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November 10, 2004

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
LOUISIANA ENERGY SERVICES, L.P.	)	Docket No. 70-3103
	)	ASLBP No. 04-826-01-ML
(National Enrichment Facility)	)	
	)	

NRC STAFF'S RESPONSE TO INTERROGATORIES AND DOCUMENT REQUEST BY PETITIONERS NUCLEAR INFORMATION AND RESOURCE SERVICE AND PUBLIC CITIZEN TO COMMISSION STAFF

On October 21, 2004, Petitioners Nuclear Information and Resource Service and Public Citizen ("NIRS/PC") filed "Interrogatories and Document Request by Petitioners Nuclear Information Service and Public Citizen to Commission Staff." In its request, NIRS/PC filed twelve interrogatories and asked that the Nuclear Regulatory Commission Staff ("NRC Staff") produce each document described or identified in response to the interrogatories. The NRC Staff hereby files its responses to NIRS/PC's request as follows.

INTERROGATORY 1:

The DEIS includes a schedule for generation of DUF_6 (at 2-17) and states that all DUF_6 would be disposed of before the site is decommissioned (at 2-27) in 2036 (at 2-2). The DEIS also states that UBCs containing DUF_6 would be temporarily stored on the UBC Storage Pad until a conversion facility is available, and storage of UBCs could occur for up to 30 years on the UBC Storage Pad (at 4-52). The DEIS also states that the proposed maximum DUF_6 inventory for the NEF, if processed at DOE facilities, could extend the time of operation of the Paducah facility for 11 years or the Portsmouth facility for 15 years. (at 4-56). Please state your best estimate of the length of time some DUF_6 would remain in storage at the NEF site prior to deconversion, if it were planned to deconvert such DUF_6 at a DOE facility in (a) Paducah or (b) Portsmouth, in view of the fact that the Paducah plant is scheduled to operate for about 25 years beginning in 2006, and the Portsmouth plant is scheduled to operate for about 18 years beginning in 2006, in deconverting DUF_6 generated by DOE gaseous diffusion plants. (at 4-55, 4-56). Please state what quantities of DUF_6 would be in storage at the NEF in each year until all DUF_6 will have been removed.

STAFF RESPONSE:

U.S. NUCLEAR REGULATORY COMMISSION
In the Matter of LOUISIANA ENERGY SERVICES, LP
Docket No. 70-3103-ML Official Exhibit No. 42
OFFERED by: Applicant/Licensee Intervenor NIRS/PC
NRC Staff Other
IDENTIFIED on Witness/Panel G. Rice
Action Taken: ADMITTED REJECTED WITHDRAWN

The NRC Staff conducted no relevant analysis addressing this topic, and therefore, has no basis to make any determination as to the length of time that some DUF_6 would remain in storage before deconversion, or the quantities of such DUF_6 in storage.

INTERROGATORY 2:

> The DEIS refers to the possibility that the Portsmouth conversion facility could being processing the DUF_6 accumulated at the NEF in 2026 and have nearly all of the accumulated UBCs processed by 2038 (at 7-4, 7-5). Please state the maximum quantities of DUF_6 that, under that scenario, would remain at the NEF in each year from the start of NEF operations to the removal of the last UBC.

STAFF RESPONSE:

The NRC Staff conducted no relevant analysis addressing this topic, and therefore, has no basis to make any determination as to the quantities of DUF_6 that would remain at the NEF in each year from the start of NEF operations to the removal of the last UBC.

INTERROGATORY 3:

> Please state the basis for the assumption in the DEIS (at 2-28) that the proposed private conversion facility would be using the same technology adapted for use by DOE in its conversion facilities and describe any documents supporting such assumption.

STAFF RESPONSE:

The NRC Staff assumed that the proposed private conversion facility would use the same chemical process adapted for use by DOE in its conversion facilities based on its best judgment that reliance on the DOE analysis was sufficient for the purpose of assessing the environmental impacts of a private deconversion facility which may be built in the future.

The conversion technology to be used by DOE applies the same chemical processes as were assumed to be applied for the conversion of DUF_6 in the Claiborne Enrichment Center ("CEC") EIS. Thus, the NEF DEIS assumption for the conversion technology is consistent with this previous

study and analysis. As discussed in its response to NIRS/PC's late-filed contentions, the specific technology which would be employed by the private conversion facility is uncertain at this time since no such facility currently exists. *See* "NRC Staff's Response to Nuclear Information and Resource Service and Public Citizen Motion to Amend and Supplement Contentions," dated Nov. 5, 2004, at p. 24.

With respect to this issue, the NRC Staff refers NIRS/PC to the following publicly available documents:

(1) (CEC EIS) U.S. Nuclear Regulatory Commission, NUREG-1484, *Final Environmental Impact Statement for the Construction and Operation of Claiborne Enrichment Center, Homer, Louisiana*, Docket No. 70-3070, Louisiana Energy Services, L.P., Office of Nuclear Material, Safety and Safegaurds (Aug. 1994).

(2) "NRC Staff's Response to Nuclear Information and Resource Service and Public Citizen Motion to Amend and Supplement Contentions," dated November 5, 2004.

INTERROGATORY 4:

At page 2-27 of the DEIS, the statement is made that NRC assumes that depleted uranium from the NEF will be disposed of as waste. Please state the facts considered by NRC in making that assumption, and describe all documents reviewed in making that determination.

STAFF RESPONSE:

In certain cases, a limited amount of depleted uranium ("DU") can be used as a resource if a corresponding commercial market exists. However, when a large inventory of DU exists, as it does with respect to the inventory at the DOE Portsmouth and Paducah facilities, it is likely that at least some of the DU produced by the NEF will be disposed of as waste. Furthermore, assuming that DU will be disposed of as a waste is a more conservative analysis than assuming other uses of the DU. Therefore, the assumption that DU would be disposed of as a waste creates a bounding analysis.

With respect to this issue, the NRC Staff refers NIRS/PC to the following publicly available

documents:

(1) U.S. Nuclear Regulatory Commission. Letter from Robert M. Bernero, Director, Office of Nuclear Material Safety and Safeguards, to Charles E. Bradley, DOE Office of Uranium Programs, Office of Nuclear Energy. January 3, 1995.

INTERROGATORY 5:

At pages 2-27 and 2-31 of the DEIS the statement is made that DUF_6 in the form of U_3O_8 can be considered Class A low-level radioactive waste. Please state the facts considered by NRC in making that determination, and describe all documents reviewed by NRC in making that determination.

STAFF RESPONSE:

The NRC Staff provided this information in a filing before the Commission entitled "NRC Staff Brief on Classification of Depleted Uranium as Waste," dated September 8, 2004. Included in the Staff's brief is an affidavit by Timothy Johnson, which was also relied upon by the NRC Staff in the DEIS.

With respect to this issue, the NRC Staff refers NIRS/PC to the following publicly available documents:

(1) "NRC Staff Brief on Classification of Depleted Uranium as Waste," dated September 8, 2004.

INTERROGATORY 6:

Please state whether NRC has conducted an environmental impact analysis in making the determination that depleted uranium from the NEF would be class A low-level radioactive waste. Please describe any documents concerning or reflecting such analysis.

STAFF RESPONSE:

The NRC Staff addressed this issue in the brief referenced in Staff Response to Interrogatory 5, *supra*. Because the NRC Staff simply applied Commission regulations to determine that DU from the NEF is class A low-level radioactive waste, it did not conduct an environmental impact analysis associated with this specific determination. Using this classification, the NRC Staff was able to determine the possible disposal pathways of DU from the NEF in the DEIS.

INTERROGATORY 7:

> The DEIS states that, depending on the quantity of DUF_6 material to be deposited, additional environmental impact evaluations of the proposed disposal site (a licensed low-level radioactive waste disposal facility) may be required (at 2-31; see also 4-58). Please state what quantity of DUF_6 may require such additional evaluation and how such quantity is determined and describe any documents concerning the statement referred to.

STAFF RESPONSE:

The need for additional environmental impact evaluations is determined by the existing license of the particular disposal facility that will be used, specifically the quantities and types of waste that such license permits. The NRC Staff does not have specific knowledge of the licenses of the potential disposal sites. None of the proposed disposal facilities are licensed under NRC jurisdiction, and therefore, any necessary environmental analyses would be done by the state in which the facility is licensed, not the NRC.

INTERROGATORY 8:

> Of the disposal sites listed on pages 2-31, 2-32, and 4-56 of the DEIS, please state which ones would require additional environmental impact evaluations of the proposed disposal site if the bulk of the DUF_6 from the NEF is to be disposed of at such site (a) after conversion in a private conversion facility or (b) after conversion in a DOE facility.

STAFF RESPONSE:

See Staff Response to Interrogatory 7.

INTERROGATORY 9:

Please describe any documents reflecting the assessments referred to in the statement: "The environmental impacts at the shallow disposal sites considered for disposition of low-level radioactive wastes would have been assessed at the time of the initial license approvals of these facilities." (DEIS at 4-58).

STAFF RESPONSE:

This statement is premised upon the NRC Staff's general knowledge that such licensing actions would require environmental analysis under state NEPA-type statutes.

INTERROGATORY 10:

With regard to the estimate of the impact of disposal of the converted waste, set forth at pages 4-58 through 4-59 (sec. 4.2.14.4 and Table 4-19) of the DEIS, please describe in full the models used to develop such estimate, each parameter used in modeling, and identify the source of each parameter, with references. Please describe any documents concerning such estimate.

STAFF RESPONSE:

The basis for Table 4-19 of the DEIS lies in the previous evaluation of impacts of disposal of U_3O_8 in deep geologic disposal units provided in the CEC EIS (pp. 4-66 to 4-68). The impacts were adjusted based on the possible quantity of U_3O_8 assumed in the CEC EIS to the amount from the operations of the proposed NEF. Specifically, the CEC EIS states that 91,000 MT (9.1×107 kg) of U_3O_8 would need to be disposed. *See* CEC EIS at p. 4-66. The proposed NEF would generate approximately 197,000 MT of DUF_6 during the time of operation. Based on the DOE DUF_6 conversion facilities' Final Environmental Impact Statements ("Portsmouth EIS" & "Paducah EIS"), these facilities would produce approximately 0.79 MT of U_3O_8 for every metric ton of DUF_6 processed. This would result in 157,000 MT of U_3O_8 from the conversion of the DUF_6 for the proposed NEF. Therefore, the CEC EIS geologic disposal units impacts were adjusted based on a

ratio of 1.72 (157,000 MT divided by 91,000 MT).

With respect to this issue, the NRC Staff refers NIRS/PC to the following publicly available documents:

(1) (CEC EIS) U.S. Nuclear Regulatory Commission, NUREG-1484, *Final Environmental Impact Statement for the Construction and Operation of Claiborne Enrichment Center, Homer, Louisiana*, Docket No. 70-3070, Louisiana Energy Services, L.P., Office of Nuclear Material, Safety and Safeguards (Aug. 1994).

(2) (Portsmouth EIS) U.S. Department of Energy, DOE/EIS-0360, *Final Environmental Impact Statement for Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Portsmouth, Ohio Site*, Office of Environmental Management (June 2004).

(3) (Paducah EIS) U.S. Department of Energy, DOE/EIS-0359, *Final Environmental Impact Statement for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Paducah, Kentucky Site*, Office of Environmental Management (June 2004).

INTERROGATORY 11:

With regard to the estimate of the impact of the Site Stormwater Detention Basin set forth at page 4-13 of the Draft Environmental Impact Statement, NUREG-1790, please state in full the model used to develop such estimate, describe each parameter used in modeling, and identify the source of each parameter, with references. Please describe any documents concerning such estimate.

STAFF RESPONSE:

The estimated impact of the Site Stormwater Detention Basin is based on an application of Darcy's Law. The Darcy Velocity, Vd = kh * dh/dl, where kh = hydraulic conductivity and dh/dl = gradient of the plume surface.[1] The chosen kh = 0.01 cm/sec, is on the conservative side (i.e., results in greater Darcy Velocity) of the range of site surface soils hydraulic conductivity as given on

[1]DeWiest, R.J.M., "Flow Through Porous Media," Academic Press, New York, New York, 1969, at p. 3 ("DeWiest").

page 3-35 of the DEIS.[2] The slope (gradient) of the plume surface is assumed to follow the slope of the Chinle Formation surface, 0.02 cm/cm, as given on page 3-35 of the DEIS.[3]

The resulting Darcy Velocity is 0.0002 cm/sec, or 63.1 m/yr. The actual plume velocity through the soil pores, i.e., the pore velocity, is Vp = Vd / p, where p = site surface soil porosity. The chosen p = 0.25 (25 percent) is the most conservative value within the range given on pages 3-34 and 3-35 of the DEIS.[4] The resulting conservative estimate of the pore velocity of 252 m/yr is set forth on page 4-13 of the DEIS.

The plume flow rate is estimated as the precipitation, at a rate of 46.1 cm/yr (LES ER p. 3.6-3), falling on the basin's drainage area of 39 hectares (LES ER p.3.4-6); runoff infiltration, evaporation of runoff water and basin water, and evapotranspiration have been conservatively neglected. The resulting conservative estimate of plume flow, the product of precipitation rate * drainage area accounting for units conversion, is 180,000 m^3/yr. This is in line with the estimate of annual stormwater flow released to the onsite retention/detention basins of 174,000 m^3/yr (DEIS at

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[2]*See also* Louisiana Energy Services, "National Enrichment Facility Environmental Report," Revision 2, NRC Docket No. 70-3103, July 2004, at p.3.4-14 ("LES ER").

[3]*See also* Cook-Joyce, Inc. prepared for Lockwood Greene Engineering & Construction, "Hydrogeologic Investigation, Section 32; Township 21 Range 38, Eunice, New Mexico," November 19, 2003, at Figure 4 ("Cook-Joyce").

[4]*See also* LES ER at p. 3.4-14.

p. 4-12). The plume cross-sectional area, 2850 m^2, is the plume flow rate divided by Vd.[5] The nominal plume width was chosen as 1000 meters, approximately twice the width of the basin perpendicular to the direction of flow (DEIS at p. 4-12); the plume depth, 2.85 meters, is the plume's cross-sectional area divided by its width. The calculations were performed using the "Stormwater Detention Basin" spreadsheet below.

Stormwater Detention Basin **(bold = input)**				
Precip =	**46.1**	cm/yr		
area =	**39**	ha	no runoff infiltration, developed area	
flow =	179,790	cu.m./yr		
hydr cond =	**1.00E-02**	cm/s		
gradient =	**0.02**			
darcy vel =	6.31E+01	m/yr		
eff. porosity =	**0.25**			
pore vel =	2.52E+02	m/yr	1.57E-01	mi/yr

[5]DeWiest.

x-sect area =	2.85E+03	sq.m.	3.07E+04	sq.ft.

With respect to this issue, the NRC Staff refers NIRS/PC to the following documents which are publicly available:

(1) (DeWiest) DeWiest, R.J.M., *Flow Through Porous Media*, New York: Academic Press. 1969.

(2) (LES ER) Louisiana Energy Services, "National Enrichment Facility Environmental Report," Revision 2, NRC Docket No. 70-3103, July 2004.

(3) (Cook-Joyce) Cook-Joyce, Inc. "Hydrogeologic Investigation Section 32; Township 21 Range 38, Eunice, New Mexico." November 19, 2003.

INTERROGATORY 12:

With regard to the impact from the septic systems set forth at page 4-14 of the Draft Environmental Impact Statement, NUREG-1790, please state in full the model used to develop such estimate, the parameter used in modeling, and identify the source of each parameter, with references. Please describe any documents concerning such estimate.

STAFF RESPONSE:

The estimated impact of the Septic Systems is based on application of Darcy's Law. The Darcy Velocity, Vd = kh * dh/dl, where kh = hydraulic conductivity and dh/dl = gradient of the plume surface.[6] The chosen kh = 0.01 cm/sec, is on the conservative side (i.e., resulting in greater Darcy Velocity) of the range of site surface soils hydraulic conductivity as given on page 3-35 of the DEIS.[7] The slope (gradient) of the plume surface is assumed to follow the slope of the Chinle Formation surface, 0.02 cm/cm as given on page 3-35 of the DEIS.[8] The resulting Darcy Velocity is 0.0002 cm/sec, or 63.1 m/yr.

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[6] *Id.* at p.3.

[7] *See also* LES ER at p. 3.4-14.

[8] *See also* Cook-Joyce, at Figure 4.

The actual plume velocity through the soil pores, i.e., the pore velocity, Vp = Vd / p, where p = site surface soil porosity. The chosen p = 0.25 (25 percent) is the most conservative value within the range given on pages 3-34 and 3-35 of the DEIS..[9] The resulting conservative estimate of the pore velocity of 252 m/yr is set forth on page 4-13 of the DEIS.

The plume flow rate is taken as the actual system discharge, 7.3 million liters/yr[10]; evapotranspiration has been conservatively neglected. The plume cross-sectional area, 116 m^2, is the plume flow rate divided by Vd.[11] The nominal plume width was chosen as 100 meters, approximately three times the characteristic length (square root of surface area) of the leach fields.[12] The plume depth, 1.16 meters, is the plume's cross-sectional area divided by its width. The calculations were performed using the "Septic System Leachfield" spreadsheet below.

Septic System Leachfield **(bold = input)**

[9] *See also* LES ER at p. 3.4-14.

[10] LES ER at p.3.12-8.

[11] DeWiest.

[12] LES ER at p.3.12-8.

flow =	**7.30E+06**	l/yr	1.93E+06	gal/yr
hydr cond =	**1.00E-02**	cm/s		
gradient =	**0.02**			
darcy vel =	6.31E+01	m/yr		
eff. porosity =	**0.25**			
pore vel =	2.52E+02	m/yr	1.57E-01	mi/yr
x-sect area =	1.16E+02	sq.m.	1.25E+03	sq.ft.

With respect to this issue, the NRC Staff refers NIRS/PC to the following documents which are publicly available:

(1) (DeWiest) DeWiest, R.J.M., *Flow Through Porous Media*, New York: Academic Press. 1969.

(2) (LES ER) Louisiana Energy Services, "National Enrichment Facility Environmental Report," Revision 2, NRC Docket No. 70-3103, July 2004.

(3) (Cook-Joyce) Cook-Joyce, Inc. "Hydrogeologic Investigation Section 32; Township 21 Range 38, Eunice, New Mexico." November 19, 2003.

Respectfully submitted,

Lisa B. Clark
Darani M. Reddick
Counsel for NRC Staff

Dated at Rockville, Maryland

This 10th day of November, 2004

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
LOUISIANA ENERGY SERVICES, L.P.	)	Docket No. 70-3103
	)	ASLBP No. 04-826-01-ML
(National Enrichment Facility)	)	

AFFIDAVIT OF TIMOTHY C. JOHNSON

I, Timothy C. Johnson, having first been duly sworn, do hereby state as follows:

1. I am employed at the U.S. Nuclear Regulatory Commission as a Project Manager overseeing the licensing for the proposed Louisiana Enrichment Services, L.P. ("LES") uranium enrichment facility near Eunice, New Mexico.

2. I have reviewed the foregoing responses of the NRC Staff to the "Interrogatories and Document Request by Petitioners Nuclear Information and Resource Service and Public Citizen to Commission Staff," and verify that they are true and correct to the best of my information and belief.

Timothy C. Johnson

Subscribed and Sworn before me
this 10th day of November, 2004

Notary Public

My commission expires:

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
LOUISIANA ENERGY SERVICES, L.P.	)	Docket No. 70-3103
	)	
(National Enrichment Facility)	)	ASLBP No. 04-826-01-ML
	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S RESPONSE TO INTERROGATORIES AND DOCUMENT REQUEST BY PETITIONERS NUCLEAR INFORMATION AND RESOURCE SERVICE AND PUBLIC CITIZEN TO COMMISSION STAFF" and "AFFIDAVIT OF TIMOTHY C. JOHNSON" in the above-captioned proceedings have been served on the following by deposit in the United States mail; through deposit in the Nuclear Regulatory Commission's internal system as indicated by an asterisk (*), and by electronic mail as indicated by a double asterisk (**) on this 11th day of November, 2004.

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