

COMMISSIONERS:

Nils J. Diaz, Chairman
Edward McGaffigan, Jr.
Jeffrey S. Merrifield
Gregory B. Jaczko
Peter B. Lyons

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

CLI-06-15

MEMORANDUM AND ORDER

I. Introduction

In this decision, we consider a petition for review filed by intervenors Nuclear Information and Resource Service and Public Citizen (“NIRS/PC”). They seek Commission review of the Atomic Safety and Licensing Board (“Board”) decisions in LBP-06-08,¹ Second Partial Initial Decision (Environmental Impacts of Disposal of Depleted Uranium) and LBP-06-09² (Ruling on Summary Disposition Cross-Motions Relating to Remand from CLI-05-20). At issue is the adequacy of the NRC Staff’s analysis, under the National Environmental Policy Act (“NEPA”), of the impacts of disposing of depleted uranium associated with the proposed National Enrichment Facility.

The issue of depleted uranium disposal has generated a number of NRC adjudicatory

¹ 63 NRC __ (Mar. 3, 2006).

² 63 NRC __ (Mar. 3, 2006).

decisions in this proceeding, including two Commission decisions.³ Because the Board's decisions in LBP-06-08 and LBP-06-09 already outline in detail the procedural background associated with this waste disposal issue, we do not repeat that history here. The two Board decisions stem from an amended environmental impacts contention that the Commission remanded to the Board in CLI-05-20. The contention, titled NIRS/PC EC-4,⁴ challenged the NRC Staff's environmental impacts analyses of near-surface and deep disposal of depleted uranium.⁵ The Board heard evidence on the contention at an evidentiary hearing held on October 24-27, 2005.

In LBP-06-08, the Board found that the Final Environmental Impact Statement ("FEIS"), as supplemented by the Board's decision and the underlying adjudicatory record, provides an adequate analysis of the environmental impacts of near-surface disposal.⁶ On the same day, the Board also issued LBP-06-09, which focuses on the NIRS/PC challenge of the staff's deep disposal analysis.⁷ This second decision granted a Staff motion for summary disposition, and dismissed the part of the NIRS/PC contention that challenged the deep disposal impacts analysis. In these two decisions, the Board resolved the NIRS/PC contention in favor of the

³ See CLI-05-5, 61 NRC 22 (2005); CLI-05-20, 62 NRC 523 (2005).

⁴ The full text of the contention is set forth in LBP-06-08. See LBP-06-08, 63 NRC at ___, slip op. at 29-30.

⁵ "Near-surface" methods of disposal may involve disposal at depths down to approximately 30 meters (although burial at a depth greater than 30 meters may also be acceptable). See 10 C.F.R. § 61.7(a). More protective methods of radioactive waste disposal, which are often called "intermediate" land disposal methods, include deeper burial than near-surface disposal, a mined cavity, or special engineered barriers or disposal techniques. See, e.g., Final Rule, "Disposal of Radioactive Wastes," 54 Fed. Reg. 22,578, 22,580-81 (May 25, 1989).

⁶ See LBP-06-8 (Mar. 3, 2006), 63 NRC at ___, slip op. at 53-54.

⁷ See LBP-06-9 (Mar. 3, 2006), 63 NRC at ___, slip op. at 24-32. This decision also denied a NIRS/PC motion for partial summary disposition. NIRS/PC had requested a finding declaring the FEIS analysis of deep disposal impacts inadequate.

NRC Staff.

Both Louisiana Energy Services, L.P. (“LES”) and the NRC Staff support the decisions in LBP-06-08 and LBP-06-09. We have reviewed the decisions and the underlying record, and see no basis for disturbing the Board’s result. We do not find the Board’s factual findings “clearly erroneous” or its legal conclusions “contrary to law.”⁸ We are concerned, though, that the Board (and the underlying FEIS) may not have fully explored potential long-term effects from disposing of depleted uranium – whose radiological hazard gradually *increases* over time. Hence, we grant review,⁹ offer additional observations on the disposal question, and affirm the Board decisions as supplemented by our decision today.

II. Analysis

A. *Near-Surface Disposal*

1. *Background and Record Evidence.* This is a proceeding to license a uranium enrichment facility, *not* a proceeding to license a near-surface waste disposal facility. NIRS/PC raise many arguments attacking the suitability of the Envirocare site for near-surface disposal of LES’s depleted uranium. But in no respect will this proceeding authorize LES to dispose of depleted uranium at Envirocare or any particular disposal facility, or by any particular method. In this decision, we examine a NEPA analysis of *estimated* depleted uranium disposal impacts. Whether LES appropriately may dispose of its depleted uranium at a specific near-surface facility will depend on whether the 10 C.F.R. Part 61 performance objectives governing near-surface disposal (or comparable state regulations) can be met at that facility. Our decision today is not a Part 61 compliance review and it would be inappropriate for us to undertake one at this time.

⁸ See 10 C.F.R. § 2.341(b)(4)(i),(ii).

⁹ See 10 C.F.R. § 2.341(b)(4)(iii),(v).

We examine the potential impacts of depleted uranium disposal in this proceeding because under NEPA standards and our environmental regulations it is appropriate to consider the reasonably foreseeable environmental impacts of a proposed action, even if they are only indirect effects.¹⁰ Depleted uranium disposal from the proposed National Enrichment Facility would be an indirect effect, removed in time and location from the proposed enrichment activities.

In addition, as we stated earlier in this proceeding, an NRC environmental impacts analysis of depleted uranium disposal impacts “does not require a full-scale site-specific review, an inquiry in the purview of the responsible licensing agency.”¹¹ The NRC does not regulate any of the five near-surface waste disposal facilities identified in the FEIS as potential locations for disposal of the LES depleted uranium.¹² These potential disposal sites are either regulated by state authorities under the NRC’s Agreement State program,¹³ or by the Department of Energy. If LES ultimately chooses one of these waste disposal facilities, it will fall within the purview of one of these authorities – not the NRC – to approve and regulate the disposal. We

¹⁰ See 10 C.F.R. Part 51, Appendix A to Subpart A at (7)(b).

¹¹ CLI-05-20, 62 NRC 523, 536 (2005).

¹² These include the licensed commercial low-level waste disposal facilities at Envirocare, Hanford, and Barnwell, located in the states of Utah, Washington, and South Carolina, respectively. It also includes the Waste Control Specialists (WCS) facility in Texas, which has applied for but currently does not have authorization from the state of Texas to dispose of low-level radioactive waste. Another potential disposal location is the Nevada Test Site, a Department of Energy disposal site that can receive “low-level radioactive wastes generated by the proposed [National Enrichment Facility] only if ownership of these wastes is first transferred to the DOE.” See Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico (June 2005), Final Report, NUREG-1790, Vol. 1 (“FEIS”) at 2-32.

¹³ Section 274 of the Atomic Energy Act authorizes the Commission to “enter into agreements with the Governor of any State” in which the NRC relinquishes certain regulatory authority over particular radioactive materials, and the disposal of such materials, to the state. See 42 U.S.C. § 2021(b). The state must provide a regulatory regime that is equivalent to or more stringent than the NRC regulations in Part 61. See 42 C.F.R. §§ 2021(d)(1), (o)(2).

would expect the appropriate regulatory authority to conduct any site-specific evaluations necessary to confirm that radiological dose limits and standards can be met at the disposal facility, in light of the quantities of depleted uranium envisioned. In short, our NEPA analysis today considers estimated disposal impacts, but does not purport to assess whether all regulatory requirements would be satisfied at any particular site.

The NRC Staff's FEIS for the National Enrichment Facility examined the potential environmental impacts of disposing of the LES depleted uranium at the Envirocare near-surface disposal facility in Utah. The Staff concluded that impacts would be small, given the specific characteristics of the site. In LBP-06-08, the Board found the Staff's conclusion reasonable. While the Board noted that the "FEIS as written does not provide an expansive explanation [of near-surface disposal impacts,] . . . when combined with the full record before the Board . . . the aggregate is sufficient to satisfy the agency's obligation under NEPA."¹⁴ The Board supplemented the FEIS disposal impacts analysis with its decision and the underlying adjudicatory record.¹⁵

Our look at the adequacy of the near-surface disposal analysis starts with a point on which all parties agree: not all near-surface disposal facilities may be suitable for disposal of large quantities of depleted uranium. It has been and continues to be the Staff's position that "some near-surface disposal facilities may not be suitable for large quantities of depleted uranium from uranium enrichment operations"¹⁶ because established radiological standards could be exceeded.

For example, an FEIS prepared years ago for the proposed Claiborne Enrichment

¹⁴ LBP-06-08, 63 NRC at ____, slip op. at 53.

¹⁵ *Id.* at ____, slip op. at 54.

¹⁶ See October Hearing Transcript (Proprietary)("Transcript") at 2836; see *also id.* at 2920-25; 2929-2944; 2953-54.

Center uranium enrichment facility found near-surface disposal unacceptable. Because the proposed Claiborne facility was to be located in Louisiana, the environmental analysis considered a generic reference site with environmental characteristics typical of the humid southeastern United States. Given the water infiltration rate and aquifer flow rate expected at such a humid southeastern site, the Claiborne analysis estimated that offsite releases of radioactive material would occur, and that radiological doses to the general public (from drinking well water and consuming crops irrigated with water drawn from the well) would exceed the limits specified in 10 C.F.R. Part 61.¹⁷

Disposal at a so-called “wet” site, typical of the humid southeastern United States, can result in disposal impacts significantly different from those at a “dry” site, typical of a site in the arid western United States. This is because the “release of uranium isotopes and their [decay products] from [a] disposal facility is limited by their solubility in water.”¹⁸ Consideration therefore should be given to whether site-specific features will minimize the waste’s contact with water, limiting the potential for radionuclides to migrate away from the site. A site that is very “dry,” with a low rate of precipitation and high rate of evapotranspiration, will be more protective against migration of radionuclides from the site than a location with humid environmental conditions.

This distinction between the radiological impacts expected from “wet” and “dry” sites is reflected in the Department of Energy’s Programmatic Environmental Impact Statement (“PEIS”) on the long-term management of depleted uranium hexafluoride. The PEIS estimated radiological doses from disposal of large quantities of depleted uranium at two representative

¹⁷ See NUREG-1484, Vol. 1, Final Environmental Impact Statement for the Construction and Operation of Claiborne Enrichment Center, Homer, Louisiana (August 1994)(Staff Exh. 46)(“ Claiborne FEIS”) at A-9; 4-67.

¹⁸ See Claiborne FEIS at 4-66.

generic sites, one with “wet” environmental characteristics and the other with “dry” characteristics. The analysis evaluated the potential impacts that might occur at approximately 1100 years following closure of the disposal site.¹⁹ The PEIS additionally states that assumptions (e.g., water infiltration rates, soil characteristics, depth to the water table, locations of human receptors) were chosen to “produce conservative estimates of impact . . . tend[ing] to overestimate the expected impact.”²⁰

Like the Claiborne FEIS, the Department of Energy’s analysis concludes that near-surface disposal of depleted uranium at a “wet” site could lead to offsite radiological exposures that exceed the Part 61 dose limits for the general public.²¹ For the “dry” disposal setting, the PEIS found that “essentially no impacts [to the public] would be expected . . . for more than 1,000 years because of the low water infiltration rate and greater depth to the water table.”²² Estimated radiological doses at the “dry” site during this time-frame were 0 [zero].²³ At the evidentiary hearing in our case, LES counsel additionally pointed out the PEIS’s statement that in a “dry” setting it indeed likely would take longer than 10,000 years for uranium and its decay products to reach groundwater.²⁴

LES has not yet made a definitive decision on where it wants to send its depleted

¹⁹ See Final Programmatic Environmental Impacts Statement for Alternative Strategies for the Long-term Management and Use of Depleted Uranium Hexafluoride (April 1999)(LES Exh. 18)(“DOE PEIS”) Appendix I at I-69.

²⁰ *Id.* at I-69 to I-70.

²¹ *Id.* at I-72.

²² *Id.* at I-19.

²³ *Id.* at I-71.

²⁴ Transcript at 2646 (referencing DOE PEIS, Appendix I at I-72); see also Environmental Impact Statement for the Proposed American Centrifuge Plant, Final Report (April 2006) at 4-77 to 4-78.

uranium, but its current preference is a private near-surface disposal facility. In evaluating potential near-surface disposal impacts, the Staff chose to examine the Envirocare facility as a “reference” site, which a Staff expert describes as a “site where it would be possible . . . to safely dispose of the depleted uranium, where the environmental impacts would be small.”²⁵ Given that a detailed site-specific review of potential disposal impacts will not be completed “until a particular disposal site is determined,” and further that the environmental impacts of disposal are only a “secondary or indirect environmental consequence of constructing and operating the [National Enrichment Facility],” the Board found it reasonable that the Staff chose to focus on one site – in this case Envirocare – as a “reference” site for evaluating near-surface disposal impacts.²⁶ As the Board described, Envirocare is already licensed, its license has no current inventory limits on uranium, and it has no regional waste “compact-related restriction that could affect the receipt of any [National Enrichment Facility] waste.”²⁷

When, as part of its NEPA review, the NRC Staff considered the feasibility of using Envirocare as a reference site for analyzing disposal of the LES depleted uranium, the Staff contacted the Utah Division of Radiation Control, which is responsible for regulating low-level radioactive waste disposal in Utah. In a telephone conference call with the NRC Staff, the Division of Radiation Control stated that the Envirocare site has several site-specific features which make it suitable for disposal of large quantities of depleted uranium.²⁸ The Board ultimately agreed,²⁹ and much in the record supports its finding.

²⁵ Transcript at 2866.

²⁶ LBP-06-08, 63 NRC at ____, slip op. at 51.

²⁷ *Id.*

²⁸ See Memorandum to Scott Flanders, NRC, from Matthew Blevins, NRC (April 6, 2005)(LES Exh. 104)(“April 6, 2005 Memo”).

²⁹ See, e.g., LBP-06-08, 63 NRC at ____, slip op. at 50-51.

For example, at the hearing, NRC Staff and LES experts explained that the Envirocare site's low precipitation (5 to 6 inches per year), high evapotranspiration rate (approximately 40 to 50 inches per year), high groundwater salinity (total dissolved solids approximately 30,000 to 80,000 milligrams per liter) and consequent high soil salinity render the site acceptable for near-surface disposal of depleted uranium.³⁰ More specifically, LES's expert described that the combination of low precipitation and high evapotranspiration at Envirocare meant that "very little water and . . . very little dissolved uranium would be transported from the [waste disposal] cell and that transport to any groundwater would take a very long period of time."³¹ He stated that even over a period of 1,000 years, "radionuclides would not be transported to groundwater at all," and that groundwater-related impacts at Envirocare, or sites like it, would be "non-existent."³²

Moreover, he stressed that "the groundwater . . . is not usable in any case [because of its high salinity]."³³ Staff and LES experts explained that the highly saline water at Envirocare precludes use for drinking or irrigation, and the saline soil is unsuitable for growing crops.³⁴ For these reasons, the Utah Division of Radiation Control concluded that it was unrealistic to assume that there will be people residing or farming on the disposal site after site closure, and

³⁰ See, e.g., Transcript at 2884-87; 2627-31; 2874-75; 2837; 2904-05. In their petition for review, NIRS/PC argue that the Division of Radiation Control did not specify how many groundwater measurements were taken or the sampling methodology. But the NRC Staff had no reason to look behind and question site-specific environmental data provided by the state regulatory authority. Moreover, NIRS/PC nowhere provide any reason to doubt these figures. As LES argues, NIRS/PC itself could have sought to obtain publicly available data on the geologic or hydrologic characteristics of the Envirocare site.

³¹ Transcript at 2630.

³² *Id.* at 2631.

³³ See *id.* at 2630.

³⁴ See *id.* at 2874, 2837, 2876, 3068-70.

thus unrealistic to assume residential or agricultural “intruders.”³⁵ Given the lack of potable water and other conditions at the Envirocare site, both the Staff and LES experts agree it is reasonable to assume there will not be radiological exposures involving residents or farmers drinking contaminated water obtained from the site and eating foods irrigated by the site’s water and grown in the site’s soil.³⁶ The Staff’s analysis of Envirocare in the FEIS “drop[s] the intruder [exposure] pathways because they were unrealistic [given] the unique site characteristics.”³⁷

At the hearing, NIRS/PC’s expert, Dr. Arjun Makhijani, agreed that for “dry” sites like Envirocare there likely would be no water-related radiological exposures to the general public, at least for 1,000 years.³⁸ As for intruders, he also “would not assume that the groundwater at this site would be used by people who are there.”³⁹ For Envirocare, therefore, he stated that “it may be reasonable to exclude the groundwater [radiological exposure] pathway, and [he] would agree with that.”⁴⁰

Dr. Makhijani’s greater concern was what he called the “erosion pathways,”⁴¹ direct

³⁵ See April 6, 2005 Memo. An inadvertent “intruder” is someone who might occupy a waste disposal site after site closure and engage in activities such as agriculture, dwelling, or construction, in which the person may unknowingly come into contact with the waste. See 10 C.F.R. § 61.2. The expression “residential intruder” refers to someone who might have a residence at the site, drill a well, and use the site groundwater for drinking. An “agricultural intruder” refers to someone who might live at a house on the disposal site and consume food grown on the site’s soil.

³⁶ See, e.g., Transcript at 2876, 2884-85, 2887, 3068-70.

³⁷ See *id.* at 2887; see also *id.* at 2884-85, 2876.

³⁸ See *id.* at 2984-86; 2999; see also *id.* at 3008.

³⁹ *Id.* at 3002.

⁴⁰ See *id.* at 2999.

⁴¹ *Id.*

radiological doses to potential intruders if the disposal unit cover has eroded away. Because of the ingrowth of radium from decay of uranium, the radiological hazard of the depleted uranium waste will not decline but will grow very slowly over tens of thousands of years. If erosion wears away the disposal site cover (and there has been no remediation of the cover), an intruder coming onto the site could receive direct external and dust inhalation doses from the uncovered waste. These exposure pathways would not depend upon water consumption or use.

Dr. Makhijani agreed, however, that short of someone actually digging into a disposal unit's cover (to construct a house, for instance), his concern about intruders relates to "when you get out many thousands of years."⁴² As Dr. Makhijani explained, the issue of the ingrowth of radium decay products – and therefore the potential for higher doses – "develops over a period of time."⁴³ At the hearing Dr. Makhijani discussed two reports (prepared by himself and Dr. Brice Smith) that contain screening calculations estimating radiological doses to intruders "far into the future."⁴⁴

LES's expert reviewed these intruder dose estimates but found them unrealistic for a site like Envirocare. He noted, first, that in one report the higher dose predictions were based on exposure scenarios that included intruders drinking contaminated water or consuming plants grown on the site – scenarios he found highly unlikely at Envirocare for the foreseeable future, given the high salinity of the soil and water.⁴⁵ He additionally found unrealistic the second report's assumption that an inadvertent intruder would receive a full year of onsite radiological

⁴² See *id.* at 2988, 2985.

⁴³ See *id.* at 2985-86.

⁴⁴ See *id.* at 2984-85.

⁴⁵ See *id.* at 3068-70.

exposures, when “we are talking about a site that is practically uninhabitable, and sites like it.”⁴⁶

He did not discount the possibility that intruders might spend relatively short periods of time at the site, engaging in recreational activities, for example (*e.g.* hunting, dune buggy riding, or camping). But in his view, these short-term activities likely would not result in unacceptable intruder doses. He therefore suggested that sites like Envirocare “could be licensed under 10 C.F.R. Part 61 regardless of the time frame you looked at.”⁴⁷

The Staff’s expert similarly concludes it is “unlikely that [the Envirocare] area would result in serious exposures because of the unlikely nature of someone being there for long periods of time.”⁴⁸ The physical environment “make[s] the site unsuitable for an intruder even coming on and building a residence,” he stated.⁴⁹ Thus, both the Staff and LES experts agree that significant intruder exposures at a site like Envirocare are unrealistic.⁵⁰ Under questioning

⁴⁶ *Id.* at 3072.

⁴⁷ *Id.* at 3073. LES’s expert also correctly pointed out that NIRS/PC erroneously apply the 10 C.F.R. § 61.41 dose limits for releases of radioactivity to members of the general public (*e.g.*, 25 millirems per year) to inadvertent intruders. See *id.* at 3078. Part 61 does not specify a dose limit for protection of inadvertent intruders. See 10 C.F.R. § 61.42. But it is clear from the Part 61 rulemaking that the 25 millirem per year limit was not considered appropriate for intruders because inadvertent intrusion is often of a “short-term temporary nature,” and “would only be expected to involve local exposure of a few individuals.” See Draft Environmental Impact Statement on 10 C.F.R. Part 61, “Licensing Requirements for Land Disposal of Radioactive Waste,” NUREG-0782, Vol. II (Sept. 1981) at 4-55 to 4-56.

⁴⁸ Transcript at 2906.

⁴⁹ *Id.* at 2910-11.

⁵⁰ At one point, Envirocare’s license contained a concentration limit on uranium isotopes, but the current license allows disposal of depleted uranium with no volume restrictions. The original radionuclide concentration limit was based upon a site-specific performance assessment that assumed potential intruder exposures. See Evaluation of the Potential Public Health Impacts Associated with Radioactive Waste Disposal at a Site Near Clive, Utah, by R.D. Baird, et. al. (June 1990)(“Baird Report”). While this report conservatively assumed potential intruder exposures and therefore recommended particular radionuclide concentration limits, it also repeatedly stated that it would be “very unlikely that anyone would choose to live near or engage in agriculture” at the site. See, *e.g.*, *id.* at ES-4. The Staff explained in this proceeding that Utah granted Envirocare a license amendment eliminating the uranium concentration limits

from the Board, the Staff's expert also said it is likely that the groundwater at the Envirocare site has had high salinity for thousands of years, and that because the area is in the rain shadow of the Sierra Mountains, he would expect the climate to remain the same for the foreseeable future, short of geological changes.⁵¹

2. *Review of Board Decision.* In LBP-06-08, the Board reviewed all the expert testimony and exhibits and found that "there is now sufficient evidence in the record . . . to conclude that the Staff indeed took a hard look at the impacts of near-surface disposal at Envirocare."⁵² The Board found that "the intruder scenarios are so unlikely based on the specific characteristics of the Envirocare site as to fall outside of what can reasonably be called anticipated or not unduly speculative impacts."⁵³ It went on to note that "for . . . residential or agricultural uses to be practicable in the future, material socio-economic changes and/or improvements in technology would have to occur," and that "[b]ecause such material technological and socio-economic changes are not predictable with any confidence, any projections about the likelihood of an intruder scenario would be exceedingly speculative."⁵⁴ The Board "expressly declined to go down the path of making speculative projections about the

after concluding that the intruder scenarios assumed in the Baird Report were unrealistic and therefore unnecessarily conservative. See, e.g., Transcript at 2887, 2894-97, 2905-06, 2910.

A challenge to the Envirocare license amendment is not a matter within the scope of this licensing proceeding given that Utah issued this amendment pursuant to its authority as an NRC Agreement State. As an Agreement State, Utah's low-level radioactive waste regulations must be compatible with the NRC's regulations in 10 C.F.R. Part 61, and the NRC periodically reviews Agreement State programs to ensure they remain compatible with our health and safety performance objectives.

⁵¹ Transcript at 2905.

⁵² LBP-06-08, 63 NRC at ___, slip op. at 47; see also *id.* at ___, slip op. at 47-49.

⁵³ *Id.* at 50-51.

⁵⁴ *Id.* at 50 n.37.

distant future.”⁵⁵

While the Commission has discretion to review all underlying factual issues *de novo*, we are disinclined to do so where a Board has weighed arguments presented by experts and rendered reasonable, record-based factual findings.⁵⁶ We generally step in only to correct “clearly erroneous” findings – that is, findings “not even plausible in light of the record viewed in its entirety.”⁵⁷ That decidedly is not the case here, where ample record evidence, including expert opinion, supports the Board’s findings. As is customary, the Board itself included two judges with technical expertise. We therefore defer to the Board’s factual findings. As the Board held, near-surface disposal, in at least at one location (Envirocare), appears at this time to be a plausible option for the LES depleted uranium.

NIRS/PC would have preferred a more conservative NEPA analysis of the Envirocare site, one that attempts to predict or simply assumes geologic, economic, societal, technological, and climate changes that might occur over thousands or even tens of thousands of years and could affect environmental impacts. But NEPA requires only that we consider “reasonably foreseeable” indirect effects of the proposed licensing action. If, as here, extensive speculation is required to find significant long-term adverse impacts at Envirocare, by the same token one could assume – perhaps even more readily – that technological improvements over upcoming centuries (or millenia) will provide more erosion-resistant disposal unit covers, or will otherwise alleviate concerns about the impacts of depleted uranium disposal. The Board’s reluctance to assume or speculate about far-reaching and large-scale changes was not unreasonable.

⁵⁵ *Id.*

⁵⁶ See, e.g., *Hydro Resources, Inc.*, (P.O. Box 777, Crownpoint, New Mexico 87313), CLI-06-01, 63 NRC 1, 2 (2006).

⁵⁷ *Anderson v. Bessemer City*, 470 U.S. 564, 573-76 (1985). *Accord Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-03-8, 58 NRC 11, 25-26 (2003).

3. *Issues Related to Long-Term Impacts of Disposal.* The Board and the NRC Staff's FEIS examined the potential disposal impacts at one "reference" near-surface disposal site only – Envirocare. Disposal impacts at one or more of the other identified potential near-surface facilities (e.g. Hanford, Waste Control Specialists, Nevada Test Site, or another site) may be greater, and accordingly one or more of those facilities may not be suitable for disposal of the National Enrichment Facility waste. Conversely, the impacts at one or more other sites may be less, making those sites suitable options for disposal. Both our decision today and the underlying record outline key considerations associated with disposal of large quantities of depleted uranium.

As we have noted, environmental site conditions (e.g., the water infiltration rate, depth to the underlying groundwater table, and soil characteristics) must adequately limit the potential for radionuclides to migrate away from the site. In addition, site conditions and facility design are relevant to reasonable assurance of protection against significant exposure of inadvertent intruders – a potential long-term concern given the ingrowth of decay products. Considerations may include whether a site has potable water, the site's rate of erosion, and how deep the waste is buried. Long-term assessments of site performance, however, inherently involve significant uncertainty.

These are factors to be considered by the appropriate state or federal regulatory authority once LES selects a disposal site, and an ultimate disposal determination needs to be made. NIRS/PC inappropriately seek to transform *this* proceeding – for a uranium enrichment facility – into the equivalent of a final disposal authorization review for one or more specific near-surface disposal facilities. But as we have stressed, this proceeding will not determine where the LES depleted uranium will go. That must await future decisions by LES and by pertinent licensing authorities, as well as future opportunities to revisit and examine in greater detail near-surface disposal impacts.

Earlier this year, we noted that while a literal reading of 10 C.F.R. § 61.55(a)(6) would render depleted uranium “Class A” waste (a category of low-level radioactive waste), the Part 61 rulemaking did not analyze the uranium enrichment waste stream. We therefore directed the NRC Staff, outside of this adjudication, “to consider whether the quantities of depleted uranium at issue in the waste stream from uranium enrichment facilities warrant amending section 61.55(a)(6) or the section 61.55(a) waste classification tables.”⁵⁸ The outcome of the staff’s review may also need to be considered by the appropriate regulatory authority at some point in the future.

And as we have already said, no decision has been made about where the LES depleted uranium ultimately will go. Prior to a final determination on disposal, we would expect that the pertinent regulatory authority will have considered both the characteristics of the waste and the site-specific features of the disposal site to assure that all radiological dose limits and safety regulations indeed can be met.⁵⁹ We have no reason to think that state authorities will

⁵⁸ CLI-05-20, 62 NRC at 535-36.

⁵⁹ NIRS/PC raise site-specific concerns about potential depleted uranium disposal at the Waste Control Specialists facility, located in Andrews County, Texas. LES has entered into a Memorandum of Understanding with Waste Control Specialists to explore the possibility of disposing of its depleted uranium at the Waste Control Specialists’ site. Waste Control Specialists’ current license, issued by the State of Texas Bureau of Radiation Control, does not authorize disposal of radioactive material, but Waste Control Specialists has applied for authorization to dispose of Class A, B, and C low-level radioactive waste. See FEIS at 2-32. To dispose of the LES depleted uranium, Waste Control Specialists would first need to obtain “[a]pproval by the State of Texas of WCS’s [waste disposal] application, including authorization by the State for the WCS . . . facility to accept for disposal depleted uranium oxides of the type and quantities expected to be generated as a result of the proposed [National Enrichment Facility’s] operations.” *Id.* at 2-33. NIRS/PC can directly raise with Texas their concerns about the pending Waste Control Specialists application. It is the job of the Agreement State regulatory body to independently evaluate a license application, and ensure that there is adequate technical data and analyses demonstrating that a proposed disposal facility meets all radiological safety requirements. We will not assume irregularities in the review of the Waste Control Specialists disposal application.

NIRS/PC also raise concerns about non-radiological hazards associated with depleted uranium, including uranium’s chemical toxicity. These arguments are untimely, as we earlier

not act responsibly and take all measures necessary to protect the public health and safety. Additionally, under the Atomic Energy Act, the NRC in its oversight role periodically reviews state radiation control programs to confirm that they remain compatible with the Commission's programs and adequately protect public health and safety. The NRC retains authority to suspend or terminate agreements relinquishing regulatory authority to states.⁶⁰

The FEIS, as amplified by the Board's decision and our decision today, provides adequate consideration of the reasonably foreseeable potential environmental impacts of near-surface disposal. Our decision today finds that at least one near-surface disposal facility, Envirocare, may be a plausible option for disposal of the National Enrichment Facility depleted uranium, where potential estimated impacts appear to be small. If LES ultimately selects another disposal site, or if upon further review it is determined that Envirocare is not a suitable facility, other near-surface disposal sites will need to be evaluated by the appropriate regulatory authority for disposal, consistent with the Part 61 performance objectives. If no near-surface disposal is ultimately selected and approved, another kind of disposal facility – such as a deep disposal facility – would need to be considered and developed. We turn now to the NEPA aspects of that option.

B . *Deep Disposal Analysis*

In LBP-06-09, the Board granted a Staff motion for summary disposition, and thereby dismissed the portion of the remanded NIRS/PC disposal impacts contention that challenged

ruled. See CLI-05-20, 62 NRC at 531 n.38. In any event, we assume that applicable regulatory limits on uranium in drinking water will be enforced. The potential for chemical contamination of groundwater from depleted uranium disposal will largely be a function of how arid or "wet" the site is (whether contaminants can spread) and whether the water is potable, factors that will need to be considered by the regulatory authority for disposal when a site is ultimately selected.

⁶⁰ See 42 U.S.C. § 2021(j).

the NRC Staff's deep disposal analysis. The decision also denied a NIRS/PC motion for partial summary disposition. NIRS/PC's motion had sought a Board ruling finding the Staff's deep disposal analysis inadequate and ordering the Staff to prepare a new deep disposal analysis.

We agree with the Board's conclusion that the only deep disposal questions that NIRS/PC raised in timely fashion have been resolved by the NRC Staff, and are now moot.⁶¹ As the Board found, NIRS/PC impermissibly seek to expand the scope of their disposal impacts contention by adding claims that could and should have been raised much earlier in this proceeding.⁶² Moreover, NIRS/PC apparently seek a level of precision and definitiveness in the deep disposal analysis that is simply unattainable at this stage, when it is (1) unclear (if not unlikely) that deep disposal will ever be required for the LES depleted uranium, and (2) unknown where such a facility would be and what its specific design and site-specific features would be. A deep disposal facility for depleted uranium would require a full detailed safety analysis and licensing review at the time such proposal is proposed. We address these issues in turn below.

1. *Timeliness.* Our contention-pleading rules direct petitioners to file their NEPA contentions "based on the applicant's environmental report."⁶³ If, later, the NRC Staff's draft or final EIS contains data or conclusions "that *differ significantly* from the data or conclusions in the applicant's documents," then petitioners may file new or amended contentions.⁶⁴

Here, LES's Environmental Report contained a specific section on the "Potential Impacts

⁶¹ See LBP-06-09, 63 NRC at ___, slip op. at 24-27.

⁶² See *id.* at ___, slip op. at 27, 29, 31 n.12.

⁶³ 10 C.F.R. 2.309(f).

⁶⁴ *Id.* (emphasis added).

of Each [depleted uranium] Disposal Option.”⁶⁵ The disposal impacts analysis relied upon and described a deep disposal analysis that had been prepared for and used in the earlier *Claiborne* uranium enrichment proceeding. The Environmental Report noted that the *Claiborne* analysis had studied the potential consequences of disposing of depleted U3O8 in “two representative deep disposal sites,” had evaluated the “intake of radionuclides from drinking water, irrigated crops, and fish,” and had further evaluated both an undisturbed performance scenario where “groundwater would be discharged to a river,” and a deep well water use exposure scenario where “an individual would obtain groundwater by drilling a well down gradient from the disposal unit.”⁶⁶

LES’s Environmental Report noted that the *Claiborne* analysis provided “an estimation of potential doses.”⁶⁷ It described some of the assumptions of the analysis, and the *Claiborne* analysis’s conclusion that the “[t]he estimated impacts for a deep disposal facility were less than the 0.25 mSv/yr (25 mrem/yr) level adopted from 10 C.F.R. 61. . . as a basis for comparison.”⁶⁸ The Environmental Report identified the section of the *Claiborne* EIS that discusses depleted uranium disposal impacts. That section contains estimated maximum doses for the two generic deep disposal sites studied, broken down by radiological exposure pathways.⁶⁹

NIRS/PC’s contentions challenging the LES Environmental Report did not challenge the Environmental Report’s conclusion that deep disposal impacts can meet Part 61 standards and would be less than 25 millirems per year. NIRS/PC did not request any more information or

⁶⁵ See National Enrichment Facility Environmental Report (Dec. 2003) at 4.13-12 to 4.13-14.

⁶⁶ See *id.* at 4.13-14.

⁶⁷ See *id.* at 4.13-13.

⁶⁸ *Id.* at 4.13-14.

⁶⁹ See *Claiborne* EIS at 4-67.

data from the Environmental Report's deep disposal analysis, or from the referenced Claiborne analysis. They did not challenge any assumption or dose result of the Claiborne analysis, and notably, as the Board stated, their expert is "apparently intimately familiar with the [Claiborne] FEIS and its underlying scientific basis" because he was the expert witness for another party in the earlier *Claiborne* proceeding.⁷⁰ In short, NIRS/PC raised no question about any of the information or the radiological impacts conclusion set forth in the Environmental Report's deep disposal analysis, and no question about the referenced Claiborne analysis. If NIRS/PC believed there is some inherent difficulty in meeting the Part 61 dose limits by deep disposal, it was incumbent upon them to challenge the Environmental Report's discussion. They did not.

Later, the staff's Draft Environmental Impact Statement ("DEIS") for the National Enrichment Facility also referenced and relied upon the Claiborne analysis. But because the National Enrichment Facility is expected to generate a greater amount of depleted uranium than the earlier proposed Claiborne facility, the Staff multiplied the Claiborne dose estimates (for the different exposure pathways) by 1.72 times. The DEIS indicated that the deep disposal dose estimates had been adapted to be "proportional to the quantity of material postulated from the Claiborne Enrichment Center enrichment facility," but did not specify precisely how the Claiborne dose results had been multiplied or applied in the National Enrichment Facility DEIS.⁷¹

After the DEIS was issued, NIRS/PC filed a motion to amend and supplement several of their contentions. Among their claims, NIRS/PC argued that the DEIS deep disposal analysis "fail[ed] to disclose the models used or the parameter values," and that while "[t]he text

⁷⁰ See LBP-06-09, 63 NRC at ___, slip. op. at 29.

⁷¹ NUREG-1790, Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico, Draft Report for Comment (Sept. 2004) ("DEIS") at 4-59.

suggests that models used in analyzing the [Claiborne] site were used . . . the results are unlike any reported in connection with the CEC facility.”⁷² The Board allowed NIRS/PC to amend some of their contentions, but for the disposal impacts claims the Board ruled that NIRS/PC could renew its motion after the Commission issued a then-pending decision on whether depleted uranium is a low-level radioactive waste.⁷³

After the Commission issued its decision on the status of depleted uranium as a low-level radioactive waste, NIRS/PC again filed a motion to amend and supplement their contentions. But instead of simply refiling their earlier motion, they submitted a new motion containing many distinct new claims, most of which were untimely.⁷⁴ In one of the bases challenging the DEIS deep disposal impacts analysis, however, NIRS/PC repeated their claim that the “estimates [in the DEIS] are said to be based on those in the [Claiborne analysis],” but that the assumptions used were unclear and the dose estimate “totals are different from those in the [Claiborne] analysis by nearly a factor of 2.”⁷⁵ NIRS/PC stated that this “difference may be partly explained by the [National Enrichment Facility’s] generation of roughly twice the amount of [depleted uranium] of the [Claiborne] proposal,” but that the estimate for one kind of drinking water dose was “almost 54,000 times lower in the current DEIS than in the [Claiborne]

⁷² See Motion on Behalf of Petitioners NIRS/PC to Amend and Supplement Contentions (Oct. 20, 2004) at 16.

⁷³ See Memorandum and Order (Ruling on Late-Filed Contentions) (Nov. 22, 2004) (unpublished) at 15.

⁷⁴ See CLI-05-20, 62 NRC at 531 n.38 (“[i]ndeed, the majority of the bases they submitted ventured into completely different issues that could have been raised previously”); see also *id.* at 530, 532. One of these late claims alleged a need to analyze the alternative of converting DUF6 to the DUO2 form, an alternative rejected in the DEIS. See CLI-05-28, 62 NRC 721, 726-28 (2005).

⁷⁵ See Motion on Behalf of Intervenors NIRS/PC for Admission of Late-Filed Contentions (Feb. 2, 2005) (Proprietary) at 17.

FEIS,” and “[t]his discrepancy remains unexplained.”⁷⁶

This claim of a “discrepancy” between the DEIS estimated radiological doses from deep disposal and the Claiborne analysis dose estimates – on which the DEIS analysis is based – is what we found to be timely and remanded to the Board.⁷⁷ In fact, we stressed that the deep disposal impacts issue appeared amenable to summary disposition because the Staff in the FEIS had (1) clarified that the same models and assumptions set forth in the Claiborne analysis applied, and (2) “corrected the DEIS dose discrepancy highlighted by NIRS/PC.”⁷⁸

We also said that “[i]f NIRS/PC actually mean to challenge the [underlying] dose estimates used in the *Claiborne* proceeding, such a challenge appears untimely, given that the LES Environmental Report said that it was relying on the Claiborne dose estimates.”⁷⁹ We highlighted timeliness because it appeared that NIRS/PC were seeking to greatly expand their deep disposal analysis challenge into a host of issues that could have been raised much earlier, at the time LES submitted its Environmental Report.

In LBP-06-09, the Board found that the “discrepancy” between the Claiborne and National Enrichment Facility dose figures had been corrected.⁸⁰ The discrepancy stemmed from a typographical error and an exponent transposition error. NIRS/PC have offered no additional challenges directly related to the correction of the National Enrichment Facility dose

⁷⁶ *Id.*

⁷⁷ See CLI-05-20, 62 NRC at 528, 530-31, 533 n.48.

⁷⁸ See *id.* at 533 n.48.

⁷⁹ *Id.* We noted further that it appeared that NIRS/PC sought to challenge the deep disposal analysis because it was based upon two representative disposal sites, a claim that “seemingly also could have been based upon the Environmental Report.” See *id.*

⁸⁰ LBP-06-09, 63 NRC at ___, slip op. at 24-27.

figures.⁸¹ But they wish to litigate a number of the Claiborne analysis's assumptions and conclusions. They argue, for instance, that in the Claiborne analysis the well water doses for the representative granite disposal site "are incredibly low," and that the river scenario doses at the granite site "are so low as to be unbelievable."⁸² They dispute particular assumptions made in the Claiborne analysis, and seek additional underlying information about the analysis. All of these claims could and should have been raised based upon LES's Environmental Report.⁸³ It is too late now.

NIRS/PC's new claims do not challenge any significantly *different* data or conclusions described in the National Enrichment Facility environmental impacts analyses. They challenge specific information set forth in the Claiborne analysis – assumptions, factors, and dose

⁸¹ At the hearing, the Board indicated that once the dose estimate errors – the discrepancy – were corrected, NIRS/PC would be able to raise claims if they stemmed from the "corrected error." See Transcript at 2844-46. Thus, the Board would have allowed NIRS/PC to contest whether the discrepancy had been resolved, or to raise a new claim if the corrected dose figures had a particular new "significance" for the deep disposal impacts conclusions. See LBP-06-09, 63 NRC at __, slip op. at 27.

⁸² See Petition on Behalf of NIRS/PC for Review of Second Partial Initial Decision on Environmental Contentions (Mar. 20, 2006) ("Petition") at 13.

⁸³ NIRS/PC also stress that the NRC Staff has not been able to provide detailed input data used in the Claiborne analysis and therefore the analysis "cannot be reproduced" and is "unscientific." See Petition at 20. A Staff expert has stated that the Claiborne analysis cannot be duplicated because the Staff lacks "detailed input data" and because "some of the codes used in the assessment ha[ve] been modified or updated." See Affidavit of Dr. Rateb Abu-Eid at 3, Attachment A to NRC Staff Motion for Summary Disposition (Nov. 18, 2005). Nonetheless, as the Board pointed out, NRC Staff experts reviewed the analysis and results, including the assumptions and models used, and confirmed it was still reasonable and appropriate to use in the National Enrichment Facility environmental impacts analysis. See LBP-06-09, 63 NRC at __, slip op. at 30 n.11. It was not improper for the staff to utilize information and conclusions drawn in a relevant analysis published in a prior FEIS. Further, since this proceeding will not approve a disposal facility, it is not necessary to have all underlying details now. The Claiborne analysis considered hypothetical disposal sites; if a deep disposal facility is ever proposed for licensing, actual site-specific data would need to be reviewed. Moreover, as the Board correctly held, Claiborne analysis challenges "should have been raised as part of the NIRS/PC challenge to the [Environmental Report]." See *id.*, slip op. at 29.

estimates described in the Claiborne FEIS. These new challenges surfaced only in the NIRS/PC motion of February 2005, almost a year after NIRS/PC filed its petition to intervene. The Board properly rejected these very late efforts to expand the scope of this proceeding.

In any event, based on our review of the record, NIRS/PC have not presented sufficient reason to revisit the Claiborne analysis in this proceeding. They argue, for example, that no explanation has been offered for why the Claiborne analysis assumed UO₂ as the dominant precipitate or solid phase of the waste when the analysis assumes U₃O₈ as the disposal form. But as both the staff and LES explained, in “reducing” (low-oxygen) conditions prevalent in groundwater deep under the ground, U₃O₈ (which is unstable in groundwater) would be expected to convert to a UO₂ form.⁸⁴ It is reasonable to expect that any potential site selected for disposal of depleted uranium would be screened to assure that it has reducing (not oxidizing) conditions because under reducing conditions the isotopes in depleted uranium would be largely insoluble and largely impervious to water transport. NIRS/PC further claim that the Claiborne assumptions on uranium solubility are inconsistent with the assumptions in a Sandia National Laboratories analysis, but the analysis they cite was for a *near-surface* facility, where groundwater conditions would be oxidizing and the solubility factor therefore greater.⁸⁵

2. *Additional Considerations.* As we have stressed, this is not a disposal facility licensing proceeding. There may never be a need to dispose of the LES depleted uranium by deep disposal methods. At this time, the Envirocare near-surface disposal facility appears to be a suitable location, and additional near-surface facilities, such as the Nevada Test Site,

⁸⁴ See Answer of Applicant LES in Opposition to Petition for Review of LBP-06-08 and LBP-06-09 (Mar. 30, 2006) at 25 & n.25 (citing NRC Staff Response to NIRS/PC’s Partial Motion for Summary Disposition (Nov. 28, 2005) at 10-12; Attachment A at 5-7).

⁸⁵ See NIRS/PC Exh. 128 at 5-6, 21. Several of the same or similar arguments that NIRS/PC now raise were addressed in a Board decision issued in the earlier *Claiborne* uranium enrichment proceeding. See *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), LBP-97-22, 46 NRC 275 (1997), vacated as moot, CLI-98-5, 47 NRC 113 (1998).

Hanford, Barnwell, and the Waste Control Specialists facility are other potential disposal sites that can be evaluated and may prove suitable for safe disposal of large quantities of depleted uranium. Thus, while deep disposal methods are a waste disposal alternative, at this time they do not appear likely to be necessary. When LES filed its Environmental Report, its “preferred” disposal option was to find an exhausted uranium mine, but LES’s current preference is disposal by a private near-surface facility. Its second preference is to request the Department of Energy to accept the depleted uranium (DOE operates the Nevada Test Site near-surface disposal facility).⁸⁶

There is no currently licensed deep disposal facility, and no application pending for such a facility. Consequently, if in the future it were determined that no near-surface disposal facility is available or that a more protective form of disposal is needed, a detailed licensing review would be needed prior to any disposal decision. The Claiborne deep disposal analysis provides estimates of disposal impacts at two hypothetical deep disposal sites (an abandoned mine in granite and in sandstone/basalt at depths of 950 and 2,070 feet respectively), but there are other kinds of potential deep disposal sites. Without the specific environmental and design characteristics of an actual disposal site, any deep disposal impacts analysis that can be prepared now can represent only a rough estimate of the impacts of disposing of the LES depleted uranium by a deep disposal method.

Because there is no current proposal for a deep disposal site, it is not feasible to determine actual site-specific values. In these circumstances, it is reasonable to defer more detailed analysis “until a concrete . . . proposal crystallizes” actual site data, allowing for a

⁸⁶ Section 3113(a) of the USEC Privatization Act requires DOE, if requested by an NRC-licensed uranium enrichment licensee, “to accept for disposal ... depleted uranium if it were ultimately determined to be a low-level radioactive waste.” See 42 U.S.C. § 2297h-11 (2000). The Commission has determined that depleted uranium is a low-level radioactive waste, and that therefore transfer of the LES depleted uranium to DOE is a plausible waste disposal strategy. See CLI-05-5, 61 NRC at 34-35.

comprehensive, site-specific evaluation of probable impacts.⁸⁷ If necessary, design characteristics could then be altered (e.g. disposal depth) or a different kind of site considered. An “FEIS need only furnish such information as appears to be reasonably necessary under the circumstances for evaluation” of a proposed action,⁸⁸ in this case the licensing of a uranium enrichment facility. The Claiborne deep disposal dose estimates reflect a screening evaluation of the plausibility of safe deep disposal. This analysis was prepared for the earlier *Claiborne* proceeding, when LES’s preferred disposal option was deep disposal in a mine. Now, however, at least one near-surface disposal facility (Envirocare) appears to be a plausible option for LES’s depleted uranium. The Claiborne analysis remains useful as support for the *additional* (perhaps unneeded) disposal option of deep disposal. Deep disposal, because it involves burial of waste hundreds – if not thousands – of feet under the ground, would clearly provide a viable disposal alternative.

Even if there is error or inaccuracy in the dose estimates for the two hypothetical sites analyzed in the Claiborne analysis (and those dose estimates were far below regulatory limits), there is adequate reason to believe that a deep geologic disposal site can be found and designed to assure that radiological standards will be met. Indeed, in two reports submitted as hearing exhibits, NIRS/PC’s expert suggests a deep geologic disposal site like the Department of Energy’s Waste Isolation Pilot Plant (“WIPP”), which is used for disposal of transuranic waste.⁸⁹ The WIPP facility involves deep disposal in a sealed mine in bedded salt. As NIRS/PC’s reports note, there has been sufficient experience with the WIPP facility for a

⁸⁷ See *California v. Block*, 690 F.2d 753, 761 (9th Cir. 1982).

⁸⁸ See *Fuel Safe Washington v. FERC*, 389 F.3d 1313, 1329 (10th Cir. 2004).

⁸⁹ See NIRS/PC Exh. 190 at 27-28; NIRS/PC Exh. 224 at 22-23 (where NIRS/PC’s expert quotes Dr. John Bredehoeft’s statement that “[t]he type of site required for disposal of depleted uranium from NEF [National Enrichment Facility] is roughly comparable to the WIPP site in terms of the level of isolation required”).

scientific consensus that the WIPP facility is safe for disposal of transuranic material.⁹⁰ In short, there has been sufficient experience with deep geological disposal to know that it can be made safe. Detailed plans and evaluations, however, can be done only when and if a deep disposal method and site are selected.

III. Conclusion

For the foregoing reasons, and for the reasons given by the Board, the Board decisions in LBP-06-08 and LBP-06-09 are *affirmed*, as supplemented by our decision today.⁹¹

IT IS SO ORDERED.

For the Commission

/RA/

Annette L. Viettti-Cook
Secretary of the Commission

Dated at Rockville, Maryland,
this 2nd day of June 2006

⁹⁰ See NIRS/PC Exh. 224 at 23; NIRS/PC Exh. 190 at 27. It also bears noting that the uranium enrichment process does not *create* new radioactive waste. Unlike nuclear reactors which produce high level waste, the uranium enrichment process actually *depletes* uranium of the U235 isotope. Thus, depleted uranium can be said to be less hazardous than much of the natural uranium already found under the ground, which is already in a form of "deep disposal." Uranium becomes more hazardous with time because of the ingrowth of daughter products until it reaches secular equilibrium in approximately one to two million years. Assuming that depleted uranium is not carelessly disposed of, the uranium enrichment process (because it removes U235) actually reduces some of the hazards associated with uranium in its own natural state.

⁹¹ Adjudicatory findings on NEPA issues, including our own in this decision, become part of the environmental "record of decision" and in effect supplement the FEIS. See *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 94 (1998), *aff'g* LBP-96-25, 44 NRC 331, 369-70 (1996); see also 10 C.F.R. § 52.102.