LOUISIANA ENERGY

Post Office Box 1004
Charlotte, NC 28201-1004

March 29, 1994

Mr. John W. N. Hickey, Chief
Enrichment Branch
Division of Fuel Cycle Safety
and Safeguards Branch, NMSS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Docket No.: 70-3070
Louisiana Energy Services
Claiborne Enrichment Center
Revisions to Licensing Documents
File: 3046-00-2001.01

Dear Mr. Hickey:

Enclosed are five copies of changed pages for the Proposed License Conditions, revision seven, and 23 copies of changed pages for the Environmental Report, revision 14, for the Claiborne Enrichment Center (CEC). Please update your copies of these documents following the enclosed Push-Pull Instructions. These changes have been made to respond to your request for additional information (RAI) dated March 3, 1994. The revisions also include correction of several typographical errors. Specific responses to each RAI are provided in Attachment A to this letter.

Your letter also invited LES to respond to public comments made on the Draft Environmental Impact Statement (DEIS), particularly comments made with regard to tails disposition, waste disposal, need for the facility, and environmental justice. Additional information on these issues is contained in Attachment B to this letter.

With respect to criticality monitors, LES will review your comments and if necessary will submit a modified exemption request.

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If there are any questions concerning this, please call me at (704) 382-2834.

Sincerely,

Peter G. LeRoy

Peter G. LeRoy
Licensing Manager

PGL/N115.394

Enclosures

xc: (w/ one copy of enclosures)

Mr. Morton B. Margulies, Esq., Chairman
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Attachment A
Specific Responses to NRC RAI

1. **Revise ER Figure 6.2-1 and Proposed License Conditions (PLC) Figure 5.2-1 to reflect correct sampling locations.**

Response:

ER Figure 6.2-1 and PLC Figure 5.2-1 have been revised to reflect correct sampling locations.

2. **Revise ER Figure 6.2-2 to reflect the sampling locations described in the PLC and the ER text.**

Response:

ER Figure 6.2-2 has been revised to reflect the sampling locations described in the PLC and the ER text.

3. **Revise ER Tables 6.1-3 and 6.2-1 so that they are consistent with the PLC. For example, sediment samples will not be composited as described in these tables. Also, revise the ER text as appropriate for consistency with the PLC.**

Response:

ER Tables 6.1-3 and 6.2-1 and text have been revised to ensure consistency with the PLC.

4. **Revise ER p 6.1-3 to indicate your intent to monitor "representative" wells versus all existing wells. See comment on DEIS p 5-12. Explain what is meant by "representative."**

Response:

ER page 6.1-3 has been revised to explain that "representative" means those wells still intact following construction of the CEC. For example, ground water monitoring well A-1 will be eliminated as a result of constructing the CEC.

5. The comment, from LES's DEIS comments, in Attachment B, Page 2, 2nd comment referring to DEIS p xxiii appears to be incomplete.

Response:

The full comment from LES' DEIS comments is as follows:

xxiii 1st paragraph: It should be noted at the end of this paragraph that all jobs at the CEC will be above minimum wage. Therefore, this last sentence should be modified as follows "...at the skill and pay scale jobs, though all positions are expected to be above minimum wage, according to LES. It is LES' intention that through experience, training, and initiative, employees at the lower end of the pay scale will have the opportunity to move from unskilled to skilled positions." (reference LES ER page 8.1-2, first paragraph).

6. Submit revised ER Table 4.1-2 to reflect revised employment figures as indicated in your comments on the DEIS. What is the basis for these revised figures? Explain how these changes affect Claiborne Parish and 24-Parish labor pool expenditures on wages, taxes, and goods and services. Provide any other cost/schedule changes that have been made and their associated effects.

Response:

ER Table 4.1-2 has been revised to reflect the difference in timing between employing personnel for construction jobs and operation jobs. The basis for the revision is that construction of the CEC is expected to take approximately 37 months (reference SAR Table 11.2-1 "CEC Construction, Testing & Operation Schedule"). This differential causes a difference in the need to staff the project with construction and operation personnel. This change in staffing timing results in no material changes in wages, taxes, and goods and services for Claiborne Parish and the surrounding 24-parish labor pool.

7. **Update the status of permits, certifications, etc. in Chapter 9 of the ER. Be sure to include the status of the liquid effluent discharge permits, certification under Section 401 (a)(1) of the Clean Water Act, and National Emission Standards for Hazardous Air Pollutants (NESHAP) approval. Discuss any issues with the permits and any resolutions that have been reached.**

Response:

ER Table 9.4-1 has been revised to reflect the current status of each permit application or approval needed for construction and operation of the CEC.

8. **There are some doubts stated by commenters regarding the authority of the Claiborne Parish [Police] Jury to relocate Parish Road 39. Provide information to indicate whether the jury has the authority to relocate the road.**

Response:

As noted in the attachment to Mr. Norton Tompkins letter to the US NRC dated January 10, 1994 (letter from John C. Blake, District Attorney to W.T. Bailey, President, Claiborne Parish Police Jury dated October 25, 1989) the Police Jury can close the portion of the road traversing the LES property (formerly the LeSage property) after a public hearing is held by the Police Jury and a determination that the potion of the road is no longer needed or is no longer used for a public purpose. As far as relocating the road is concerned, LES has been assisting, and will continue to work with the Claiborne Parish Police Jury to relocate the affected portion of the road to minimize the impact of the facility on nearby communities. Closing of the road on the LES property would take place only after a new road is built. As shown in ER Figure 4.1-6, the proposed relocation of the north end of Parish Road #39 would result in the intersection of Parish Road #39 with State Route #9 moving only approximately 2000 feet.

9. **Discuss your plans regarding the use of chlorinated fluorocarbons (CFCs). Provide information on the likely replacements for the CFCs that were to be used as refrigerants and solvents (R-11, R-13, R-22, and R-113). Discuss the differences of the substitutes as compared to the CFCs. Describe the associated potential impacts on plant design and the environment and the occupational hazards associated with each of the substitutes. Provide an estimate of the potential releases.**

Response:

Information regarding the likely replacements for the CFCs that were to be used at the CEC is widely available from various manufacturers of refrigerant materials (e.g., Du Pont, AlliedSignal). Currently, HFC-134a appears to be one of the more promising substitutes for refrigerant use. It contains no chlorine and has a high Allowable Exposure Limit (AEL) of 1000. Substitutes for CFC solvents are also available. AXAREL® 6000 and 9000 series cleaning agents could be used at the facility in place of R-113.

LES and Urenco are also studying alternate cleaning methods that use no CFCs or CFC substitutes. One method already being used at the Almelo enrichment facility involves the use of an aqueous cleaning method. Detergents dissolved in water are used to clean the equipment, the equipment is rinsed in demineralized water and dried with forced hot air. The main constituents of the detergents are phosphates and silicates. Any residue is evaluated and disposed of appropriately as normal or hazardous waste.

As stated in LES' initial license application (reference SAR section 2.1.2.2.7 and ER section 4.2.2.5) LES has been aware of the changing regulations on the use of CFCs since enactment of the Clean Air Act, as amended in 1990. As explained below the change to a new refrigerant is a minor design change, one that LES has anticipated, and one that will not affect the safe operation of the CEC.

The change in refrigerant for facility cooling systems has no effect on the flow rate or dimensions of the centrifuges. The Freon is used to cool a water system (Main Plant Cooling Water System), that in turn cools another cooling water system (Machine Cooling Water System), which in turn cools the centrifuges. This is explained in detail in ER sections 3.2.9.3.1 and 3.2.9.3.4, and in SAR sections 6.4.6.1 and 6.4.6.2. Therefore, although the compressors and heat exchangers associated with the Main Plant Cooling Water System may have to be re-sized, no changes to the enrichment systems and centrifuges will be necessary.

As stated in the EPA's Notice of Final Rulemaking for the Protection of Stratospheric Ozone [58 FR 65018] "... alternatives [for lubricants] have been developed for new equipment ...." Therefore, finding suitable lubricants for the cooling system equipment will not be a problem since the facility equipment will be new.

As stated before, there are no direct connections between "freon" systems and systems containing UF_6. Therefore, no changes in radiological effluents will occur as a result of the use of a freon substitute.

The Proposed License Conditions (PLC) for the CEC (reference section 1.5) allow LES to make facility modifications without prior NRC approval provided the changes satisfy the conditions listed in the PLCs (e.g., no significant increase in the probability or consequences of an accident or malfunction). LES considers the change in use of refrigerant to be such a facility modification. This would allow the use of the refrigerant with the least environmental impact, most efficient thermodynamic properties, and least toxicity.

10. In section 2.5.3 of the SER (NUREG-1491), the NRC staff recommends that the Poisson ratio values calculated from the geophysical surveys not be used (see SER pgs 2-36, 2-44, and 2-45). Please provide your response to this recommendation, and discuss how it will be taken into account in future plant design.

Response:

The first arrivals of seismic waves were identified from the seismic records by the geophysicist who performed the work, and were independently checked. Therefore, the first arrivals of the seismic waves were correctly identified.

The crosshole geophysical testing was done in general accordance with established practice, and PVC casing was installed and grouted in place in the boreholes. This procedure is allowed in the published ASTM procedure (ASTM D4428/D4428M-84) for seismic crosshole testing. The compressional and shear waves were not affected by the presence of the grout in the annular space between the casing and soil. The wave lengths associated with the seismic testing were too long to be affected by the grout at the boreholes. Therefore, the values of Poisson's ratio were not affected by the grout at the boreholes.

The Poisson's ratio values calculated from the geophysical tests are not unusual and are within the bounds of expected values, based on experience and as reported in various places in the technical literature. Listed on page A-7 are example copyrighted technical articles that contain Poisson's ratio values in soil determined from geophysical measurements by others that support the values reported for the Claiborne Enrichment Center site, both above and below the water table.

The Poisson's ratio range of 0.25 to 0.33 quoted in the SER in Section 2.5.1.3.5 (page 2-36) are typical of "drained" values for some soils. Drained values of soil parameters are appropriate for design analyses involving static loading, wherein the loads are applied over a period of time long enough for induced pore pressures to dissipate. The Poisson's ratios from the geophysical tests are considered to be undrained values, which are always higher than drained values. Undrained values of soil parameters are appropriate for design analyses involving rapidly applied loading, wherein there is insufficient time for pore pressure dissipation.

The Poisson's ratio values calculated from the geophysical surveys, being undrained values, are appropriate for use in calculations involving seismic loading and vibratory loading. The only seismic analyses to date in which the Poisson's ratios were used were the calculations for the vertical response spectrum (SER, Section 2.5.3, page 2-45). Although the Poisson's ratios from the geophysical tests, being undrained values, are appropriate for use in the vertical response spectrum

calculations, a preliminary calculation was performed using the lower Poisson's ratio of 0.25, and demonstrated the already proposed vertical response spectrum to be conservative compared to the one calculated using the lower Poisson's ratio. Therefore, it is concluded that the proposed vertical response spectrum is conservative and will continue to be used in design activities.

The undrained Poisson's ratio values from the geophysical tests, and the shear wave velocity and shear modulus values corrected for changes in stress as a result of grading the site, are appropriate for future design analyses for foundations subject to dynamic loads from machines and equipment. These undrained Poisson's ratios will not, however, be appropriate for design calculations for foundations under static loads, and will not be used for this latter class of problems.

Examples of Technical Articles Reporting Poisson's Ratios from Geophysical Tests

A) Bishop, A.W. and Hight, D.W., 1977. "The values of Poisson's ratio in saturated soils and rocks stressed under undrained conditions", Geotechnique 27, No. 3, pp 369-384.

B) Woods, Richard D., 1978, "Measurement of Dynamic Soil Properties", ASCE, Volume 1, Proceedings of the Specialty Conference on Earthquake Engineering and Soil Dynamics held June 19-21 at Pasadena, California, page 91 ff.

C) Butler, Dwain K. and Curro, Joseph R., Jr., 1981. "Crosshole seismic testing - Procedures and Pitfalls," Geophysics, Vol. 46, No. 1, January, pp. 23-29.

D) McCann, D.M., Baria, R., Jackson, P.D. and Green, A.S.P., 1986. "Application of cross-hole seismic measurements in site investigation surveys", Geophysics, Vol. 51, No. 4, April, pp. 914-929.

Attachment B
Responses to DEIS Comments

A) Tails Disposition

LES shall comply with applicable regulatory requirements throughout the project, including any regulations regarding the disposition of depleted uranium hexafluoride (DUF_6). This includes:

(1) establishing a decommissioning fund that will ensure sufficient funding to remove DUF_6 from the site at the required frequency and for conversion and disposal in the manner required,

(2) a process to address DUF_6 disposition subject to regulations in effect at the time of disposition, and

(3) compliance with Proposed License Condition 1.3, "Possession Limits" which includes a requirement that LES possess no more than 80,000 metric tons of DUF_6 and/or that no cylinder of DUF_6 may be stored on site for more than 15 years.

DUF_6 is generated as a normal and necessary part of the enrichment process and will occur in virtually the same amounts to meet the fuel needs of U.S. reactors whether or not the CEC is operating (i.e., if the DUF_6 is not generated by LES, it will be generated by another facility). Therefore, tails generated by the CEC should not be considered as an "incremental" impact resulting from this licensing. In light of continued DUF_6 production by the U.S. Enrichment Corporation, the incremental environmental impact of LES' DUF_6 is nil. As a result of discussions with the NRC and the development of the LES decommissioning funding plan, LES is the first domestic entity to be licensed[1] by the NRC to address the possible methodologies and costs of disposal and has revised its decommissioning cost estimate several times to accommodate conversion to U_3O_8 and disposal at a burial facility.

These proposed disposition methods are reasonable and responsive to the current regulatory structure, but this structure is not yet fixed. Currently the Department of Energy is preparing a plan for disposition of DUF_6 that may establish the ultimate regulatory structure for DUF_6 disposition. Thus, it would

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[1] The United States Enrichment Corporation (USEC) is currently producing DUF_6 at a rate approximately 6 times that at which LES will produce tails. Assuming that the USEC is also required, through the NRC certification process, to begin DUF_6 removal from its sites after 15 years of production, the USEC will be the first domestic entity to have to dispose of DUF_6. Disposition of DUF_6 by the USEC would begin approximately 5 years before LES begins disposition of DUF_6. This would allow LES to use the experience gained by the USEC in formulating its plan for disposing of DUF_6.

be premature to adopt a prescriptive position, and expend resources analyzing that position, until one of the many viable options is determined to be the proper course to pursue. A final determination may not be feasible until well after the CEC license is issued. In the interim, only a general discussion of the environmental impact of DUF_6 disposition is reasonable and necessary provided LES continues to demonstrate that decommissioning funding is sufficient, or can be modified as necessary to support a final determination. It should be noted that LES is required by Proposed License Conditions 1.6B, "Financial Information and Commitments," and 7.C, "Decommissioning Plan" to review and revise the CEC decommissioning cost estimate, including DUF_6 disposition, at least every five years and appropriately adjust the decommissioning funding mechanisms.

B) Waste Disposal

DEIS commenters indicated that the DEIS did not indicate facilities that would be used for disposal of waste. Outlined below are LES' plans for disposal of waste from the CEC:

Normal Trash:

At least two trash removal companies, BFI and Waste Management, serve customers in Claiborne Parish. These companies use landfills near Monroe, Louisiana, and Farmerville, Louisiana, for trash disposal. BFI disposes of approximately 6,240,000 pounds of trash annually from Claiborne Parish. Waste Management disposes of approximately 8,320,000 pounds of trash annually from Claiborne Parish. The CEC will produce approximately 43,000 pounds of normal trash annually (reference ER Table 3.3-7). This is approximately 0.3 % of the refuse currently handled by these two companies.

Low Level Radioactive Waste:

LES expects to dispose of its low level radioactive waste (LLRW) at the Central Interstate Compact (CIC) facility for LLRW. In discussions with U.S. Ecology, the developer of the CIC, officials indicated the CIC currently expects to begin receiving LLRW in 1998. This corresponds to the earliest date LES would need to dispose of LLRW. LLRW from the CEC would be transported to the facility in accordance with applicable NRC and Department of Transportation (DOT) regulations and any special CIC packaging requirements.

Hazardous Waste:

LES expects to dispose of its hazardous waste (approximately 1,425 pounds annually, reference ER Table 3.3-7) by contracting with a hazardous waste disposal firm. This company would take title to the waste. One such company already serving Claiborne Parish is Laidlow TES based in Houston, Texas. A selection of the company or companies that will transport and dispose of the potential hazardous wastes generated at the CEC will be made in the future.

Mixed Waste:

LES expects to dispose of its mixed waste at the Diversified Scientific Services, Inc. (DSS) facility in Kingston, Tennessee. DSS has indicated to LES that it can easily handle disposal of the quantities (approximately 20 pounds annually) and types of mixed waste that will potentially be generated at the CEC.

C) Need for the Facility

As a general matter, LES is unaware of a requirement for a requirement for an environmental impact statement to describe the "need" for the facility. The "need" to which the DEIS comments are referring appears to derive from NRC caselaw which substitutes "need for power" for the benefit side of the cost-benefit analysis required by CEQ regulation 40 CFR § 1502.23. The Atomic Safety and Licensing Appeal Board in Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397, 405 (1976), discussing how to balance environmental costs against expected benefits under the National Environmental Policy Act, stated that "[a] nuclear plant's principal 'benefit' is of course the electric power it generates. Hence, absent some 'need for power,' justification for building a facility is problematical."

Interpreting the "need for power" (which was developed for commercial nuclear power plant licensing) as a separate requirement to identify a "need for the CEC" independent of the "benefit" side of the NEPA cost-benefit analysis introduces an unnecessary element into the NRC's analysis. The benefits to be provided by the CEC, are fully described in LES' submittal dated April 30, 1992, responding to requests for additional information from the NRC dated November 7, 1991. The need for the CEC is not only as another domestic supplier of enrichment services, but also as a competitive source of enrichment services that uses a very efficient and low-environmental-impact technology.

The need for the facility has also been confirmed by the fact that at least 12 nuclear utilities and utility organizations representing U.S. nuclear utilities and nuclear utility vendors, which have commented on the DEIS and stressed that this facility is needed. Competition in the domestic enrichment business stimulates efficiency. With nuclear power supplying roughly 22% of the United States electricity needs, the ability to minimize the cost of any step in the nuclear fuel cycle is vital to supplying the U.S. economy with inexpensive electricity, and under currently available U.S. enrichment technology, enrichment has traditionally been the most expensive step in making nuclear fuel.

The need for the CEC is not just a matter of available capacity and enriched uranium resources. The price of the available material (i.e., economics), security of the supply and environmental considerations all play a part in the decision by a utility to secure enrichment services. An analysis of the enrichment services marketplace cannot simply ignore these marketplace drivers. The market for enrichment services is worldwide. Developments outside the United States impact the U.S. market for enrichment services and therefore the price paid for enrichment services in the United States. The largest block of enrichment capacity is currently in the U.S. and is based upon old, energy intensive technology which is expected to be economically obsolete. The Energy Policy Act of 1992 established the U.S. Enrichment Corporation to, among other goals, conduct research and development as required to meet business objectives for the purposes of identifying, evaluating, improving, and testing alternative technologies for uranium enrichment (see Energy Policy Act of 1992, Sec 1202(6)).

Although an agreement has been signed with Russia for transfer of uranium to the United States, no transfer of enriched uranium from the blending down of uranium from domestic and foreign weapons has yet occurred. It should be noted that the Agreement Between the Government of the United States of America and the Government of the Russian Federation Concerning the Disposition of Highly Enriched Uranium Extracted from Nuclear Weapons (Agreement) states that "..... the United States of America shall use the LEU converted from HEU in such a manner so as to minimize disruptions in the market and maximize the overall economic benefit for both Parties" (see Article V. section 12 of Agreement. See also Energy Policy Act of 1992, Sec.1408.(d)). Therefore, LES will not be an obstacle to the transfer of nuclear material from Russia. Also, the law and the Agreement anticipate that domestic competition will not only exist, but should not be adversely impacted by the HEU Agreement.

D) Environmental Justice

An Executive Order, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," which was issued on February 11, 1994, provides guidance to the NRC on actions to be taken to address Environmental Justice issues. The Order tasks each Federal Executive Agency to achieve environmental justice by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States. This order stipulates that within 24 months each Federal agency shall report to the Working Group, formed as part of this order, on its progress in implementing its agency-wide environmental justice strategy.

The impacts from the CEC are very small. All liquid and gaseous releases from the CEC are small fractions of allowed federal and state limits. From this standpoint, the CEC could be located in any region of the country. Seismic requirements were the major technical factor affecting selection of a general region for the CEC. Thus, the construction and operation of the CEC will not result in adverse human health or environmental effects on minority populations and low-income populations. On the contrary the facility will increase property values, enhance the tax base considerably, and offer new jobs and other economic opportunities, which comports with the guidance in the Executive Order. The location and actual proven operating experience of similar facilities in Europe much closer to larger urban areas demonstrates that these facilities can be constructed and operated without human health or environmental effects on any populations.

To avoid high land costs, LES searched for areas outside large metropolitan areas to locate the CEC. The search for areas outside large metropolitan areas was not because of safety, environmental, or population issues. No families will be displaced by construction and operation of the CEC. The search for an appropriate site for the CEC was conducted in accordance with the criteria outlined in Chapter 7 of the LES' Environmental Report (ER).

One of the factors considered in LES' search for an appropriate site was the designation of sites located in rural enterprise zones. These zones were established by the Louisiana Enterprise Zone Act which was passed unanimously by the Louisiana legislature in 1981. The legislation was initiated and coordinated by then state senator (now U.S. Representative) William Jefferson. The purpose of the Act was to encourage business and industrial development in economically disadvantaged areas. A subchapter of the recently passed Budget Reconciliation Act dealing with "Empowerment Zones, Enterprise Communities

and Rural Development Investment Areas" is a national version of the Louisiana legislation, providing incentives for businesses that locate and hire in economically depressed areas. Businesses that take advantage of these incentives and fulfill the accompanying parish hiring requirements cannot be held responsible for long-existing housing patterns in an area.

Louisiana Energy Services

Proposed License Conditions
Push-Pull Instructions
Revision 7, March 29, 1994

	Remove	Insert
•	"List of Effective Pages" - pages 1 through 4	"List of Effective Pages" - pages 1 through 4
•	Table 5.2-1 - pages 5-7 through 5-14	Table 5.2-1 - pages 5-7 through 5-14
•	Figure 5.2-1	Figure 5.2-1

Notes:

1) *Each page affected by this revision has the month and year of the revision printed in the lower right hand corner of the page.*

2) *The "List of Effective Pages" contains the latest revision and date of the revision affecting the page.*

3) *All changes or additions to text of each document are indicated by a sidebar (|) in the right hand margin. In the case of deletion of text, the sidebar appears in the right hand margin with a perpendicular line towards the text (⊣) indicating where material was deleted.*

LOUISIANA ENERGY SERVICES
PROPOSED LICENSE CONDITIONS
LIST OF EFFECTIVE PAGES

Page/Table/Figure Number*	Revision Number, Date of Revision
Table of Contents	
i	Rev. 4, 12/03/93
ii	Rev. 4, 12/03/93
iii	Rev. 4, 12/03/93
iv	Rev. 4, 12/03/93
v	Rev. 4, 12/03/93
vi	Rev. 4, 12/03/93
vii	Rev. 4, 12/03/93
viii	Rev. 4, 12/03/93
ix	Rev. 4, 12/03/93
Introduction	
p I-1	Rev. 4, 12/03/93
Section 1.0	
p 1-1	Rev. 4, 12/03/93
p 1-2	Rev. 4, 12/03/93
p 1-3	Rev. 4, 12/03/93
p 1-4	Rev. 4, 12/03/93
p 1-5	Rev. 4, 12/03/93
p 1-6	Rev. 4, 12/03/93
p 1-7	Rev. 4, 12/03/93
p 1-8	Rev. 4, 12/03/93
p 1-9	Rev. 4, 12/03/93

NOTE: p = page
F = Figure
T = Table

LOUISIANA ENERGY SERVICES
PROPOSED LICENSE CONDITIONS
LIST OF EFFECTIVE PAGES

Section 2.0

p 2-1	Rev. 4, 12/03/93
p 2-2	Rev. 4, 12/03/93
p 2-3	Rev. 4, 12/03/93
p 2-4	Rev. 4, 12/03/93
p 2-5	Rev. 6, 01/17/94
p 2-6	Rev. 4, 12/03/93
p 2-7	Rev. 4, 12/03/93
p 2-8	Rev. 4, 12/03/93
p 2-9	Rev. 6, 01/17/94
p 2-10	Rev. 4, 12/03/93
p 2-11	Rev. 4, 12/03/93
p 2-12	Rev. 4, 12/03/93
p 2-13	Rev. 4, 12/03/93
p 2-14	Rev. 4, 12/03/93
p 2-15	Rev. 4, 12/03/93
p 2-16	Rev. 4, 12/03/93
p 2-17	Rev. 4, 12/03/93
F 2.1-1 (p 2-18)	Rev. 4, 12/03/93

Section 3.0

p 3-1	Rev. 4, 12/03/93
p 3-2	Rev. 5, 12/17/93
p 3-3	Rev. 5, 12/17/93
p 3-4	Rev. 4, 12/03/93
p 3-5	Rev. 6, 01/17/94
p 3-6	Rev. 4, 12/03/93
p 3-7	Rev. 4, 12/03/93
p 3-8	Rev. 5, 12/17/93
p 3-9	Rev. 4, 12/03/93
p 3-10	Rev. 4, 12/03/93

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F = Figure
T = Table

LOUISIANA ENERGY SERVICES
PROPOSED LICENSE CONDITIONS
LIST OF EFFECTIVE PAGES

Section 4.0

p 4-1	Rev. 4, 12/03/93
p 4-2	Rev. 4, 12/03/93
p 4-3	Rev. 4, 12/03/93
p 4-4	Rev. 4, 12/03/93
p 4-5	Rev. 4, 12/03/93
p 4-6	Rev. 4, 12/03/93
p 4-7	Rev. 4, 12/03/93
p 4-8	Rev. 4, 12/03/93
p 4-9	Rev. 4, 12/03/93
p 4-10	Rev. 4, 12/03/93
T 4.2-1 (p 4-11)	Rev. 4, 12/03/93

Section 5.0

p 5-1	Rev. 4, 12/03/93
p 5-2	Rev. 4, 12/03/93
p 5-3	Rev. 4, 12/03/93
p 5-4	Rev. 4, 12/03/93
T 5.1-1 (p 5-5)	Rev. 4, 12/03/93
T 5.1-2 (p 5-6)	Rev. 4, 12/03/93
T 5.2-1 (p 5-7 through 5-14)	Rev. 7, 03/29/94
T 5.2-2 (p 5-15)	Rev. 4, 12/03/93
F 5.2-1 (p 5-16)	Rev. 7, 03/29/94
F 5.2-2 (p 5-17)	Rev. 4, 12/03/93
F 5.2-3 (p 5-18)	Rev. 4, 12/03/93

NOTE: p = page
F = Figure
T = Table

LOUISIANA ENERGY SERVICES
PROPOSED LICENSE CONDITIONS
LIST OF EFFECTIVE PAGES

Section 6.0

p 6-1	Rev. 4, 12/03/93
p 6-2	Rev. 4, 12/03/93
p 6-3	Rev. 4, 12/03/93
p 6-4	Rev. 4, 12/03/93
p 6-5	Rev. 4, 12/03/93

Section 7.0

p 7-1	Rev. 4, 12/03/93

Section 8.0

p 8-1	Rev. 4, 12/03/93

Appendix A

p 1	Rev. 4, 12/03/93
p 2	Rev. 4, 12/03/93
p 3	Rev. 4, 12/03/93
p 4	Rev. 4, 12/03/93

Appendix B

p 1	Rev. 4, 12/03/93
p 2	Rev. 4, 12/03/93

Appendix C

p 1	Rev. 4, 12/03/93
p 2	Rev. 4, 12/03/93

NOTE: p = page
F = Figure
T = Table

Table 5.2-1

Radiological Environmental Monitoring Program

Preoperational Monitoring

Pathway/ Sample type	Preoperational Samples and Locations	Preoperational Sampling and Collections
*Airborne Particulate	AP1 - One sample located in the sector with the highest prevailing wind direction. To be located in the area with the highest Chi/Q for that sector near the site boundary. AP2 - One sample located in the sector with the second highest prevailing wind direction. To be located in the area with the highest Chi/Q for that sector near the site boundary. AP3 - One sample located near the resident who is maximally exposed from the gaseous pathway. AP4 - One sample located in the west sector. To be located near the site boundary corresponding to the highest Chi/Q in that sector. AP5 - One sample located in the east sector near the site boundary corresponding to the highest Chi/Q in that sector.	Air sampler with a particulate filter, operating continuously and collected and analyzed weekly.

NOTE: *Selection of initial sectors shall be based on Shreveport data. After five years (maximum 66 months) of onsite meteorological monitoring, the sector selection will be reevaluated. Sampling locations shall be modified to meet the criteria specified in this table. The reevaluation shall be performed every five years (maximum 66 months) after the initial and subsequent evaluations. Necessary changes shall be implemented within six months of the evaluation.

Table 5.2-1

Radiological Environmental Monitoring Program

Preoperational Monitoring

Pathway/ Sample type	Preoperational Samples and Locations	Preoperational Sampling and Collections
	AP6 - One sample located in the south sector near the site boundary, corresponding to the highest Chi/Q in that sector. If this sector is already represented by another air sampling site corresponding to the AP1 through AP4 sites above, then site AP6 is not needed.	
	AP7 - One sample located in the north sector near the site boundary, corresponding to the highest Chi/Q in that sector. If this sector is already represented by another air sampling site corresponding to the AP1 through AP4 sites above, then site AP7 is not needed.	
Airborne/ Soil	S1-S16 - Samples to be collected near the site boundary in each sector. One sample per site.	Collected and analyzed quarterly. Combine samples from sixteen sectors into four composites. *
Airborne/ Vegetation	V1-V16 - Samples to be collected near the site boundary in each sector. One sample per site.	Collected and analyzed quarterly. Combine samples from sixteen sectors into four composites. *
Liquid/ Ground Water	GW1 - Well #A1, Figure 5.2-2	Grab samples to be collected and analyzed quarterly.
	GW2 - Well #B1, Figure 5.2-2	
	GW3 - Well #C1, Figure 5.2-2	
	GW4 - Well #D1, Figure 5.2-2	
	GW5 - Well #E1, Figure 5.2-2	

*See page 5-14 for composite groups

Table 5.2-1

Radiological Environmental Monitoring Program

Preoperational Monitoring

Pathway/ Sample type	Preoperational Samples and Locations	Preoperational Sampling and Collections
Liquid/ Shoreline Sediment	SS1 - To be collected near the outflow of Bluegill Pond.	Grab samples to be collected and analyzed quarterly.
	SS2 - To be collected near the inflow of Bluegill Pond from the Hold-Up Basin.	
	SS3 - To be collected near the south shore of Bluegill Pond.	
	SS4 - To be collected near the north shore of Bluegill Pond.	
	SS5 - To be collected at Lake Claiborne.	
Liquid/ Bottom Sediment	BS1 - To be collected from the east end of Bluegill Pond.	Grab samples to be collected and analyzed quarterly. See Figure 5.2-1
	BS2 - To be collected from the center of Bluegill Pond.	
	BS3 - To be collected from the west end of Bluegill Pond.	
	BS4 - To be collected from the center of the Hold-Up Basin.	
	BS5 - To be collected at Lake Claiborne.	
Liquid/Surface Water	SW1 - Inflow to Lake Avalyn.	Grab samples collected and analyzed quarterly. See Figure 5.2-1
	SW5 - Inflow to Bluegill Pond.	
	SW6 - Bluegill Pond, near the center.	
	SW7 - Outflow from Bluegill Pond.	

Table 5.2-1

Radiological Environmental Monitoring Program

Preoperational Monitoring

Pathway/ Sample type	Preoperational Samples and Locations	Preoperational Sampling and Collections
	SW8 - Site drainage stream.	
	SW9 - Outflow at the western property boundary.	
	SW11 - Hold-Up Basin.	
	SW12 - Lake Claiborne. Take sample at inflow point of Cypress Creek.	

Table 5.2-1

Radiological Environmental Monitoring Program

Operational Monitoring

Pathway/ Sample type	Operational Samples and Locations	Operational Sampling and Collections
*Airborne Particulate	AP1 - One sample located in the sector with the highest prevailing wind direction. To be located in the area with the highest Chi/Q for that sector near the site boundary. AP2 - One sample located in the sector with the second highest prevailing wind direction. To be located in the area with the highest Chi/Q for that sector near the site boundary. AP3 - One sample located near the resident who is maximally exposed from the gaseous pathway. AP4 - One sample located in the west sector. To be located near the site boundary corresponding to the highest Chi/Q in that sector. AP5 - One sample located in the east sector near the site boundary, corresponding to the highest Chi/Q in that sector.	Air sampler with a particulate filter, operating continuously and collected and analyzed weekly. Also, for site AP3, isotopic analysis shall be conducted on a composite sample on a semi-annual basis. The composite sample analysis shall be for U^{234}, U^{235}, and U^{238}.

NOTE: *Selection of initial sectors shall be based on Shreveport data. After five years (maximum 66 months) of onsite meteorological monitoring, the sector selection will be reevaluated. Sampling locations shall be modified to meet the criteria specified in this table. The reevaluation shall be performed every five years (maximum 66 months) after the initial and subsequent evaluations. Necessary changes shall be implemented within six months of the evaluation.

Table 5.2-1

Radiological Environmental Monitoring Program

Operational Monitoring

Pathway/ Sample type	Operational Samples and Locations	Operational Sampling and Collections
	AP6 - One sample located in the south sector near the site boundary, corresponding to the highest Chi/Q in that sector. If this sector is already represented by another air sampling site corresponding to the AP1 through AP4 sites above, then site AP6 is not needed. AP7 - One sample located in the north sector near the site boundary, corresponding to the highest Chi/Q in that sector. If this sector is already represented by another air sampling site corresponding to the AP1 through AP4 sites above, then site AP7 is not needed.	
Airborne/ Soil	S1-S16 - Samples to be collected near the air boundary in each sector. One sample per site.	Collected and analyzed semi-annually. Combine samples from sixteen sectors into four composites. *
Airborne/ Vegetation	V1-V16 - Samples to be collected near the site boundary in each sector. One sample per site.	Collected and analyzed semi-annually at the same time as soil sample collection. Combine samples from sixteen sectors into four composites. *
Liquid/ Ground Water	GW1 - Well #B1, Figure 5.2-2 GW2 - Well #C1, Figure 5.2-2 GW3 - Well #E1, Figure 5.2-2	Grab samples to be collected and analyzed semi-annually.

*See page 5-14 for composite groups

Table 5.2-1

Radiological Environmental Monitoring Program

Operational Monitoring

Pathway/ Sample type	Operational Samples and Locations	Operational Sampling and Collections
Liquid/ Shoreline Sediment	SS1 - To be collected near the outflow of Bluegill Pond.	Grab samples to be collected and analyzed semi-annually.
	SS2 - To be collected near the inflow of Bluegill Pond from the Hold-Up Basin.	
	SS3 - To be collected near the south shore of Bluegill Pond.	
	SS4 - To be collected near the north shore of Bluegill Pond.	
	SS5 - To be collected near surface water site SW12 at Lake Claiborne.	
Liquid/ Bottom Sediment	BS1 - To be collected from the east end of Bluegill Pond.	Grab samples to be collected semi-annually.
	BS2 - To be collected from the center of Bluegill Pond.	
	BS3 - To be collected from the west end of Bluegill Pond.	
	BS4 - To be collected from the center of the Hold-Up Basin.	
	BS5 - To be collected at Lake Claiborne.	
Liquid/Surface Water	SW1 - Inflow to Lake Avalyn.	Collected continuously via integrating water sampling equipment to obtain monthly composites. Analyzed monthly. See Figure 5.2-1
	SW5 - Inflow to Bluegill Pond.	
	SW6 - Bluegill Pond, near the center.	
	SW7 - Outflow from Bluegill Pond.	

Table 5.2-1

Radiological Environmental Monitoring Program

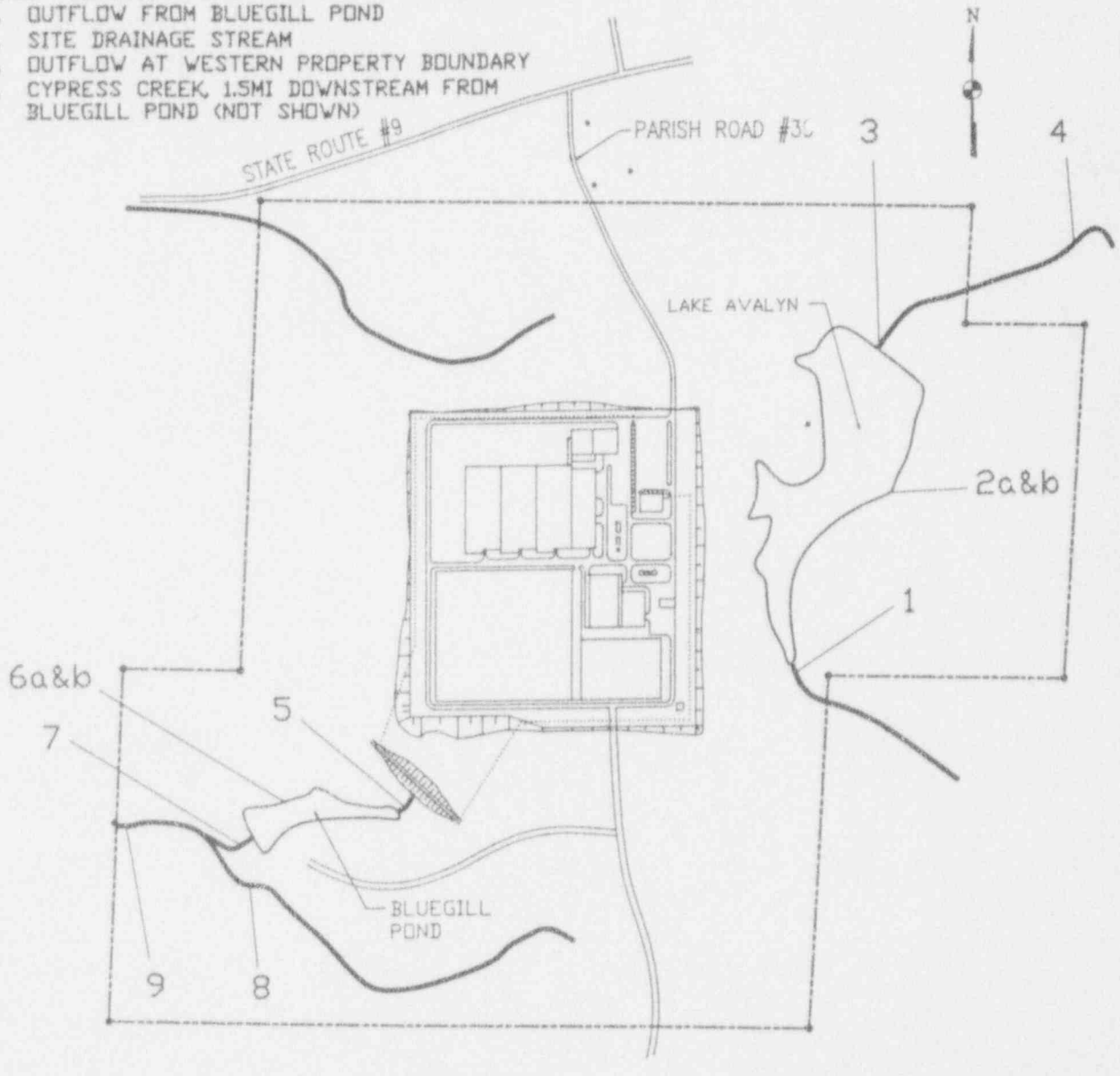
Operational Monitoring

Pathway/ Sample type	Operational Samples and Locations	Operational Sampling and Collections
	SW8 - Site drainage stream	
	SW9 - Outflow at the western property boundary.	
	SW12- Lake Claiborne. Take sample at inflow point of Cypress Creek.	

*Composites are formed by combining sectors as follows:

Composite 1 = sectors N, NNE, NE
Composite 2 = sectors E, SSE, SE
Composite 3 = sectors S, SSW, SW
Composite 4 = sectors W, WNW, NW

1. INFLOW TO LAKE AVALYN
2a&b. LAKE AVALYN (SURFACE & BOTTOM)
3. OUTFLOW FROM LAKE AVALYN (LOCATION #1)
4. OUTFLOW FROM LAKE AVALYN (LOCATION #2)
5. INFLOW TO BLUEGILL POND
6a&b. BLUEGILL POND (SURFACE & BOTTOM)
7. OUTFLOW FROM BLUEGILL POND
8. SITE DRAINAGE STREAM
9. OUTFLOW AT WESTERN PROPERTY BOUNDARY
10. CYPRESS CREEK, 1.5MI DOWNSTREAM FROM BLUEGILL POND (NOT SHOWN)



LOUISIANA ENERGY

CLAIBORNE ENRICHMENT CENTER

Surface Water Chemistry Monitoring Locations

Figure 5.2-1

REVISION 7
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