily commute and delivery truck trips. The generators are for emergency use only and will only be permitted to operate for a maximum of 500 hours per year. Total annual emissions from the operations are 143 tons per year of oxides of nitrogen and 4.9 tons per year of volatile organic compounds. These emission rates are well below the threshold amount for New Source Review trigger of 250 tons per year of any regulated New Source Review pollutant. Because ozone formation is a regional issue affected by emissions for an entire area, the small additional cumulative contribution to the county total would be unlikely to substantially alter the ozone levels of the county.

Comment: 014-34
A commenter (Page 4-10) commended NRC for proposing mitigation measures during construction of the proposed project to reduce air quality impacts. According to the Draft EIS, the NRC staff determined that the majority of particulate emissions emitted during construction would come from construction vehicle exhaust. Therefore, in order to reduce particulate emissions from construction vehicle exhaust, NRC recommended that USEC: (1) use Tier 2 construction-related vehicles, which would reduce diesel particulate emissions by about 40 percent; and (2) use ultra-low sulfur diesel fuel. The commenter urged NRC to establish these mitigation measures in the construction contracts for the proposed project, and to document these mitigation measures in the Record of Decision.

Response: The NRC acknowledges the commenters support for the proposed mitigation measures. However, is should be noted that the NRC is not involved in USEC's contracting process. Because the percentage reduction in particulate matter emissions due to implementation of this measure is expected to be small, and because the site is located in an area that is exempt from restrictions on emissions from fugitive dust, the NRC staff does not believe inclusion of this mitigation measure as a license condition for the proposed ACP is warranted.

Comment: 014-35
A commenter observed (Environmental Impacts Section 4.2.4.2, Facility Operation, Radiological Emissions, Pages 4-14, 4-15) that several different isotopes are mentioned in this discussion, but emissions appear to be aggregated without a clear discussion of the relative percentages of each

radionuclide's contribution to the total emissions. Disaggregating should be done in the Final EIS, so that a more accurate determination of potential exposures can be made and evaluated for the resulting health consequences, if any, attributable to ACP.

Response: Section 4.2.4.2 provides a description of the radiological release sources and the methods in place to monitor the releases. It also lists the expected isotopes on page 4-14, but as noted in the comment does not break them out by contribution to the total emission. The activity of the isotopes of uranium were retained as a single total in this discussion because that was necessary to compare the total uranium activity airborne concentration to the concentration limit in the applicable regulation, 10 CFR part 20, Appendix B Table 2. We agree that the contribution by isotope is important for the demonstration of compliance with the National Emission Standards for Hazardous Air Pollutants air release standards, and to estimate public health effects. The release amounts by isotope are discussed in section 4.2.12.3 as part of the analysis of Public and Occupational Health Impacts. These individual isotopic values are not important to the discussion in section 4.2.4.2; including them in this section would introduce unnecessary redundancies in the document.

Comment: 014-39
A commenter observed (Environmental Impacts Section 4.2.4.1 Site Preparation and Construction. Radiological Emissions, Page 4-11 paragraph 1) the statements here regarding 40 CFR 61, Subpart H are potentially misleading as to the potential health effects from exposures, by subtly indicating that the data and standard are not based on any measured data. The commenter stated this is incorrect and should be either discussed in the Final EIS, or the Final EIS should state the standard's requirements or demonstration of compliance.

Response: Section 4.2.4 is concerned with compliance with various air quality standards; 40 CFR Part 61 Subpart H is a dose based standard rather than an air permit limit stated in pounds or concentration. The point of paragraph 1 on page 4-11 of the EIS is simply to identify that fact. Demonstrating compliance with a standard based on radiation dose includes not just information about the amount and type of radiological source, but must also include knowledge regarding transport of the radioisotope to the receptor, the uptake methods for the receptor, and the relative effectiveness of the radioisotope in question for delivering dose for that given uptake method. In all cases, some of the knowledge required comes from measurements and is then augmented by modeling. The dose analysis for site preparation and construction is provided in section 4.2.12.2 of the EIS. Including the standard and the analysis for estimating compliance with the standard for the ACP during site preparation and construction would be redundant to the analysis in 4.2.12.2 of the EIS.

Comment: 015-50
A commenter suggested revising bulletized item as “X-3356 and X-3366 Product and Tails Withdrawal Buildings;” on line 7 of page 4-14.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-51
A commenter suggested adding “X-3366" after “X-3356" on line 25 of page 4-14.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Water Resources

Comment: PMT-015-5
A commenter stated that the ACP models the highest possible flood using the low rate five times that of the historical flood of 1937, the highest possible flood actually reached a lower height than the 1937 flood.

Response: The floodplain was based on the latest version of the Federal Emergency Management Agency Flood Insurance Rate Maps (ODNR, 2005).

Comment: 004-5
A commenter asked about the quality of the water as a result of the previous USEC plant at Piketon, and whether there were testing procedures and reports regarding the quality of the water.

Response: The EIS discusses both surface water and groundwater quality within and around the Piketon facility. DOE issues an annual environmental report for the facility that includes both groundwater and surface water sampling results.

Comment: 005-1
A commenter (Page xxiii, Water Resources, line 29) requested a description of what type of best management practices would be utilized to minimize the impact to water resources from construction activities. The commenter stated the Ohio EPA has completed stream sampling from around the DOE reservation. The data should be included in the EIS to evaluate the impact potential construction activity may have upon the streams and creeks surrounding the facility. USEC must ensure that there is limited impact to the streams.

Response: Section 3.7, Water Resources, and Section 4.2.6 Water Resource Impacts discuss the best management practices that would be used, which are further described in Section 4.2.6.1, Site Preparation and Construction. Section 3.7 presents the most recent surface water sampling results from the 2003 annual environmental report issued in 2004.

Comment: 005-2
A commenter (Page xxiii, Water Resources, line 29) requested a description of how the ACP intends to utilize a Spill Prevention and Control and Counter measure plan when they do not control all the holding ponds at the site. Please describe how coordination between USEC, DOE and UDS would be implemented to prevent a spill from leaving the site.

Response: Details of the ACP spill control measures and an assessment of the impacts are presented in Section 4.2.6 Water Resource Impacts. Page xxiii, Water Resources is part of the executive summary and does not contain the a detailed analysis and description of the impacts.

Comment: 011-1
A commenter provided a report on the origin of a series of levees along the Scioto River in southern Pike County. There are three separate levees. The northernmost is on the Nier property at the U.S. Route 23 entrance to Piketon DOE facility. The middle levee is partially located on a DOE well field located next to the Scioto River on the old Billy Cutlip farm. The third levee extends across 10 farms beginning at the Barnes property and extending south along the river to the Will Acord farm. The northern and southern levees were built in response to 1959 floods to protect agricultural fields from future flooding. The middle levee was built for technical and economic reasons. When the DOE wells were being drilled in the

1980s, the pipeline from the river to the steam plant required the addition of concrete and ground cover over the original concrete anchors in order to hold the line in place. According to the commenter, the "result is a levy-like [sic] appearance." Concurrently, and into the 1990s, the Standard Slag company, owners of a sand and gravel quarry on the former Cutlip farm, moved its overburden down to the river and built a levee between the wells and river to make space for expansion. At first the levee was kept mowed and it was possible to drive on it, but when Standard Slag determined that it would not be able to quarry the terrace next to the levee, the levee was no longer maintained.

Response: This comment provides information about the age and origin of the embankment observed in one of the DOE well fields. Other commenters expressed concern that the embankment might be a Native American earthwork related to others in the area, such as the Scioto Township works; and that continued use of the well field might affect such an earthwork (see comments PMT-010-4 and 008-5). NRC addressed the potential for effects on the embankment in the Draft EIS in Section 4.2.6.2.. NRC added information received in this comment to Section 3.3.4 of the FEIS, in association with the concern expressed by other commenters.

Comment: 014-41
A commenter observed (Page 6-9, Line 3) the ACP Draft EIS states that due to historical operations, The DOE reservation has multiple plumes of groundwater contamination. The Final EIS should also describe: 1) whether any of these plumes reside in areas leased for the ACP facilities; 2) whether the ACP facilities and areas have been certified as being free of environmental media contamination (soil, groundwater, etc.); 3) whether ACP operations are expected to contribute to groundwater contamination and to what extent; and 4) whether the ACP will have its own groundwater monitoring program independent of DOE's. The Final EIS should include maps of groundwater contamination at the Portsmouth complex to aid in the description.

Response: Sections 3.7 and 4.2.6, Water Resources discuss the nature and extent of groundwater contamination and its impacts associated with the ACP.

Comment: 015-52
A commenter suggested changing "012" to "013" on line 17 of page 4-21.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-53
A commenter suggested changing "013" to "012" on line 18 of page 4-21.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-54
A commenter suggested changing "weekly composite" to monthly grab" on line 33 of page 4-23.

Response: The NRC staff has revised the text to reflect the correct information.

Comment: 015-55
A commenter suggested adding "are taken quarterly" to the end of the sentence on line 37 of page 4-23.

Response: The NRC staff has revised the text to reflect the correct information.

Ecological Resources

Comment: 003-7
A commenter expressed concern about wildlife and groundwater contamination, and the need for better protective measures at the site. The commenter noted that a three-strand barbed wired fence surrounding the facility was not sufficient and reported that uranium had been found in the liver of a deer that had been tested from on site. The commenter also questioned what provisions were being provided for unplanned releases and whether the Draft EIS considers existing contamination in addition to what USEC may produce in the future.

Response: NRC reviewed the impacts on wildlife in Section 4.2.7, and found that the impacts would be small. Section 4.2.7.2 states that radiological emissions associated with the ACP are safe for humans, which is adequate for the protection of wildlife. In addition, the environmental measurement and monitoring programs described in Section 6 are adequate protective measures.

In accordance with the requirements of Subpart H of 10 CFR Part 70, the NRC evaluated the potential consequences associated with an unplanned release in Appendix H, for the proposed ACP, and summarized the results in Section 4.2.12. When combined with the likelihood of the accident, as evaluated in the staff's Safety Evaluation Report, the NRC found that the accidents pose an acceptably low risk and would result in small to moderate impacts to workers, the environment, and the public.

Comment: 005-10
A commenter stated (Page 4-26, Section 4.2.7.2 Facility Operation, line 37) the EIS should discuss the impact to rare, threatened and endangered species should an air release or incident occur which could release hydrogen fluoride or radioactivity into the atmosphere. The EIS should also discuss deposition and potential areas of the site which would be impacted.

Response: NRC evaluated the potential risk associated with an unplanned release in Appendix H, Accident Analysis for the Proposed ACP, and summarized the results in Section 4.2.12. NRC found that the accidents pose an acceptably low risk and would result in small to moderate impacts on workers, the environment, and the public.

Comment: 013-1
The U.S. Department of the Interior submitted a statement that it has reviewed the Draft EIS, NUREG-1834, for the Possession and Use of Source, Byproduct, and Special Nuclear Materials at USEC Inc.'s American Centrifuge Plant, Pike County, Ohio (Docket No. 70-7004). The Draft EIS adequately addresses the concerns of the Department of the Interior regarding fish and wildlife resources, as well as species protected by the Endangered Species Act. The Department of the Interior concurred with the conclusions of the U. S. Nuclear Regulatory Commission staff with respect to the potential impacts of the proposed action and its reasonable alternatives on these resources and species. The Department of the Interior had no comment on the adequacy of other resource discussions presented in the document.

Response: The comment is noted.

Socioeconomics

Comment: PMT-002-6
A commenter stated that the proposed ACP is not fiscally responsible and that taxpayers are ultimately subsidizing the nuclear industry.

Response: The fiscal implications and impact on taxpayers of licensing the ACP is outside the scope of this EIS. The NRC is responsible for protecting public health and safety and the common defense and security by establishing requirements for the possession and use of radioactive materials. As part of its licensing evaluation, the NRC considers the financial qualifications of a license applicant to safely perform the activities for which the license is sought and the financial commitments the applicant is making to carry out decommissioning. The NRC, however, does not evaluate the overall profitability of the applicant's proposed activities.

Comment: PMT-011-2
One commenter discussed the positive impacts the proposed USEC plant would have on the local economy. The commenter noted that the NRC evaluated both the direct and indirect economic impacts from the plant determined that there would be small to moderate impacts. Most are positive impacts, such as jobs and tax revenues. This conclusion seems reasonable, the commenter stated, based on the understanding of USEC project.

Site preparation and construction is estimated to cost $1.4 billion between 2006 and 2010. USEC, the commenter noted, states it will spend approximately $1.7 billion on the plant from 2002 until its completion. The commenter noted "that's a lot of money" for the local economies here in Piketon, Chillicothe, and all of southern Ohio. It means up to 500 jobs, both direct for the reservation and indirect for contractors in the region.

In addition to the multiplier effect on the local economy, the commenter noted, these workers will be supporting our local businesses and "that's good for everyone."

The cost estimates to construct and operate the plant were based on a facility that would generate 3.5 million SWU per year, as you just heard, but the draft environmental impact statement and USEC's environmental report anticipated growing the plant's output to 7 million SWU per year and that means more machines, more jobs, and more money into your local economy. The Draft EIS does not anticipate any additional problems from increasing the plant's output to 7 million SWU.

During the site preparation, refurbishment, and construction, it is anticipated that there will be 3,362 new full-time jobs created in the local economy. There is also an anticipated increase of $2.3 million in annual state income tax revenues and an increase of $3.7 million in annual state tax receipts. During American Centrifuge operation, 1,500 jobs are anticipated to be created as a ripple effect into the community. The state will potentially benefit from $1.8 million to $2.4 million in additional annual income in sales tax receipts, respectively.

At the end of the life of the centrifuge plant, there would be a decommissioning phase. When the plant is closed, that time frame could be much longer as the experience from the gaseous diffusion plant shows. The gaseous diffusion plant began operation in 1956 and was not shut down until 2001 and it still has not

been decommissioned, but when it is, there will be jobs for that work as well. The NRC estimates that $435 million will be spent over six years to decommission the ACP.

Response: The NRC acknowledges the commenter's information.

Comment: PMT-014-1, 004-7, 007-2, 009-2
A commenter stated the Draft EIS contains enough information for us to predict that the ACP would create 374 new jobs over the short-term building period, followed by a net loss of 1,358 jobs in the operations period.

A commenter stated that according to the Draft EIS, the ACP would cost about $3 billion to construct the centrifuges. The Enterprise Zone program of the state of Ohio would expect about 15 thousand new jobs to be created for that scale of capital investment. The commenter stated that it appears from the Draft EIS that there would be a net loss of jobs rather than an increase in jobs while jobs would be lost at Paducah. The commenter asked NRC to clarify this discrepancy and asked whether there be an overall loss of jobs with a great capital investment.

A commenter stated that the Draft EIS claims are made about the net gain of jobs for our community if USEC is licensed to proceed with the ACP. Figures as high as a net gain of 3,000 jobs are alluded to in the Draft EIS. However, using USEC's own data, we see that after the decommissioning of the old Portsmouth Gaseous Diffusion Plant and with the operation of the proposed ACP there will actually be a net loss of jobs in the community. Even if we had no other concerns about the USEC proposal, we would have grave concerns about a project that promises to cost the community so much and pay back so little.

A commenter stated that according to calculations by Portsmouth/Piketon Residents for Safety and Security, the new facility would create a total net loss of 1,558 jobs. If the site were converted to Enterprise Zone type of manufacturing, spending the same amount of money would create 25 times the 600 jobs projected by USEC. The commenter stated the Draft EIS treats alternatives poorly. For example, there was very little discussion of the benefits of cleaning up the site and using Enterprise Zone initiatives to industrialize the site. The commenter stated the Sierra Club would like to see this type of analysis in the Draft EIS.

Response: The commenter does not specify what baseline is being used in concluding there will be a "net loss" in jobs as a result of building and operating the ACP. It would be inappropriate to compare total employment at the ACP with total employment at the Portsmouth Gaseous Diffusion Plant because the decision to place the Portsmouth Gaseous Diffusion Plant in cold storage status was independent of the decision to build the ACP. The cessation of operations at the Paducah Gaseous Diffusion Plant will result in the termination of most operations phase jobs at that plant and the associated indirect jobs. These losses would be temporarily mitigated to some extent by the hiring of decommissioning workers in the event that the Paducah plant was to be decontaminated and decommissioned.

In each year between 2006 and 2010, average annual employment in the region of influence resulting from site preparation, refurbishment, and construction activities is estimated at 3,362 full-time jobs. This estimate includes both direct and indirect employment. In each year between 2004 and 2013, average annual employment as a result of centrifuge manufacturing and assembly activities is estimated at 2,130 full-time jobs. This estimate includes both direct and indirect employment. During each year of the 30-year operations phase of the ACP commencing approximately in 2011, average annual employment as a result of operations phase activities is estimated at 600 full-time jobs and 900 indirect jobs in the region of influence.

These are all "new" jobs which would not exist if the ACP was not built and operated.

Continuing DOE activities at the site may provide separate sources of employment, other than those listed above; however, it is out of the scope of the EIS to speculate on these activities.

It is not within the scope of the EIS to assess the labor intensiveness of the uranium enrichment industry versus other types of industry. However, it is notable that the ACP represents an upstream infrastructure industry. It is the output of such industries that create the infrastructure to support a competitive manufacturing and services sector (and the associated employment), both nationally and locally. From an economic perspective, the replacement of resource-intensive gaseous diffusion technology by state-of-the-art centrifuge technology will substantially lower the cost of nuclear fuel and thereby improve the competitiveness of the domestic manufacturing and services sectors, which support large numbers of jobs.

The site preparation and construction phase of the ACP is estimated to cost $1.45 billion for a 7 million SWU capacity plant. The centrifuge manufacturing and assembly phase is estimated to cost $1.4 billion for a 7 million SWU capacity plant.

Comment: PMT-016-3
A commenter stated the Draft EIS overlooks a possibility that USEC may have misled the State of Ohio in order to win various incentives. For example, on page 7-1 of USEC's ACP Environmental Report, the commenter noted that on August 15 USEC issued requests for proposals to the Commonwealth of Kentucky and State of Ohio to site the ACP at the respective gaseous diffusion plant. Both States were offered an opportunity to provide financial or other incentives to reduce the cost of the ACP. By all accounts, the cost of the ACP as understood by the State of Ohio was $1.5 billion; however, page 7-2 of the Draft EIS gives the cost of building the ACP and manufacturing centrifuges at $2.872 billion.

The commenter stated the Draft EIS does not consider that the cost of the ACP is unlikely to be met by private investors. For example, in addition to the costs mentioned above, this position would cost $2.758 billion based on 571,000 metric tons of tails for a 7 million SWU plant, and -- at $4.83 per kilogram disposition cost, this compares with a license application's estimate of $0.72 billion for tails disposition.

Further, the commenter indicated that decommissioning would cost $0.435 billion, according to Draft EIS page 7-2 (estimated in the license application as $0.130 billion). The commenter stated that USEC appears to have uniformly underestimated costs by a factor of between three and four, so the total cost, without the withheld information about running cost, is about $6.65 billion. By comparison, when USEC went public, it raised just $1.5 billion in its initial public offering. This was $1.0 billion short of the $2.5 billion required for its atomic vapor laser isotope separation program. The commenter noted the atomic vapor laser isotope separation program was cancelled.

Response: The difference in cost estimates for construction and centrifuge manufacturing arises because the cost estimates in the Environmental Report are based on a 3.5 million SWU capacity plant, whereas the cost estimates in the EIS are for a 7.0 million SWU capacity plant.

Since the preparation of the Draft EIS, USEC has updated the estimate of total tails that will be generated by a 7.0 million SWU plant over the 30-year license period as well as updated the unit cost of disposal of tails. The total amount of tails generated by a 7.0 million SWU plant over the 30-year license period is now estimated at 512,730 metric tons. The unit cost of tails disposal is now estimated at $4.83/kg U. This estimate of unit cost is expected to reflect a conservative upper bound and is higher than previously used to estimate tails disposal costs. These revisions have been recorded in the latest versions

of the Environmental Report, License Application and Decommissioning Funding Plan. Based on the updated estimates, NRC estimates a total tails disposition cost of $1.8 billion (2004 dollars) and based on USEC's assumption of a 10 percent contingency. The EIS has been updated to reflect these changes. (It is important to note that the unit cost of tails disposal is cited in terms of costs per kilogram of uranium. Tails are not pure uranium. To calculate the total costs, it is necessary to apply a conversion factor which computes the amount of uranium per unit weight of tails. This conversion factor is 0.67612 kilograms uranium/kilogram tails.)

USEC estimates decommissioning costs at $435 million (2004 dollars) for a 7 million SWU capacity plant; this reflects the most current and precise cost estimate available. The decommissioning cost estimate in the license application is for a 3.5 million SWU plant.

Comment: 006-1
A commenter stated the plant will not have a positive impact on the economic environment. The commenter observed that given all the tax breaks USEC is being given, it will cost money. The number of jobs created will be minimal in spite of the huge financial investment. There are other healthier jobs could be created in Southern Ohio.

Response: NRC presented its analysis in Section 7, Cost Benefit Analysis. The comment does not provide NRC with substantiated information that would alter the findings presented in Section 7.

Comment: 003-9
A commenter requested information on the electricity requirements of USEC's operation. The commenter also asked whether an EIS is being conducted for the local communities for coal-fired power plants that produce the electricity. The commenter noted that the Gavin plant has been converted to residential use and is no longer available. The commenter also noted that the first centrifuge plant required took the same amount of electricity to operate as the city of Los Angeles. The commenter asked where the energy to run ACP is coming from, who is paying for any cost for construction of an electric plant, and how will the plant's operation impact communities?

Response: The ACP, which is based on the latest centrifuge technology, will consume less than 5% as much electricity per SWU as the Portsmouth Gaseous Diffusion Plant, which was based on gaseous diffusion technology. Dedicated utilities, including power plants, were constructed in the 1950s solely to support the needs of the Portsmouth Gaseous Diffusion Plant. The ACP would continue to procure electricity through existing resources. No new power plants will be constructed. No separate EIS is being performed for the existing dedicated power plants. At the reduced levels of power required by the ACP compared to the Portsmouth Gaseous Diffusion Plant, no impact is expected to local communities. USEC will bear the cost of power generated to operate the ACP as an operational expense.

Environmental Justice

Comment: 007-4
A commenter questioned whether the community and NRC would be having dialogue if the area were not a poor, rural, Appalachian community.

Response: Public dialogue plays a significant role in enhancing public confidence in the NRC and its ability to carry out its mission — to protect public health and safety in commercial uses of nuclear energy. The NRC has long recognized the importance and value of public communication and involvement as a key cornerstone of strong, fair regulation of the nuclear industry. As a result, the agency

has sought, over time, with the assistance of members of the public and other stakeholders, to ensure full and fair consideration of issues that are brought to NRC's attention.

Comment: 008-20
A commenter stated that (section 4.2.9) the section on environmental justice, gives no consideration whatever to disproportionate adverse environmental impacts on the cultural interests of such minority (and probably low-income) groups as the Absentee Shawnee and other tribes. The commenter requested NRC review the pertinent EPA guidance and address these impacts.

Response: NRC completed its review of environmental justice impacts in accordance with EPA's guidance. Section 4.2.2, Historic and Cultural Resources Impacts found no effects on historic and cultural sites. Because there are no high and adverse human health or environmental effects associated with historic or cultural resources no minority or low-income population would be disproportionately affected.

Transportation

Comment: PMT-006-4
A commenter noted that the Draft EIS does not mention accidents with enriched, radioactive material leaving the plant to become fuel for nuclear plants and other critical safety concerns.

Response: Section 4.2.12.1 of the EIS describes the impacts of accidents associated with the transportation of product from the ACP. Table 4-15 provides the results of the analysis.

Comment: PMT-015-7
A commenter observed the Draft EIS purports to assess unknowable risk and cited a footnote on page 4-53 stating that no 2.5 ton cylinder is currently certified to ship uranium enrichment to higher than 5 weight percent of uranium-235. The commenter stated that the Draft EIS goes on to assess the risks associated with the transport of 10 percent enriched uranium in a cylinder that does not exist.

Response: The commenter is correct that no 2.5-ton cylinder is currently certified to ship uranium enriched to higher than 5 weight percent of uranium-235. Although it is currently believed to be unlikely, sometime in the future, a demand may be created for enriched product up to 10 weight percent of uranium-235. In the event this higher enrichment is generated at the ACP, USEC would have to gain the appropriate certification before it shipped 10 percent product in either an existing 2.5-ton cylinder or in a new 2.5-ton cylinder. The EIS's analysis of direct radiation surrounding Type 30B cylinders containing enriched product is reasonable for shipping in another type of approved 2.5-ton cylinder because direct radiation levels for such alternate containers are expected to be similar. Also, the EIS's analysis is conservative as the radioactivity levels for uranium gradually increase with enrichment

Comment: PMT-016-1
A commenter stated the Draft EIS has incompetent data entry. For example, Table 4-15, estimated latent cancer fatalities from the transportation of radioactive materials for one year of operation is seriously messed up. None of the totals is the sum of its column or row. Moreover, by comparison to Table D-12 we can see that the risk to the public, whether following a cylinder on the road, living by a road where cylinders are transported, or pulling into a rest stop where a cylinder truck is, the risks have obviously been grossly understated by a factor of 10,000. The commenter stated the Draft EIS shows insufficient modeling. For example, in Tables D-12 and D-14, the trip from Piketon to Clive, Utah, indicates that the trip includes rest stops and inspection stops. The modeling is based on the WebTRAGIS system, but the

WebTRAGIS manual only mentions rest stops and inspection stops in association with road transport, not the rail transport, as indicated. So, the Piketon-Clive trip is clearly modeled for road transport, yet on page D-5, it is clearly stated that this is a trip -- is a rail trip. Furthermore, the commenter tried to register with the Oak Ridge National Laboratory WebTRAGIS system on September 23, but received no reply. The commenter suggested the system admits only classified access and that the system is, in any case, not available for public scrutiny. The commenter stated the risk analysis is, therefore, unverifiable by the public.

Response: The total estimated number of annual latent cancer fatalities from incident free transport and accidents presented in Table 4-15 is consistent with results presented in Appendix D, however, Table 4-15 of the Draft EIS does contain a number of data entry errors, including some of the totals in the last row of the table. Table 4-15 has been revised in the EIS to correct these errors.

Modeling of the transport of conversion products from the ACP to a disposal site was performed using the "Rail" vehicle mode of RadTran 5.5 and input parameters appropriate for transportation by rail. Stops for rail transport were assumed to occur for purposes of classification, but were reported in the "Rest Stop" column of Table D-12. Appendix D and Table D-12 have been revised to clarify that stops made for rail transport are for purposes of classification.

While access to WebTRAGIS may not be available to members of the general public, information about each route used for modeling purposes, generated by WebTRAGIS, is provided in Table D-6. This information allows members of the public to verify that the route related inputs to the risk assessment modeling are reasonable.

Comment: 002-4
A commenter stated the Draft EIS carefully considers the potential impacts from increased vehicular traffic and finds that the increased traffic will be small and will not introduce adverse effects. Within the limits defined in the Draft EIS, the commenter agreed with this finding provided that appropriate conditions are developed to reopen consultation if vehicular traffic increases above this level or if new construction of roads or railroads becomes necessary as a direct and foreseeable consequence of the development of this project.

Response: NRC acknowledges the commenter's statements.

Comment: 003-8
A commenter stated that there is not an adequate analysis of transportation of uranium from overseas facilities. The commenter stated that with the U.S. having only two percent of the world's uranium reserves, any meaningful examination of transport of this material should include such an analysis. The commenter noted a recent shipment from Libya, and how the material was shipped as a matter of national security. The commenter expressed concern that these transportation impacts from overseas locations are not being adequately considered.

Response: USEC intends to use natural uranium in the form of UF_6 for the proposed ACP. The intention is to not introduce feedstock contaminated with significant concentrations of other nuclides into the process. Feed material that meets the American Standards for Testing and Materials specification for recycled feed may be used, and may contain radionuclides such as uranium-236 and technetium-99. The UF_6 would be transported to the plant in 48-inch (48X or 48Y), 10-ton or 14-ton cylinders that are designed, fabricated, packaged and shipped in accordance with American National Standards Institute N14.1, Uranium Hexafluoride-Packaging for Transport. Feed cylinders would be typically transported to

the site by 18-wheeled tractor-trailer trucks. It is anticipated that approximately 1,100 shipments of feed cylinders per year would arrive at the proposed ACP (USEC, 2005b). Expected feed suppliers include the Cameco Corporation (Ontario, Canada) and Honeywell Specialty Chemical Plant (Metropolis, Illinois). No uranium feed for the ACP is anticipated from overseas vendors.

Comment: 004-6
A commenter noted the Draft EIS concluded that traffic on the highway near the plant would have a short term moderate impact. This is in comparison to other areas evaluated. All received a small environmental impact. The commenter asked what will the transportation problems be and will hazardous waste be transported on the highways of Ohio to the ACP. If so, the commenter stated this is unacceptable.

Response: Transportation impacts of interest are the potentials for delays, accidents, injuries, or fatalities associated with the movements of people and goods into and out of the proposed ACP. A moderate impact was found for the potential increase in traffic accidents resulting in injuries. These impacts may occur during site preparation and construction, facility operations, and cessation of activities and decommissioning in the future. In each of these stages, raw materials and equipment would be brought to the site, wastes of various types would leave the site, and workers would travel back and forth to their places of residence. During facility operations, enriched UF_6 would also leave the site. Hazardous waste will not be transported to the ACP. Some hazardous waste will be generated during facility operations and it will be handled in accordance with applicable State and Federal regulations. A moderate impact was also identified for level of service based on estimated increases in traffic volumes. NRC found that a moderate impact would occur as a result of an accident involving the release of uranium. Although the health risk is low, the consequences, should such an accident occur, would be high, resulting in an overall potential health impact of moderate.

Public and Occupational Health

Comment: PMT-002-1; PMT-002-2
A commenter asked how the potential dose to the public from the ACP compares to the dose to the public surrounding nuclear power plants? The commenter stated that cancer rates have gone up since nuclear testing has been going on in the atmosphere and the radioactivity in the air does affect cancer rates. The commenter stated that there is more radioactivity around nuclear plants and cancer rates around nuclear plants are higher than the cancer rates away from the nuclear power plants. The commenter questioned then, that if the rates are similar, it would be reasonable to expect to see the same thing at the Piketon site.

Response: The maximum potential dose to a member of the public from operation of the ACP is expected to be be approximately 0.01 millisieverts (1 millirem), of which 90 percent is predicted to come from direct gamma exposure and 10 percent is predicted to come from exposure to radionuclides emitted to the air. These results are based on conservative assumptions (see Appendix C), and it is anticipated that actual exposure levels would be less than presented here. The total annual dose from all exposure pathways would be less than the limit of 1 millisievert per year (100 millirem per year) established in the NRC's regulations in 10 CFR § 20.1301. All exposures are also expected to be significantly below the U.S. EPA limit of 0.25 millisieverts per year (25 millirem per year), as set in 40 CFR Part 190 for uranium fuel-cycle facilities. The typical average dose to nearby members of the public will be significantly less than the potential maximum; this typical average is expected to be 0.1 millirem per year or lower. This expected dose range is similar to that for nuclear plants based on the annual effluent and environmental reports submitted by nuclear power stations in North America to their regulatory bodies. The causes and risk contributors of cancer are complex, and have been the subject of decades of study and medical research. Based on the best available currently published risk factors for cancer from

radiation, such as the BEIR V report, the maximum possible doses expected from operation of the ACP result in a risk of approximately 1 in 1,000,000 per year. The typical expected average doses to members of the nearby public from operation of the ACP will produce risks approximately 10 times lower than the maximum.

Comment: PMT-003-6; 007-1
A commenter stated that during their time of employment at the DOE facility, there were over 570 violations that were never addressed. In particular the commenter stated that there were alpha daughter isotopes in the lunchroom, and suggested that none of those workers were ever notified of this. Another commenter described USEC's safety record as "disgraceful." This commenter asked why this record was not factored into NRC's analysis.

Response: NRC is aware of past violations. The EIS focuses on environmental impacts of the proposed action. Consideration of violations of the terms of the license are beyond the scope of this document. However, should a licensee violate the terms of its license, which includes compliance with all applicable laws and regulations pertaining to uranium enrichment operations and environmental protection, then the NRC, as the Federal oversight agency, may impose penalties, including financial and civil penalties and license revocation. Other Federal and State agencies can also impose requirements and penalties for violations of laws and regulations under their purview.

Comment: PMT-003-9
A commenter indicated concern about the offsite radium-226 at the facility. The commenter questioned the veracity of the analysis being conducted at the plant, if it indicates that radium-226 is not present offsite.

Response: The NRC staff agrees that radium-226 is certainly present in and around the ACP location. Radium-226 is a member of the decay chain for uranium-238. Because uranium-238 is a naturally occurring isotope in the soils of southern Ohio radium-226 will also be present in those soils, typically at concentrations approximating that of the uranium-238. This same uranium-238 chain is the source of the radon-222 that is ubiquitous in the homes of Ohio and that is the primary source of background radiation to most Ohioans. Many years are required for the isotopes in the uranium-238 decay chain to build in to significant concentrations. The decay chain products from naturally occurring uranium-238 have had millions of years to build in to a concentration that is essentially equivalent to that of the uranium-238. Because the enrichment facility has only been in existence for less than 60 years, there is not yet any significant build in of radium-226 or its daughters in the chain relative to the concentrations of uranium-238 that may have been deposited by releases from the enrichment facility. Hundreds or thousands of years will be required before any uranium released by the ACP will have decayed to produce sufficient radium-226 to warrant testing for this radium-226. Until that time, such tests will only identify the natural background of radium-226 resulting from decay of naturally occurring uranium-238.

Comment: PMT-005-3
A commenter identified a possible typographical error in the Draft EIS indicating that the number of cancer deaths will probably be, according to the Draft EIS, higher for routine non-accident issues (0.013 deaths per year), than for accidental releases, which appears to be 0.008, or half of the number of cancer deaths.

Response: The EIS has been revised to correct any typographical error. The EIS correctly states that the probability of cancer death from an accidental release is about one-half that of the probability of a cancer death from routine non-accident scenarios. In a case where the primary radiological hazard is

external exposure and the accident rate is low, the risk from incident-free transport would more likely exceed the risk from accidents. In another case where the primary radiological hazard is inhalation or ingestion and the accident rate is high, the risk from accidents would more likely exceed the risk from incident-free transport.

Comment: PMT-011-1
A commenter expressed confidence that the NRC's evaluation that potentially there could only be very minimal impact to the public and occupational safety and health, especially given USEC's history of safe operation. The commenter also stated that the plant is consistently below the national average in the number of Occupational Safety and Health Administration-recordable illnesses and injuries. Further, the commenter noted that as with the gaseous diffusion plant, the centrifuge's commercial plant will also be a highly regulated facility, requiring strong safety programs in order to maintain strict compliance with all State and Federal regulations for the safety and health of the employees, as well as the public.

Response: NRC acknowledges the commenter's statements.

Comment: PMT-014-2
A commenter stated that the Draft EIS neglects to express the injury rates in several significant categories related to routine and accidental radiological exposures in both the occupational and transport categories of both the operations stage and in the decommissioning stage. The commenter further notes that the Draft EIS treatment of occupational injury rates depends on statistics from the Bureau of Labor Statistics but overlooks an important statement in a study by the Bureau that indicates that some conditions, for example, long-term latent illnesses caused by exposure to carcinogens, are often difficult to relate to the workplace and are not adequately recognized and reported. These long-term latent illnesses are believed to be understated in the survey's illness measures.

Response: Occupational injury from radiological exposure is traditionally assigned to acute exposure during radiological accidents. The only potential source of such exposures at the ACP would be inadvertent criticality incidents. Criticality control at U.S. nuclear facilities is well understood, and there have been no inadvertent criticality incidents in the U.S. at enrichment facilities. This is particularly true for a facility that only handles low enrichments such as the ACP. The primary latent illness of interest is cancer; therefore the risk values used in radiological assessments are those for the risk of inducing a fatal cancer from the given radiation dose. Note that since the EIS includes the expected radiation dose for many scenarios, an interested party can get an estimate of risk for both fatal and non-fatal cancer induction by examining reports such as BEIR V to identify a dose-to-risk conversion factor.

Comment: PMT-014-3
A commenter noted that on page 4-62, the Draft EIS describes that workers may be exposed to puff releases of UF_6 gas which is exactly the type of puff -- of exposure that would result in a long-term latent illness. The commenter also notes that the Draft EIS does show in Table 3-29 that mortality rates in Pike County, due to renal failure, are between two and four times that of the rates in Ross County and Scioto County; however, although renal failure is associated with uranium poisoning, the Draft EIS suggests that this death rate may instead be associated with diabetes and hypertension. The commenter stated that the NRC staff has made no attempt to determine whether uranium poisoning has, in fact, caused those deaths.

Response: Determining a causative relationship between renal failures and puff exposures at the enrichment facility would require an independent targeted study of those workers with records of puff exposures versus their rate of renal failures, and bio-sampling to determine if these persons had significant body burdens of uranium. Such a study is outside the scope of the EIS.

Comment: PMT-014-4; 004-4
Two commenters stated that the Draft EIS compares potential ACP occupational injury rates to those from the broad and now obsolete Standard Industrial Classification. The commenter also argued that this is inappropriate, and the ACP occupational injury rates are projected using Piketon (i.e., DOE) operations in the years 2002 and 2003. One commenter also asked who will be responsible for the health care needs related to the uranium enrichment process of employees and residents of the Piketon area who are impacted? Will it be the responsibility of USEC or the Federal government (NRC)? Uranium is implicated in huge health risks. It appears unacceptable that the NRC approves of such a process and plant.

Response: The 2002 North American Industry Classification System for industry classification puts uranium enrichment in NAICS code 325188, cross referenced to Standard Industrial Classification code 2819. The Bureau of Labor Statistics 2004 data for North American Industry Classification System code 32518 shows 3 fatal injuries for North American Industry Classification System code 35218, which is similar to that presented in Table 4-18 of the EIS. Health impacts to workers from uranium exposure are addressed in section 4.2.12.3 separately from industrial accident risks. It is outside the scope of this EIS to address health care coverage for USEC employees and contractors.

Comment: PMT-014-5: 007-1
Two commenters stated that uranium enrichment operations at the DOE reservation in Piketon, Ohio, ceased in May, 2001, and as measured by the NRC's enforcement action notices, USEC has, by far, the worst safety record of all NRC materials licensees. Of 516 materials licensees that have been issued with NRC enforcement notices, USEC has the most, with 16, followed by Mallinckrodt Incorporated, with nine, and Westinghouse Electric, with six. The commenter noted that most other licensees have just one or two violations.

Response: NRC is aware of past violations. The EIS focuses on environmental impacts of the proposed action. Consideration of violations of the terms of the license are beyond the scope of this document. However, should a licensee violate the terms of its license, which includes compliance with all applicable laws and regulations pertaining to uranium enrichment operations and environmental protection, then the NRC, as the Federal oversight agency, may impose penalties, including financial and civil penalties and license revocation. Other Federal and State agencies can also impose requirements and penalties for violations of laws and regulations under their purview.

Comment: PMT-015-3; 007-1
Two commenters noted that the Draft EIS states that the calendar year 2003 Bureau of Labor Statistics average incidence rate of nonfatal occupational industries -- injuries and illnesses are not currently published. One commenter stated that, in fact, these statistics were published in December, 19 -- 2004, and reissued in June, 2005.

Response: Page 4-61 of the EIS, beginning at line 6 states, "Incident rates for Total Recordable Cases and Lost Workday Cases for calendar year 2003, in units of incidents per 100 full-time equivalents, for North American Industry Classification System Code 325188 were obtained from the Bureau of Labor Statistics Publication Table 1, Incident Rates of Nonfatal Occupational Injuries and Illnesses by Industry and Case Types 2003 (BLS, 2004a). Fatality incident rates for Manufacturing (North American Industry Classification System Code 325) for calendar year 2003, in units of incidents per 100,000 full-time equivalents, were obtained from Bureau of Labor Statistics Publication National Census of Fatal Occupational Injuries in 2003 (BLS, 2004b)."

Comment: 003-6
A commenter noted that the last published DOE annual report for site cleanup progress at the Piketon site documented plutonium contamination and several uranium isotopes found in fish sampled in streams known to be fishing holes for local people - all supposedly at "safe" consumption levels. The commenter was not aware that there was a safe level of plutonium for human consumption. The commenter suggested that there are many unanswered questions about the transport of materials to and from the plant as well as the operations within and the clean-up of the old plant. The commenter believes that long-term latent illnesses are understated in the report.

Response: As discussed in section 1.5 of the EIS, all emissions, whether to the air or water, must meet Federal and State regulations to ensure the safety and health of the public. As presented in section 4.2 of the EIS, releases from the proposed ACP would be within regulatory limits and would not endanger members of the public.

Comment: 014-3
A commenter stated that while the Draft EIS provides estimated latent cancer fatality data, but does not include non-fatal cancer rate data. The commenter suggested that the Final EIS should provide more comprehensive cancer rate data.

Response: The radiological analysis used in the EIS is designed to identify the impact of the facility on occupational and public health. The analysis does so by comparing the expected radiation doses and risks to the applicable regulatory limits on dose and risk. The does and risk limits defined by the cognizant Agencies are based on the protection of public health. The dose and risk estimates below these standards are therefore considered to have small impacts upon occupational or public health. The risk standards used are for induction of fatal cancer, so that is the risk data used in the EIS.

Comment: 014-4
A commenter suggested that the Final EIS should reference the most current annual radiological emissions data for 2004.

Response: The 2002 and 2003 site radiological emissions reports show similar results, so the 2004 data is not expected to significantly alter the values in the draft EIS.

Comment: 014-36
A commenter stated that in the statement of standards that protect the health and safety of the public, 40 CFR 61, Subpart H, has been left out of the Draft EIS. The commenter stated that the reference should be properly incorporated throughout the document. The commenter also stated that this regulation was used to determine public health protection, whereas the NRC regulations deal more with occupational levels for exposures rather than a public health exposure level.

Response: The EIS properly incorporates the National Emission Standards for Hazardous Air Pollutants regulations of 40 CFR Part 61, Subpart H. The commenter is referred to Table 1-3, Section 4.2.4.1, 4.2.4.2, Section 4.2.12.3, and Section 4.3.2 which specifically reference the appropriate National Emission Standards for Hazardous Air Pollutants regulations of 40 CFR 61 Subpart H. The NRC's regulations at 10 CFR 20, Subpart D, provide safe exposure limits for members of the public. This NRC dose limit of 100 mrem/yr considers all pathways, whereas the EPA regulation cited by the commenter, 40 CFR Subpart H, provides a dose limit of 10 rem/yr from airborne exposure pathway.

Comment: 015-56
A commenter noted that no foodstuffs are being produced on the DOE reservation, thus the food sources for the on-site tenants should be adjusted to reflect this on lines 9 through 31 of page 4-61. The commenter added that CAP88-PC does allow this.

Response: Lines 2 and 3 of page 4-65 in the EIS describe the food consumption patterns for on-site tenants. These tenants are not assumed to have any locally produced foodstuffs (food produced on the DOE reservation). They are assumed to consume foodstuffs produced within the 80 kilometer assessment radius used in the CAP88-PC model.

Waste Management

Comment: 007-3
A commenter stated that the problem of safe, permanent storage of radioactive wastes generated over the past 50 years at the Piketon site and those wastes projected to be generated over the next 50 years at the site is still unsolved.

Response: Sections 4.2.13.2 and 4.2.15.13 of the EIS describes USEC's plans for managing wastes generated during operation and decommissioning of the ACP. Wastes generated at the site in prior years are considered in Section 4.3.10 of the EIS.

Comment: PMT-005-1
A commenter asked whether USEC or NRC determines the safety of spent fuel.

Response: The NRC has specific regulations and requirements for both the storage and ultimate disposal of spent nuclear fuel. However, the license application in question is for the enrichment of uranium for use as a fuel in nuclear reactors. Spent nuclear fuel would not be directly generated as a result of this licensing action.

Comment: 003-1-3; PMT-002-8; **PMT-004-3; 009-1**
Two commenters expressed a concern that there is no safe place to permanently and safely dispose of radioactive waste that would be generated at the ACP. One of these commenters also stated that the people of Nevada do not want this waste, and neither do the people of Ohio.

A commenter asked whether the approximately 200,000 tons of uranium tailings that USEC's proposed ACP facility currently under NRC licensing consideration would create would also be sent to Envirocare The commenter also requested information on the number of facilities and the total volume of waste, existing and proposed, that is currently slated for shipment to Envirocare. A commenter also asked about environmental ability to handle the waste.

Response: As described in section 2.1.4.3, the disposition of the depleted triuranium octaoxide (U_3O_8) generated from the DOE conversion facilities at Paducah and Portsmouth would be either at the Envirocare site (DOE's proposed disposition site) or at the Nevada Test Site (DOE's optional disposal site). Depleted U_3O_8 generated from the adjacent or offsite private conversion process would be disposed at a site licensed to accept this material. For example, under its Radioactive Materials License issued by the State of Utah, Envirocare is authorized to accept for disposal the quantities of depleted uranium oxides expected to be generated by the conversion of the proposed ACP's depleted UF_6. Further, section 4.2.13 .2 describes the capacity impacts of the disposal of the converted U_3O_8 on the Envirocare facility. As

stated, NRC estimates that the U_3O_8 from the proposed ACP would take up approximately 11 percent of the remaining disposal capacity at Envirocare.

Comment: PMT-007-5
A commenter noted that the waste material at issue, depleted UF_6, once converted, is most suitable for disposal in the ground. The commenter also noted that potential spills associated with this material would not migrate offsite because it is not volatile. The only material of concern would be hydrogen fluoride. The commenter also noted that converting the tails material and subsequently disposing of it in the ground is the most environmentally responsible method for managing the waste.

Response: NRC acknowledges the comments concerning the suitability of land disposal of converted depleted UF_6..

Comment: PMT-010-6; 006-2; 009-1
A commenter charged that NRC, in its Draft EIS, has gone beyond being a regulatory body and has actually solved USEC's waste problem for it. The commenter stated that while USEC did not specifically indicate where it would dispose of its waste, NRC indicated that the waste will be treated, or will probably be treated, or can be treated at the deconversion facility that's now being built on site by DOE. Two commenters questioned whether DOE can even accept the ACP waste for conversion. One commenter stated that DOE, in their reports to the community at their semiannual environmental assessment meetings has said repeatedly that the deconversion plant can not be used to treat a USEC waste, to use that facility would completely violate the letter and spirit of the USEC Privatization Act. The commenter stated that the purpose of the Privatization Act was to separate private facilities from legacy government facilities and the deconversion facility was built to treat the legacy waste that is of public responsibility and at public expense, and is not available, legally, to treat USEC's private waste. The commenter goes on to state that, barring a new act of congress to change the law, the deconversion plant is not capable and was not designed to treat all of the USEC waste. Another commenter stated that USEC is a private company and they should not be given the right to use the Conversion plant for their own economic purposes.

Response: USEC indicated in its Environmental Report that it does not wish to foreclose potential future commercial uses of depleted uranium tails and thus was not classifying the depleted uranium tails as a waste at this time. USEC then goes on to describe a method, via the USEC privatization Act whereby they could transfer the tails to DOE for conversion and disposal. The NRC staff have elaborated on this proposal in order to fully inform the NRC's decision maker and the public as to the likely impacts of depleted uranium tails conversion and disposal as required by NEPA and the NRC's implementing regulations at 10 CFR Part 51. Section 3113(a) of the USEC Privatization Act (Public Law 104-134) requires DOE to accept low-level waste, including depleted uranium that has been determined to be low-level waste, for disposal upon the request and reimbursement of costs. DOE has stated that depleted uranium transferred under this provision of law in the future, would most likely be in the form of depleted UF_6, thus adding to the inventory of material needing conversion at a depleted UF_6 conversion facility. DOE has stated that, "…it is reasonable to assume that the conversion facilities could be operated longer than specified in the current plans in order to convert this material" (DOE, 2004a).

Comment: PMT-016-2; 006-2
Two commenters raised concerns about the use of the DOE conversion facility to address ACP waste issues. One commenter stated that the Draft EIS indicates that the DOE conversion facility is designated to operate until 2024 and to handle a capacity of 243,000 metric tons of depleted UF_6, but that the ACP is designed to operate until 2040 and to generate 571,000 metric tons, thus the DOE conversion facility is designed to be decommissioned 16 years too early and to have a capacity that is less than one-third of all

ACP waste expected to be generated. One of the commenters stated that there are some scientists who believe that the conversion plant itself is not a perfect solution to the nuclear waste problem. The commenter said that even though the material in the canisters will be converted to a less dangerous form, the conversion process too will create waste, and at the present time it's not clear where it will be taken. The commenter stated that the fear is that the waste will simply stay at the Piketon site and because of this, no more uranium should be processed because the country is already dying from the existing nuclear waste.

Response: The Piketon conversion facility is planned to operate for 18 years beginning in 2006. The existing inventory planned for conversion is 243,000 metric tons (267,862 tons) of depleted UF_6 (DOE, 2004a). The projected maximum amount of 512,730 metric tons (535,200 tons) of depleted UF_6 generated by the proposed ACP represents a significant increase in this existing inventory. Converting the depleted UF_6 from the proposed ACP would require DOE to significantly extend the life of the conversion facility, or to construct a second conversion facility on the site. DOE has maintained that, with routine facility and equipment maintenance, periodic equipment replacements, or upgrades, the conversion facility could be operated safely beyond the 18-year planned life-time period to process the additional depleted UF_6 from the proposed ACP. In addition, DOE indicates the estimated impacts that would occur from prior conversion facility operations would remain the same when processing the proposed ACP wastes. The overall cumulative impacts from the operation of the conversion facility would extend proportionately with the increased life of the facility (DOE, 2004a). Based on this, the added inventory of depleted UF_6 coming from the proposed ACP should not change the nature or magnitude of the impacts from the DOE conversion facility operations, but it would extend those impacts for several additional years.

Comment: 003-1-1

The commenter indicated that the transcript of the conversation between the NRC and Utah Department of Radiation Control included calculations for eventual discharges into the Great Salt Lake, that Envirocare did not have to comply with the usual water regulations because the ground water was not potable beneath the landfill, and that Envirocare did not have to comply with agriculture regulations because it was not surrounded by agricultural activity (even though the transcript documented livestock grazing around the perimeter of the landfill).

Response: The transcript noted by the commenter does indicate that Envirocare is exempted from groundwater regulations, however, it must be emphasized that the context for this exemption is the extremely saline groundwater that underlies the facility that is incompatible with any human use. The State of Utah has the regulatory oversight for Envirocare and has conducted numerous performance assessments and hydrogeological studies. These documents are available directly from the State. Likewise, the transcript only indicated the potential for livestock grazing on the surrounding land as the extremely arid environment does not support sufficient vegetation for grazing on a regular basis.

Comment: 003-1-2

The commenter stated that existing waste is not just coming from Piketon, Ohio and the public does not have access to all of the applications currently under licensing consideration with the NRC. The commenter argued that in light of this the NRC has a responsibility to take inventory of this situation immediately. The commenter also stated that Envirocare should not be rubber stamped as being a feasible option for long-term storage of nuclear waste for USEC's ACP licensing - or any other proposed facilities - until this inventory is taken and that information is available to the public for public comment and input.

Response: The NRC has two licensing actions related to uranium enrichment. Both actions are for gas centrifuge facilities, one proposed by Louisiana Energy Services at Eunice, NM and one by USEC at

Piketon, OH. Both actions have been publicly noticed and have provided substantial opportunity for public involvement. In the case of Envirocare and the DOE tails conversion facility at Piketon the NRC does not have a licensing role. The State of Utah has regulatory authority over Envirocare and the DOE has responsibility for the conversion facilities (both at Piketon and Paducah). In terms of document availability, three environmental impact statements were completed by the DOE for the conversion facilities following DOE's public involvement process. A programmatic EIS for handling of depleted uranium was completed in 1999 and has a document number of DOE/EIS-0269. Subsequently, two site-specific EIS's were completed in 2004 for both Paducah and Piketon with document numbers of DOE/EIS-0359 and DOE/EIS-0360, respectively. These documents can be found at: http://www.eh.doe.gov/nepa/documents.html. Likewise, numerous performance assessments and hydrogeological studies have been carried out by the State of Utah following there public involvement procedures and are available directly from the State.

Comment: 005-3

A commenter asked the NRC to describe the agreement the ACP has with the DOE to accept the depleted UF_6 cylinders for the centrifuge facility. The commenter stated that currently, Ohio EPA is not aware that such an agreement exists. The commenter also stated that if the ACP anticipates that DOE will be responsible for converting all depleted UF_6 cylinders from the centrifuge plant, Ohio EPA should be contacted so that proper agreements are in place and orders may be modified to allow the transfer of waste material. Additionally, the commenter requested that the cost for conversion for the depleted UF_6 should be included in the costs of the facility.

Response: The 2002 agreement between USEC and DOE addressed DOE taking title to depleted uranium through 2005. The parties are currently working on an agreement to replace the expired agreement under which DOE would continue to take title to depleted uranium generated by USEC operations. DOE is currently storing approximately 700,000 metric tons of depleted uranium in approximately 60,000 cylinders stored at various locations on the DOE portions of the Gaseous Diffusion Plant sites. USEC is responsible for decommissioning costs, including the approximately $1.8 billion cost for dispositioning depleted uranium tails (as noted in Section 2.1.4.4 of the EIS). The cost for conversion of the depleted uranium tails will be included in the costs of the facility as described in Chapter 7 of the EIS (see Table 7-1).

Comment: 009-1

A commenter expressed concern with the amount of radioactive material being brought to and generated at the Piketon site. The commenter requested that the Final EIS state limits to the importation of uranium and the amount of waste and tailings that will result from the ACP enrichment process. The commenter also requested a plan for disposal of the depleted UF_6 that will be a byproduct of the ACP. The commenter noted that there is already a very large backlog of depleted UF_6 waiting to be converted, since the conversion plant is behind schedule in its construction. The commenter asked that the Final EIS state how the depleted UF_6 from the ACP will be converted and the oxides disposed.

Response: The proposed ACP must be decommissioned and all depleted UF_6 properly disposed of prior to license termination. As discussed in section 2.1.4.3 of the EIS, USEC has indicated that the depleted UF_6 generated at the ACP will be sent for conversion at the planned DOE conversion plant at Portsmouth, Ohio. The disposal options presented in the EIS satisfy the Commission rulings concerning a disposal strategy and the classification of depleted UF_6.

Comment: 014-2
A commenter stated that the Final EIS should describe what the NRC is doing to ensure that funding sufficient for the ACP's decontamination and decommissioning, as well as waste management, is in place prior to issuing a license.

Response: As discussed in section 2.1.4.4 of the EIS, USEC is required to put in place a financial surety bonding mechanism to assure that adequate funds would be available to fully decommission the proposed ACP, including disposing of all depleted UF_6 generated during facility operations. Adequacy of decommissioning funding is addressed in the Safety Evaluation Report.

Decontamination and Decommissioning

Comment: 003-3; 003-10
A commenter noted that the cost of decommissioning described in Table 7-1 ($435 million) is not described clearly enough to determine how the value was arrived at. The commenter suggested that additional information needs to be provided to the public. This commenter noted that taxpayers have almost totally funded these costs for the former facility's operation at the DOE site to the tune of $300,000,000 (million) annually. The commenter argued that the cost provided in the Draft EIS would not be sufficient. The commenter also stated that taxpayers need solid assurance that they will not be left holding the bag if the facility is shut down, or does not have sufficient funding set aside to cover decontamination and decommissioning costs and long term storage and monitoring of radioactive waste it is responsible for generating. The commenter asked how much taxpayer funding is currently being spent to do this work at Paducah and other sites. The commenter further requested that these funds be in place prior to issuance of a license.

Response: Decontamination and decommissioning costs were estimated as the sum of the costs incurred for various activities including: planning and preparation; decontamination and/or dismantling of radioactive facility components; restoration of contaminated areas of facility grounds; final radiation survey; site stabilization and long-term surveillance; packaging, shipping, and waste disposal costs; equipment/supply costs; laboratory costs; miscellaneous costs; NRC staff review and approval; NRC fees; DOE lease; business insurance; taxes; contractor profitability; and a contingency buffer. The EIS provides the most updated cost estimates available. The decontamination and decommissioning costs and funding of previous projects is out of the scope of the EIS.

USEC presently intends to utilize a surety bond to provide financial assurance for decommissioning, pursuant to 10 CFR 70.25(f). The surety bond will provide an ultimate guarantee that decommissioning costs will be paid in the event USEC is unable to meet its decommissioning obligations at the time of decommissioning. The surety bond will require that the surety company will deposit any funds paid under its terms directly into either an external trust or a standby trust. However, USEC may choose to utilize alternate financial assurance funding methods. Upon finalization of the specific funding instruments to be utilized and at least 90 days prior to the commencement of enrichment operations, USEC will supplement its application to include the signed, executed documentation.

Comment: 003-4
A commenter noted that the Draft EIS does not appear to contain information on costs related to long term waste storage. The commenter believes that consideration needs to be given to this cost and provision made in advance as this is the most expensive cost involved in decontamination and decommissioning. The commenter stated that a request was made of DOE to provide the total amount of taxpayer funding spent to date for long term waste storage, but that information was never received.

Response: USEC's total decommissioning liability is the sum of the total plant decommissioning costs and the tails disposition costs. Depleted uranium tails will be stored in steel cylinders at the site until they can be processed in accordance with the disposal strategy established by USEC. For the purpose of storage, additional cylinder storage yards will be constructed at the site. The costs associated with the construction of cylinder storage yards are included in the construction costs of the ACP and will be borne by USEC.

Comment: 005-4
A commenter asked for a description of how the DOE/USEC lease would work once DOE has completed its mission at the site. The commenter believes it is highly likely that the decontamination and decommissioning of the gaseous diffusion plant will be completed, and rather, the site will require long term surveillance and maintenance.

Response: As noted in the Executive Summary and Chapter 1 of this EIS, the site for the ACP facility is to be located on a small portion (approximately 1 percent) of the DOE reservation at Piketon, Ohio. The Gaseous Diffusion Plant, which is in cold standby is located on the reservation. The Portsmouth plant is owned by DOE but operated by USEC's wholly owned subsidiary, the United States Enrichment Corporation. The NRC has regulatory authority over the United States Enrichment Corporation for its activities associated with the Gaseous diffusion plant and for the proposed ACP. At the end of ACP operations, USEC will decommission the ACP. Under its proposed decommissioning plan, USEC will decontaminate (clean up) the ACP site to a level that would qualify the site for unrestricted use. Section 10.3 of the Safety Evaluation Report provides a description of the USEC decommissioning plan. Although USEC is responsible for decommissioning the ACP, DOE is responsible for decommissioning the remainder of the reservation containing the Gaseous diffusion plant. DOE will be responsible for long-term monitoring of the entire reservation, including the ACP site, when the reservation is returned to DOE. DOE, not USEC, will have the responsibility to conduct any required surveillance and maintenance once the ACP site is transferred back to DOE.

Comment: 005-11
A commenter asked for clarification of how the ecological impacts from the site most likely will change during the life span of the ACP and how these changes will be accounted for during decontamination and decommissioning. The commenter asked whether USEC will be responsible for conducting ecological surveys and whether there is money set aside during the decontamination and decommissioning process for these types of surveys to be conducted?

Response: NRC evaluated the ecological impacts associated with decontamination and decommissioning in Section 4.2.15.7, Ecological Impacts. Because NRC assumed that the footprint associated with decontamination and decommissioning would be bounded by those used to construct the proposed ACP, the impacts would be the same or less than those described under site preparation and construction.

Because the site would be located on a DOE reservation, DOE would maintain current information on the ecological conditions to include Federally-listed threatened and endangered species.

Comment: 014-18
A comment noted that the Draft EIS states that the intent of decommissioning is to return the proposed ACP site to a state that meets NRC requirements for release for unrestricted use after decontamination and decommissioning is completed. The commenter stated that the Final EIS define and discuss what NRC considers "unrestricted use" to mean, including: are the NRC requirements consistent with Comprehensive Environmental Response Compensation and Liability Act standards for free release of property without

institutional, controls? Who owns the ACP buildings? Are they owned by DOE and leased to USEC, or does USEC have ownership of buildings on the Portsmouth Reservation? If USEC or a subsequent owner goes bankrupt, would DOE then be the primary responsible party responsible for cleanup and have priority access to the cleanup funds in the ACP's surety bond (or other financial mechanisms) over other entities such as lax authorities and commercial lenders?

Response: The NRC requirements for unrestricted release are provided in at 10 CFR 20.1402. These standards relating for free-release (i.e., no institutional controls) require that doses to members of the public are less than 25 mrem/year. If non-radiological contaminants are found the site would be referred to the appropriate state agency and the EPA. As previosly stated, USEC leases all buildings from the DOE and USEC is responsible for decontamination and decommissioning. The NRC requires decommissioning financial assurances (see 10 CFR § 40.36 and 70.25) before issuing a license. The NRC's objective is to ensure that NRC-licensed sites (unlike Superfund sites) never require taxpayer funds to complete decommissioning. In the event that the licensee is unable to carry out decommissioning due to bankruptcy or some other reason, the financial assurance provisions provide the funding for decommissioning, and the NRC would ensure that proper site remediation takes place. For uranium enrichment facilities, applicants must provide a decommissioning funding plan consisting of a site-specific cost estimate for decommissioning and a financial instrument, such as a surety bond or letter of credit. USEC has chosen to use a surety bond for its financial mechanism. Further, as stated in 10 CFR § 40.36(d) and 70.25(e), decommissioning cost estimates must be adjusted at intervals not to exceed 3 years. The NRC staff reviews this issue in the Safety Evaluation Report.

Comment: 014-19
A commenter noted that the Draft EIS states that the decontamination and decommissioning activities for the proposed ACP are anticipated to occur approximately 30 years in the future, and therefore only a general description of the activities that would be conducted for the proposed ACP can be developed at this time for the Draft EIS. The commenter asked whether NRC will review and approve the ACP engineering design prior to its construction? The commenter further asked if NRC requires the concurrent development of a decontamination and decommissioning plan while the facility is being designed, and whether NRC regards issues such as cost, implementability and ease, worker safety, waste minimization during decontamination and decommissioning to be considerations in the design of radiological facilities such as the ACP?

Response: The NRC reviews this information in the Staff's Safety Evaluation Report. USEC, as part of their license application, provided information about decommissioning which describes specific features that serve to minimize the level and spread of radioactive contamination during operation that simplify the eventual plant decommissioning and minimize worker exposure.

Comment: 014-2
A commenter suggested that the Final EIS should describe what the NRC is doing to ensure that funding sufficient for the ACP's decontamination and decommissioning, as well as waste management, is in place prior to issuing a license.

Response: As discussed in section 2.1.4.4 of the EIS, USEC is required to put in place a financial surety bonding mechanism to assure that adequate funds would be available to fully decommission the proposed ACP, including disposing of all depleted UF_6 generated during facility operations. The NRC staff evaluates the adequacy of the proposed funding in the Safety Evaluation Report.

Cumulative Impacts

Comment: 008-5-1
A commenter stated that the cumulative impacts section of the Draft EIS is deficient for its lack of treatment of effects on historic properties or any other kinds of "cultural resources." The commenter stated that a cumulative impact analysis is supposed to consider the effects (even the "SMALL" effects) of the project under review in the context of other past, present, and reasonably foreseeable future actions. Serious impacts on the cultural character of the area that includes the project Area of Potential Effect (however defined) have obviously taken place in the past; they may be going on in the present, and what the future holds remains to be analyzed. The commenter requested that NRC address the cumulative impacts of the project on cultural resources of all kinds, notably including historic properties.

Response: In Section 4.3, NRC evaluated the cumulative impacts associated with the proposed action and other actions that would affect the same resources. As stated in Section 4.3, because the proposed action would result in no effect on cultural or historic resources, implementation of the proposed action would not lead to additional cumulative impacts on such resources.

Comment: 008-5-2, **010-8**
A commenter9 believed that further investigation of the DOE Water Field is warranted in order to determine the origin of the earthworks with confidence. The commenter noted that a field trip to the Water Field had been conducted, and the results of that field trip indicate a research protocol is needed to determine the identity and age of this structure. That protocol should begin with access to all previous reports of cultural resource investigations conducted at the Water Field property prior to the development of the Water Field, investigations that would have been required by Section 106 of the National Historic Preservation Act. The commenter stated that if the structure is determined to have historic significance, an evaluation should be made of the visual and physical impact of the American Centrifuge Project on that structure. Finally, the commenter stated that the Gas Centrifuge Enrichment Plant Water Field site lies close enough to the Barnes Works to warrant a close examination of its historic significance. Any prehistoric earthworks that may be identified at that location deserve the utmost attention and protection. Therefore, the commenter urged a program of research at that site as rapidly as possible, in compliance with Federal preservation law. Commenters declared that on a site visit to Gaseous Centrifuge Enrichment Plant Water Field, they observed what appears to be prehistoric earthworks.

Response: NRC evaluated the use of the DOE Well Field in Section 4.2.6, Water Resource Impacts and found that the operation of the wells would not alter the current physical conditions at the well fields.

As described in Comment 011-1 in Section J.11, a commenter provided a report on the origin of a series of levees along the Scioto River in southern Pike County. There are three separate levees. The northernmost is on the Nier property at the U.S. Route 23 entrance to Piketon DOE facility. The middle levee is partially located on a DOE well field located next to the Scioto River on the old Billy Cutlip farm. The third levee extends across 10 farms beginning at the Barnes property and extending south along the river to the Will Acord farm. The northern and southern levees were built after the 1959 floods, to protect agricultural land from subsequent floods The middle levee was built for technical and economic reasons. When the DOE wells were being drilled in the 1980s, the pipeline from the river to the steam plant required the addition of concrete and ground cover over the original concrete anchors in order to hold the line in place. According to the commenter, the "result is a levy-like [sic] appearance." Concurrently, and into the 1990s, the Standard Slag company, owners of a sand and gravel quarry on the former Cutlip farm, moved its overburden down to the river and built a levee between the wells and river to make space for expansion. At first the levee was kept mowed and it was possible to drive on it, but when Standard Slag

determined that it would not be able to quarry the terrace next to the levee, the levee was no longer maintained.

This information indicates that the embankment of concern to the commenter was constructed less than 50 years ago for flood protection purposes. Text has been added to the EIS at Section 3.3.4 to provide this information.

Comment: 014-40-1
A commenter is concerned about cumulative erosion and sedimentation impacts which could be caused by construction of Cylinder Storage Yard X-745H. The commenter notes that according to the Draft EIS, the cylinder storage yard would be constructed in an area characterized by steep slopes. The commenter also noted that the Draft EIS states, "During excavation and grading, the steep slopes would be more susceptible to soil erosion, and the streams at the bottom of the slopes may receive an increased amount of silt." The commenter stated that construction activities would be close to Little Beaver Creek, an impaired stream. Presently, siltation and sedimentation are two causes of the creek's impairment. Additional erosion and sedimentation from the construction of the cylinder storage yard could result in cumulative impacts to Little Beaver Creek. The commenter believed that Draft EIS did not perform a cumulative impact analysis for this case and that such an analysis should be included in the Final EIS.

Response: NRC evaluated the potential site preparation and construction impacts on Little Beaver Creek in Section 4.2.6.1 and reference the best management practices that would be implemented to maintain a small impact on Little Beaver Creek. In completing the cumulative impact analysis, NRC evaluated the other activities occurring on the Portsmouth reservation and their specific location as listed in Table 4-24, Other Activities Considered for Cumulative Impacts. No changes to the cumulative impact analysis are warranted, because no other large scale land disturbing activities with the potential to increase erosion or sedimentation in Little Beaver Creek were identified.

General Comments

Comment: 006-3
One commenter asked how anyone in government can make a claim that there will be no significant impacts from the facility given the disastrous history of the nuclear industry the last 60 years, and the contamination that exists at all the nuclear sites, which is costing billions to clean. The commenter stated that the legacy of radioactive contamination is now in the soil and water of the whole country. The commenter also stated that USEC's assertion that there will never be any kind of accident, or technical malfunction, or computer error, or human error, which will cause the release of radioactive materials is hard to believe. The commenter said that nuclear plants are dangerous and unnecessary. The commenter believes there are much better sources of energy which are not laden with all the dangers of nuclear power.

Response: The NRC staff recognizes that some commenters are opposed to the proposed ACP and to nuclear power. These comments are beyond the scope of the EIS.

Comment: 015-57
A commenter suggested adding "NRC Docket No. 70-7004" before the date on line 31 of page 4-123.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-58
A commenter suggested changing "USEC, Inc." to "USEC Inc." on line 42 of page 4-123.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-59
A commenter suggested changing "USEC,, Inc." to "USEC Inc." on line 46 of page 4-123.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

J.12 No-Action Alternative

No comments received on this section.

J.13 Mitigation

Comment: 014-40-2
A commenter commended NRC for proposing the use of best management practices to mitigate erosion and sedimentation impacts (e.g., silt fences, straw bales, re-seeding disturbed areas, etc.). The commenter requested that in addition, NRC should commit to evaluating significant characteristics for the Little Beaver Creek habitat (e.g., fish spawning periods, mussel locations), and conducting appropriate mitigation activities to preserve these characteristics. The commenter urged NRC to establish such mitigation commitments in the construction contracts for the proposed project, and to document these mitigation measures in the Record of Decision.

Response: Because the potential impacts on Little Beaver Creek are small, the development of additional mitigation measures beyond the best management practices identified by USEC in its Environmental Report are not warranted. NRC notes, that under the proposed Environmental Measurement and Monitoring programs, USEC would collect and analyze weekly and monthly surface water and sediment samples from Little and Big Beaver creeks, which would detect any significant changes in its characteristics. See Section 6.1.4, Surface Water and Sediment Monitoring, for details.

Comment: 015-60
A commenter suggested changing "United States Enrichment Corporation" to "USEC Inc." on lines 31 and 34 of page 5-4.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

J.14 Environmental Measurement and Monitoring Programs

Comment: PMT-007-3
A commenter noted that the correct formula for uranyl fluoride (page 6-3) is UO_2F_2 not UF_2.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 014-33
A commenter noted that on page 6-3, line 14, the Draft EIS states that uranium isotopes anticipated to "be released as airborne emissions would include uranium-234, uranium-235, uranium-236, and uranium-238. The commenter asked that the Final EIS also include the isotopes of americium, neptunium, plutonium,

and technetium (listed on the bottom of page 3-31) that have been known emissions from the former Portsmouth Gaseous Diffusion Plant, which had uranium feed similar to what is anticipated for the ACP.

Response: The gaseous diffusion plants during their history processed feed from a variety of sources, resulting in the presence of the additional isotopes listed on page 3-31. USEC intends to use natural uranium in the form of UF_6 for the proposed ACP. The intention is to not introduce feedstock contaminated with significant concentrations of other nuclides into the process. Feed material that meets the American Standards for Testing and Materials specification for recycled feed may be used, and may contain radionuclides such as uranium-236 and technetium-99. Based on USEC's license application, no transuranic elements such as plutonium, americium, or neptunium are expected to be processed by the ACP in other than trace quantities. USEC does plan on analyzing effluents for technetium-99 because of the isotope's historic presence on the reservation. Analysis of expected dose from air releases of isotopes of the transuranic elements can not be performed in the EIS because there is no expected release source of the isotopes from the ACP.

Comment: 015-61
A commenter suggested revising bulletized item to read, "X-3001, X-3002, X-3003, and X-3004 Process Buildings;" on line 7 of page 6-3.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-62
A commenter suggested revising bulletized item to read, "X-3356 and X-3366 Product and Tails Withdrawal Buildings;" on line 8 of page 6-3.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-63
A commenter suggested revising the subtitle to read, "X-3001, and X-3002, and X-3004 Process Buildings" on line 4 of page 6-4.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-64
A commenter suggested revising the sentence to read, "The X-3001, X-3002, X-3003, and X-3004 Process Buildings would..." on line 6 of page 6-4.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-65
A commenter suggested revising the subtitle to read, "X-3356 and X-3366 Product and Tails Withdrawal Buildings" on line 25 of page 6-4.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-66
A commenter suggested revising the sentence to read, "The X-3356 and X-3366 buildings would..." on line 26 of page 6-4.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-67
A commenter suggested changing "012" to "013" on line 6 of page 6-6.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-68
A commenter suggested changing "013" to "012" on line 7 of page 6-6.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

Comment: 015-69
A commenter suggested changing "United States Enrichment Corporation" To "USEC Inc." on line 34 of page 6-12.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

J.15 Cost-Benefit Analysis

Comment: 005-12
A commenter indicated that on Page 7-1, Section 7.1.1 costs of the Proposed Action are not clear and questioned if USEC would be responsible for the decontamination and decommissioning of the facilities once the life cycle is completed. The commenter stated that USEC is currently leasing the facilities from a federal agency and the EIS should make it clear if the federal government will be ultimately responsible for the decontamination and decommissioning of the facilities to be used by the ACP.

Response: USEC's total decommissioning liability includes both the total plant decommissioning and decontamination costs and the tails disposition costs. USEC presently intends to utilize a surety bond to provide financial assurance for decommissioning, pursuant to 10 CFR 70.25(f). The surety bond will provide an ultimate guarantee that decommissioning costs will be paid in the event USEC is unable to meet its decommissioning obligations at the time of decommissioning. The surety bond will require that the surety company will deposit any funds paid under its terms directly into either an external trust or a standby trust. However, USEC may choose to utilize alternate financial assurance funding methods. Upon finalization of the specific funding instruments to be utilized and at least 90 days prior to the commencement of enrichment operations, USEC will supplement its application to include the signed, executed documentation.

Comment: 015-70
A commenter suggested changing "United States Enrichment Corporation" to "USEC Inc." on lines 43 and 46 of page 7-10.

Response: The NRC staff has revised the text to reflect the commenter's suggestion.

J.16 Summary of Environmental Consequences

Comment: 015-71
A commenter suggested changing “3324" to “3346" on line 13 of page 8-4.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

Comment: 015-72
A commenter suggested changing “United States Enrichment Corporation” to “USEC Inc.” on line 3 of page 8-5.

Response: The NRC staff has revised the text to reflect the commenter’s suggestion.

J.17 List of Preparers

Comment: 008-1
A commenter asked for an explanation of the basis for regarding NRC’s analyst for historic and cultural resources as qualified to analyze the impacts of the proposed ACP.

Response: The analyst meets the standards for archeology in The Secretary of the Interior's “Standards and Guidelines for Archeology and Historic Preservation” (48 FR 44716) and has conducted evaluations for historic and cultural resources for NEPA documents and other environmental studies since 1978. She has also conducted information gathering efforts with many American Indian tribes for a variety of infrastructure projects and has supported federal agencies in government-to-government consultations with federally-recognized tribes.

J.18 Appendices

Comment: PMT-007-4
One commenter noted that in Appendix B, page 1, the term uranium hexafluoride is misspelled.

Response: The NRC staff acknowledges the comment, however, Appendix B is a reproduction of correspondence that has already been completed.

Comment: 014-30
A commenter stated that throughout Appendix C the isotope list should include technetium and transuranic isotopes such as those listed on page 3-31 to reflect activities anticipated at the ACP.

Response: Technetium is included in the Appendix C analyses that deal with disturbance of existing sources such as on-site soil. The activity levels for the airborne sources in Appendix C were taken from the sampling results in the 2003 site environmental report, and technetium-99 is included as one of the isotopes identified by the site sampling. Isotopes of the transuranic elements were not listed as being detected in the soils at the locations of interest, such as the ambient air monitoring stations. These isotopes were accordingly not included in the calculations of dose resulting from soil disturbance. For the dose assessment from operations, USEC has stated in section 9.2.2 of their license application that they intend to use natural feedstock at the ACP that does not contain significant quantities of isotopes other than uranium-234, uranium-235, and uranium-238. USEC also intends to adhere to the American Society of Testing and Materials specification for recycled feed, which will limit the presence of other isotopes such as uranium-236 and technetium-99. Based on USEC’s license application, no transuranic elements

such as plutonium, americium, or neptunium are expected to be processed by the ACP in other than trace quantities. The analysis accordingly did not include those isotopes in the airborne release inventory.

J.19 Other Comments

Accidents

Comment: 004-8
A commenter asked what the plans are for managing a radioactive accident at the facility?

Response: In the EIS, the impacts of selected potential accidents were evaluated to assess the potential human health impacts associated with accidents. The accident sequences selected vary in severity from high- to low-consequence events, and include accidents initiated by operator error and equipment failure. NRC regulations and USEC's operating procedures for the proposed ACP are designed to ensure that the high and intermediate accident scenarios would be highly unlikely. The NRC staff's Safety Evaluation Report assesses the safety features and operating procedures required to reduce the risks from accidents. The combination of Items Relied on for Safety that mitigate emergency conditions, and the implementation of emergency procedures and protective actions in accordance with the proposed Emergency Plan for the ACP, would limit the impacts of accidents that could otherwise extend beyond the proposed ACP boundaries. The Items Relied on for Safety include such measures as active and passive engineered controls.

Security/Terrorism Issues

Comment: PMT-014-3
One commenter claimed that uranium enrichment plants have a poor security history. The commenter identified the Urenco plant as being responsible for allowing the Con Network access to the centrifuge technology behind the enrichment programs of Pakistan, Iran, Iraq, and Libya. The commenter also noted that some of USEC's violation notices have involved lax control over classified computers.

Response: In accordance with the requirements of 10 CFR Part 95, USEC submitted to the NRC, as part of its license application, its plan for the protection of classified matter, including classified computers, at the ACP. The NRC's review of this plan is being documented in the NRC's safety evaluation report. As part of the NRC's process for approving the plan, prior to USEC's receipt of any classified matter at the ACP, the NRC will conduct an inspection to ensure that USEC will adequately implement the NRC's classified matter protection requirements and the commitments contained in the plan. In addition, during the time USEC possesses classified matter, the NRC will conduct periodic inspections to ensure that USEC is complying with the regulatory requirements and the commitments contained in the plan.

Comment: 004-9
A commenter questioned what assurances there are that this plant will not encourage a terrorist act in our own rural backyard?

Response: As stated in the Commission's Memorandum and Order CLI-02-241, although the NRC has determined that issues of terrorism in the context of NEPA should not be addressed, the NRC is devoting substantial time and attention to terrorism-related matters. For example, as part of fulfilling its mission to protect public health and safety and common defense and security pursuant to the Atomic Energy Act, *the NRC staff is conducting security assessments of commercial uses of radioactive material.*

Comment: 003-5
A commenter indicated that because the Envirocare facility is currently not able to accommodate the radioactive waste shipped to it and that there is no confidence that the waste generated by the USEC facility will ever be removed from the site. The commenter stated that this is an environmental hazard and creates a terrorist target in southeast Ohio.

Response: As described in section 2.1.4.3, the disposition of the depleted U_3O_8 generated from the DOE conversion facilities at Paducah and Portsmouth would be either at the Envirocare site (DOE's proposed disposition site) or at the Nevada Test Site (DOE's optional disposal site). Depleted U_3O_8 generated from the adjacent or offsite private conversion process would be disposed at a site licensed to accept this material. For example, under its Radioactive Materials License issued by the State of Utah, Envirocare is authorized to accept for disposal the quantities of depleted uranium oxides expected to be generated by the conversion of the proposed ACP's depleted UF_6 .

Comment: 003-5
A commenter noted that there is currently a 3-strand barbed wire fence surrounding the facility, which does not provide much assurance against potential terrorist entry to the facility.

Response: As stated in the Commission's Memorandum and Order CLI-02-241, although the NRC has determined that issues of terrorism in the context of NEPA should not be addressed, the NRC is devoting substantial time and attention to terrorism-related matters. For example, as part of fulfilling its mission to protect public health and safety and common defense and security pursuant to the Atomic Energy Act*, the NRC staff is conducting security assessments of commercial uses of radioactive material.*

Highly Enriched Uranium

Comment: PMT-017-3; **PMT-002-5**; **PMT-005-2**
Two commenters expressed concern over the use of centrifuge technology to manufacture weapons-grade material. One commenter stated that centrifuge technology is the very same technology the U.S. government is concerned about Iran possessing. One of the comments noted that the resulting environmental impacts would be extremely different and would change the whole impact of the plant. Another commenter questioned whether there is any possibility that this plant would manufacture materials at high enough concentrations for use in other applications, such as bomb manufacturing.

Response: The license application under review is limited to the construction and operation of a plant to enrich uranium up to 10 percent by weight of uranium-235, with an initial production capacity of 3.5 million SWUs potentially expandable to 7 million SWUs, using gas centrifuge technology. Any significant changes to this license would require prior approval by the NRC, and would be subject to additional review. As described in Section 1.2, page 1-2 of the EIS, the proposed ACP would produce only low-enriched uranium for shipment to commercial nuclear power fuel fabricators; expected product recipients are listed in Section 2.1.4.3, page 2-27. The production of highly-enriched uranium for the Department of Defense is not considered part of the proposed action and is not under consideration in the NRC licensing review (see Section 1.3.1).

Comment: PMT-007-1; PMT-003-7
One commenter stated that another commenter stated that the material was manufactured from 1954 to 1964 and the building was shut down around 1992. Another commenter indicated that production of the material did not actually cease until 1992.

Response: NRC appreciates the commenter's clarification of the time period during which highly enriched uranium was produced at the Portsmouth facility.

Violations

Comment: PMT-004-1
A commenter wondered if USECs previous violations were taken into account in the Draft EIS.

Response: NRC is aware of past violations. The EIS focuses on environmental impacts of the proposed action. Consideration of violations of the terms of the license are beyond the scope of this document. However, should a licensee violate the terms of its license, which includes compliance with all applicable laws and regulations pertaining to uranium enrichment operations and environmental protection, then the NRC, as the Federal oversight agency, may impose penalties, including financial and civil penalties and license revocation. Other Federal and State agencies can also impose requirements and penalties for violations of laws and regulations under their purview.

Historic and Cultural Resources

Comment -010-2-1: Commenter stated that the requirements of the National Historic Preservation Act were not followed when the DOE took part of his land in the 1950s. Commenter also states that his property should be eligible for inclusion in the National Register of Historic Places.

Response: These comments are acknowledged and do not provide significant new information relevant to this EIS.

Comment 010-3: Commenter stated that safety, security, and environmental fears could negatively impact public visitation to and appreciation of the historic sites surrounding the DOE reservation.

Response: These comments are acknowledged and do not provide significant new information relevant to this EIS.

Comment 010-4: Commenter suggested that the site would better serve the public as a historic memorial to both the passenger pigeon and to the various historically significant buildings that are found in the surrounding areas.

Response: This comment is acknowledged and does not provide significant new information relevant to this EIS.

Comment 010-5: Commenter described the historical significance of the Barnes Works, also known as the Seal Works.

Response: This comment is acknowledged and does not provide significant new information relevant to this EIS.

Comment 010-6: Commenter stated that her tribe was not contacted about the construction of the centrifuge plant and they want to be included as a consulting party.

Response: Information in the commenter's letter was included in Section 3.3.5. NRC attempted several times to reach the commenter's tribe to consult, but received no response.

Comment 010-7: Commenter stated that his tribe was not contacted about the construction of the centrifuge plant and they want to be included as a consulting party.

Response: NRC sent a letter and copy of the Draft EIS to the commenter and requested further input, but received no response.

J.20 Late Filed Comments

Just prior to publication of the Final EIS (from approximately March 3, 2006 to March 11, 2006), NRC received several comments concerning the possible discovery of a new prehistoric earthwork located near the main entrance to the DOE Reservation. A general summary of those comments, along with responses, is provided below.

Comment:
A commenter expressed concern about an apparent prehistoric earthwork located near the West Access road to the DOE reservation and next to a highway off-ramp where the commenter reports that work is scheduled to be conducted by the Ohio Department of Transportation. The commenter believes that the road work is being done in connection with the proposed ACP project and, therefore, that NRC must consider the effects of the work as part of the undertaking under consideration in the EIS.

Response: NRC queried the applicant, USEC, and was informed that USEC had not requested improvements to the off-ramp or the West Access road. USEC stated that the Ohio Department of Transportation had informed them of the work in advance to allow time for access to be established via an alternate route. USEC indicated that it understood the work to be maintenance based on Ohio Department of Transportation inspection records, and noted that repavement south of the cloverleaf took place two years ago and, north of the cloverleaf, last year. NRC contacted the Ohio Department of Transportation and verified that its work in the area was unrelated to the proposed ACP. Based on this information, NRC finds that the Ohio Department of Transportation work is not part of its undertaking and that the highway off-ramp and road outside the DOE reservation is not part of the area of potential effects to be considered in assessing impacts of the undertaking on historic properties.

Comment:
A commenter expressed concern about traffic accidents that might affect an archaeological site in the location of the possible prehistoric earthwork location, specifically an accident involving release of radioactive materials that would require soils cleanup that would adversely affect an archaeological site.

Response: The EIS analyzes the effects of transportation related to the proposed ACP during construction and operations in section 4.2.11. Current (2004) daily trips on U.S. Route 23 and State Road 32 average 15,110 and 8,830, respectively (see Table 4-5). ACP construction would generate 2,639 daily highway trips and operations would generate 1,137; the bulk of these trips would be workers in cars, while daily truck trips would average 27 during construction and 24 during operations (see Tables 4-5 and 4-9). The likelihood of accidents involving ACP-related trucks occurring anywhere along the transportation routes is small, resulting in an estimated 3.61 injuries per year during construction and less than one per year during operations (see Tables 4-8 and 4-11).

The likelihood of an accident involving the release of radioactive material that might affect an archeological site near the location of the possible prehistoric earthwork location is small. It is estimated that there will be approximately 1,565 truck shipments of radioactive material per year, including feed material cylinders, product material cylinders, heel cylinders, and radioactive waste. Assuming an

accident rate of 3×10^{-7} accidents per vehicle per km (see Table D-8), there is estimated to be an average of 0.005 accidents per year involving a radioactive material shipment along a ten kilometer stretch of road near the prehistoric earthworks, or about one accident every 200 years. Only a fraction of these accidents would involve the release of any radioactive material. If an accident were to occur, it is estimated that there is a 55 percent probability that no radioactive material will be released, a 36 percent probability that only 1 percent of the radioactive material will be released, a 7 percent probability that 10 percent of the material will be released, and only about 2 percent that all the radioactive will be released (see Tables D-9 and D-11).

Comment:
A commenter expressed the opinion that a reported discovery of a prehistoric earthwork next to the West Access road to the DOE reservation would trigger the Native American Graves Protection and Repatriation Act provisions for inadvertent discoveries on Federal lands and would require NRC to notify those tribes with whom it had consulted who requested to be notified if any Native American Graves Protection and Repatriation Act items were encountered during construction.

Response: NRC notes that the reported discovery is not on Federal lands and that the proposed ACP is not under construction. The commenter asserts that the area of the reported discovery is beside a highway exit ramp where a large number of trucks will pass. As indicated in the response above, the location of the reported discovery does not fall within the area of potential effects of NRC's licensing activity. The previous response summarizes the transportation impacts and accidents associated with ACP construction and operations as analyzed in the EIS. It should be noted that the commenter's numerical count of trucks is incorrectly attributed to the ACP; it applies to current (2004) daily traffic counts on U.S. Route 23 and State Route 32 (see Table 4-5).

J.21 References

(DOE, 2004a). U.S. Department of Energy. "Final Environmental Impact Statement for Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Portsmouth, Ohio Site." DOE/EIS-0360. Office of Environmental Management. June 2004.

(DOE, 2004b). U.S. Department of Energy. "Portsmouth Annual Environmental Report for 2003." DOE/OR/11-3153 & D1. Office of Environmental Management. June 2004.

(ERDA, 1977). Energy Research and Development Administration. "Final Environmental Statement, Portsmouth Gaseous Diffusion Plant Expansion, Piketon, Ohio." ERDA-1549. September 1977.

(NRC, 2005). U.S. Nuclear Regulatory Commission. Commission Order CLI-05-05. January 18, 2005.

(ODR, 2205). Ohio Department of Natural Resources. "100-Year Flood Hazard Areas - Pike County." 2005. <http://www.dnr.state.oh.us/gims/report.asp> (Accessed 6/8/2005).

(USEC, 2005a). United States Enrichment Corporation. "Responses to Request for Additional Information on the Environmental Report, AET-05-0061." July 29, 2005.

(USEC, 2005b). USEC Inc. "Environmental Report for the American Centrifuge Plant in Piketon, Ohio." NRC Docket No. 70-7004. Revision 6. November 2005.

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