RAS 7056

November 11, 2003

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
DUKE ENERGY CORPORATION	)	Docket Nos. 50-413 OLA
	)	50-414 OLA
(Catawba Nuclear Station,	)	
Units 1 and 2)	)	
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	)	

ANSWER OF DUKE ENERGY CORPORATION TO THE "BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE'S SUPPLEMENTAL PETITION TO INTERVENE" AND THE "CONTENTIONS OF NUCLEAR ~~INFORMATION~~ AND RESOURCE SERVICE"

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I. INTRODUCTION

On October 21, 2003, the Blue Ridge Environmental Defense League ("BREDL") and the Nuclear Information and Resource Service ("NIRS") (collectively, "Petitioners") each submitted proposed contentions in supplemental filings[1] amending their prior petitions to intervene and requests for hearing in this license amendment proceeding.[2] Pursuant to 10 C.F.R. § 2.714(c) and the schedule established by the NRC Atomic Safety and Licensing Board ("Licensing Board") in this proceeding, Duke Energy Corporation ("Duke") herein responds to

1 *See* "Blue Ridge Environmental Defense League's Supplemental Petition to Intervene" (October 21, 2003) ("BREDL Contentions") and "Contentions of Nuclear Information and Resource Service" (October 21, 2003) ("NIRS Contentions").

2 *See* "Blue Ridge Environmental Defense League's Hearing Request and Petition to Intervene" (August 25, 2003) and Nuclear Information and Resource Service's "Request for Hearing and Petition to Intervene" (August 21, 2003).

Petitioners' proposed contentions on the issue of admissibility. As discussed further below, Duke opposes the Petitioners' requests for hearing because neither Petitioner has identified an admissible contention.

II. BACKGROUND

A. Duke's MOX Fuel Lead Assembly Application

On February 27, 2003, Duke filed a license amendment request ("LAR") with the Nuclear Regulatory Commission ("NRC"), seeking authorization to revise certain Technical Specifications ("TS") for the McGuire Nuclear Station, Units 1 and 2 ("McGuire") and the Catawba Nuclear Station, Units 1 and 2 ("Catawba"), to allow the insertion of four mixed oxide ("MOX") lead assemblies at either facility.[3] The four MOX lead assemblies (approximately 2% of a reactor core comprised of 193 fuel assemblies) are to be loaded into non-limiting core locations. The TS changes sought as part of the LAR are necessitated by the language of some existing TS. In general, the proposed TS revisions relate to the storage of MOX fuel assemblies in the spent fuel storage racks, the description of the fuel pellet and cladding material, references to approved methodologies in the Core Operating Limits Report, and information in the TS bases. Subsequently, in a September 23, 2003 submittal to the NRC, Duke limited the MOX fuel lead assembly LAR to Catawba.[4]

This LAR was submitted as part of a MOX fuel program that supports the ongoing U.S.—Russia plutonium disposition program, a nuclear nonproliferation initiative. The

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[3] *See* February 27, 2003 letter to the NRC from M. Tuckman, "Proposed Amendments to the Facility Operating License and Technical Specifications to Allow Insertion of Mixed Oxide (MOX) Fuel Lead Assemblies and request for Exemption from Certain Regulations in 10 CFR Part 50," Docket Nos. 50-369, 50-370, 50-413, and 50-414, in the form of a transmittal letter and 6 attachments.

[4] *See* September 23, 2003 letter to the NRC from M. Tuckman.

Department of Energy ("DOE") plans to dispose of U.S. surplus weapons grade ("WG") plutonium by converting that material to MOX fuel and using that fuel in commercial nuclear reactors. In furtherance of that effort, DOE has contracted with Duke Cogema Stone & Webster, LLC ("DCS") to use MOX fuel at the McGuire and Catawba reactors operated by DCS's subcontractor, Duke.

The current LAR supports only plans for the four MOX fuel lead assemblies to be irradiated for a minimum of two cycles at a Catawba unit to confirm acceptability of the planned MOX fuel assembly design, verify the validity of Duke's models to predict fuel assembly performance, and confirm the applicability of the European database to Duke's use of MOX fuel. DOE will fabricate the new (unirradiated) MOX fuel lead assemblies and transport them to the Catawba facility. Fabrication and transportation activity associated with the lead assemblies are not part of the present NRC licensing action. To support "batch use" of MOX fuel at McGuire or Catawba, Duke would be required to file a separate NRC license amendment application in the future. This batch use would involve use of more significant quantities of MOX fuel (approximately 40% of the core) along with conventional low enriched uranium ("LEU") fuel.

The Catawba lead assembly program is similar to previous MOX fuel lead assembly programs in the United States, and is much smaller than past and ongoing use of MOX fuel worldwide. MOX fuel has been used extensively in Europe for over 20 years and is currently being used safely in more than 30 European power reactors in several countries. The MOX fuel used in Europe is manufactured from the plutonium extracted from reprocessed LEU fuel discharged from European reactors; this MOX fuel is typically referred to as reactor grade ("RG") MOX fuel. Reactor grade MOX fuel is similar to the WG MOX fuel that Duke proposes to use. The difference between these types of MOX fuel is in the isotopic content of the

plutonium. According to one of the papers cited by BREDL and discussed further below,[5] the ongoing use of RG MOX fuel presents greater potential safety and environmental impacts than the use of the WG MOX fuel as now proposed by Duke. In any event, as indicated above, MOX fuel has also been used previously in demonstration programs in five U.S. commercial power reactors. The most recent such program was the use of four MOX fuel assemblies (out of 121 core assemblies) at the Ginna nuclear facility in the early 1980s.[6]

B. *DOE's Plutonium Disposition Environmental Reviews*

In accordance with the National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4321 *et seq.*, DOE has assessed the potential environmental effects associated with various aspects of its MOX fuel program for plutonium disposition. In December 1996, DOE first published a programmatic environmental impact statement ("PEIS") for the plutonium disposition program.[7] At that time, among other alternatives, DOE evaluated the potential environmental impacts of fabrication of MOX fuel and subsequent use of MOX fuel in commercial power reactors. One of the approaches evaluated in the PEIS involved the transport of 50 metric tons of plutonium (in the form of plutonium oxide) from a storage facility at an existing DOE site to a U.S. port; handling at the U.S. port; ocean transport to the European ports for fabrication into the MOX fuel; ocean transport of MOX fuel back to the U.S.; safe, secure trailer transport of MOX fuel from the U.S. port to commercial reactor sites in the U.S.; and use as fuel at those sites. The PEIS supports a conclusion that the potential environmental impacts

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5 *See* n. 44 below.

6 The NRC reviewed and approved the use of MOX fuel at Ginna. *See* License Amendment No. 32 to Provisional Operating License No. DPR-18 (April 15, 1980).

7 *DOE Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement*, DOE/EIS-0229 (Dec. 1996).

associated with these activities would be small. In a subsequent Record of Decision ("ROD") (62 Fed. Reg. 3014, January 21, 1997), DOE outlined its decision to pursue a hybrid disposition strategy for the surplus plutonium, involving both immobilization and MOX fuel irradiation. DOE also decided to construct a new facility in the United States to fabricate MOX fuel. This ROD, however, did not address lead assembly fabrication.

In November 1999, DOE issued the *Surplus Plutonium Disposition Final Environmental Impact Statement*,[8] or "SPDEIS," which tiered from the PEIS. The SPDEIS specifically evaluated the environmental impacts of fabricating 33 metric tons of plutonium into MOX fuel at a new fabrication facility at a DOE site and using the fuel at six commercial power reactors (the McGuire, Catawba, and North Anna units, referred to as the "mission reactors"). As part of the SPDEIS, DOE considered domestic (U.S.) fabrication of up to ten MOX fuel lead assemblies, post-irradiation examination of the MOX fuel, and associated transportation impacts. For the lead assemblies the SPDEIS assumed the use of plutonium oxide from Los Alamos National Laboratory ("LANL"), and considered five DOE sites for fabrication activities, irradiation at either McGuire or Catawba, and post-irradiation examination at either of two DOE sites. The SPDEIS supports a conclusion that the potential environmental impacts of these activities would be small.

In a subsequent ROD (65 Fed. Reg. 1608) (Jan. 11, 2000), DOE selected LANL as the site for lead assembly fabrication, to be followed by irradiation at McGuire or Catawba and post-irradiation examination of selected fuel rods at Oak Ridge National Laboratory ("ORNL"). DOE issued an amended Record of Decision in April, 2003 (68 Fed. Reg. 20,134),

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8 *DOE Surplus Plutonium Disposition Final Environmental Impact Statement*, DOE/EIS-0283 (Nov. 1999).

in which it indicated its decision to cancel the immobilization component of the surplus plutonium disposition program. Under the revised program, DOE will disposition up to 34 metric tons of surplus weapons grade plutonium by irradiation in commercial nuclear reactors as MOX fuel. In connection with this change, DOE issued a Supplement Analysis evaluating the impacts of fabricating a portion of the plutonium originally destined for immobilization into MOX fuel.[9]

Finally, subsequent to the earlier RODs, DOE has revisited its decision regarding the fabrication of the lead assemblies, and has now decided to pursue European fabrication of the MOX fuel lead assemblies (the so-called "Eurofab" option). The environmental impacts associated with Eurofab have also been evaluated by DOE (to the extent the actions are within the scope of NEPA). DOE recently issued a Supplement Analysis and amended ROD concerning Eurofab.[10] The Supplement Analysis addressed overland truck transport of plutonium oxide from LANL to a U.S. (Atlantic) military port; transfer and transport to France for fabrication into lead assemblies at existing facilities; return ocean transport between a French port and a U.S. port; transfer of the lead assemblies to truck; and overland transport to Catawba or McGuire. The concurrent DOE ROD states that DOE will carry out the Eurofab option as outlined in the Supplement Analysis, with archive and scrap material to be stored at LANL. The agency's NEPA review in connection with Eurofab is now complete.

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9 *See Supplement Analysis For The Changes Needed To The Surplus Plutonium Disposition Program*, DOE/EIS-0283-SA1 (April 2003).

10 *See Supplement Analysis: Fabrication of Mixed Oxide Fuel Lead Assemblies in Europe* (DOE/EIS-0229-SA3) (Nov. 2003). A related ROD, finalized the same day, will be published in the *Federal Register* shortly. A copy of the Supplement Analysis and the related ROD are included as Addendum A and Addendum B (respectively) to this filing.

C. *This License Amendment Proceeding*

On July 25, 2003, the NRC Staff issued a "Notice of Consideration of Issuance of Amendment to Facility Operating License and Opportunity for a Hearing"[11] in connection with the LAR. In response to the notice, BREDL and NIRS filed separate petitions to intervene and requests for hearing on August 25, 2003 and August 21, 2003, respectively. Duke and the NRC Staff responded to these petitions, on the issue of standing only, on September 9 and September 15, 2003, respectively.[12] An NRC Licensing Board was established to preside in this proceeding on September 17, 2003.[13] On September 23, 2003, the Licensing Board issued an Order establishing a schedule for the filing of pleadings and further guidance for the proceeding.[14] While Petitioners were originally scheduled to submit proposed contentions by October 14,

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11 *See* "Duke Energy Corporation, et al., Catawba Nuclear Station, Units 1 and 2; McGuire Nuclear Station, Units 1 and 2; Notice of Consideration of Issuance of Amendment to Facility Operating License and Opportunity for a Hearing," 68 Fed. Reg. 44,107 (July 25, 2003).

12 "Answer of Duke Energy Corporation to the Petitions to Intervene and Requests for Hearing of the Nuclear Information and Resource Service and the Blue Ridge Environmental Defense League" (Sept. 9, 2003); "NRC Staff's Answer to Nuclear Information and Resource Service and Blue Ridge Environmental Defense League's Petitions for Leave to Intervene and Requests for Hearing" (Sept. 15, 2003).

13 *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), "Establishment of Atomic Safety and Licensing Board" (Sept. 17, 2003); subsequently published at 68 Fed. Reg. 55,414 (Sept. 25, 2003).

14 *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), "Order (Setting Deadlines, Schedule, and Guidance for Proceedings)," __ NRC __ (slip op., Sept. 23, 2003).

2003, the Licensing Board extended that deadline until October 21, 2003 at BREDL's request.[15] The present schedule and filings exclude security issues.[16]

III. PETITIONERS' STANDING

In its earlier filing in this proceeding, Duke stated that it does not contest NIRS's claim of representational standing in this proceeding. Duke further stated that, subject to clarification of the intent of BREDL's declarant (Mr. Gregg Jocoy), Duke does not contest BREDL's representational standing. In its most recent filing, BREDL has amended its assertion of standing by submitting the declarations of 19 additional individuals. The declarations of 15 of those individuals state that the person is a member of BREDL, that he or she lives within twenty miles of Catawba, and that he or she authorizes BREDL to represent their interests in this license amendment proceeding.[17] Given this showing of additional BREDL members, Duke does not contest BREDL's standing in this proceeding.[18]

Standing alone is not sufficient to admit a petitioner as a party to an NRC proceeding. All petitioners must submit at least one admissible contention as well. The Commission has also recently emphasized:

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15 *Duke Energy Corp.* (Catawba Nuclear Station, Units 1 and 2), "Order (Granting Request for Extension of Time)," __ NRC __ (slip op., Oct. 3, 2003). Both Duke and the NRC Staff opposed BREDL's extension request.

16 *See Duke Energy Corp.* (Catawba Nuclear Station, Units 1 and 2), "Order (Confirming Matters Addressed at October 10, 2003, Telephone Conference)," ___ NRC ___ (slip op., October 10, 2003); Tr. 67-68.

17 The declarations of four of the individuals submitted by BREDL state that they live within a certain stated distance from McGuire and do not refer to Catawba. Proximity to McGuire is no longer relevant for purposes of determining standing, given that the LAR no longer includes McGuire.

18 A review of the declarations using the Geographic Information System reveals that, of the 15 individuals who state that they live within 20 miles of Catawba, the addresses of only 11 are in fact within 20 miles.

> A threshold finding of standing does not render contentions admissible. While a petitioner may have a sufficient 'interest' in a proceeding for standing, he or she may have no genuine material dispute to adjudicate, or no specific factual or legal support to bring an issue to hearing.[19]

As is discussed further below, the Petitioners here do not make substantive arguments regarding the safety and environmental impacts of the lead assembly LAR now before the NRC. Rather, they raise disagreements with the current government policy for plutonium disposition, seek further environmental reviews related to possible future "batch use" of MOX fuel, pursue generic safety issues that are not created by and exist independent of the proposed use of MOX fuel, and address transportation issues related to the export of plutonium oxide, which is not an authorization within the scope of the LAR. These are not matters to be addressed in this forum.

IV. NRC STANDARDS FOR ADMISSIBILITY OF CONTENTIONS

The standards that NRC licensing boards must apply in ruling on the admissibility of proposed contentions are set forth at 10 C.F.R. §§ 2.714(b) and (d). Significantly, proposed contentions must have a basis sufficient to demonstrate that there is a genuine, substantive dispute of fact or law related to the application at issue. One NRC licensing board recently summarized the requirements for admissible contentions in 10 C.F.R. § 2.714 as follows:

> [A] contention must:
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> (A) under section 2.714(b)(2), consist of a *specific* statement of the issue of law or fact the petitioner wishes to raise or controvert; and
>
> (B) under subsection 2.714(b)(2)(i), be supported by a brief *explanation* of the factual and/or legal basis or bases of the contention, which goes beyond mere allegation and speculation, is *not* open-ended, ill-defined, vague, or unparticularized, and *is* stated with reasonable specificity; and

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[19] *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Unit 2), CLI-03-14, __ NRC __ (Oct. 23, 2003, slip op. at 11-12) (internal citations omitted).

(C) under subsection 2.714(b)(2)(ii), include a statement of the alleged facts or expert opinion (or both) that support the contention and on which the petitioner intends to rely to prove its case at a hearing, which must also be stated with reasonable specificity; and

(D) also under subsection 2.714(b)(2)(ii), include references to those specific sources and documents of which the petitioner is aware and on which the petitioner intends to rely to establish the facts it alleges and/or the expert opinion it offers, which must also be stated with reasonable specificity and, at a minimum, consist of a fact-based argument sufficient to demonstrate that an inquiry in depth is appropriate, and illustrate that the petitioner has examined the publicly available documentary material pertaining to the facility(ies) in question with sufficient care to uncover any information that could serve as a foundation for a specific contention; and

(E) under subsection 2.714(b)(2)(iii), provide sufficient information to show that a *genuine dispute* exists with the applicant on a *material* issue of law or fact (i.e., a dispute that actually, specifically, and directly challenges and controverts the application, with regard to a legal or factual issue, the resolution of which "would make a difference in the outcome of the licensing proceeding," 54 Fed. Reg. at 33,172[)], which includes either:

(1) *references to the specific portions of the application* (including the applicant's environmental report and safety report) that the petitioner disputes *and the supporting reasons for each dispute*, or

(2) if the petitioner believes that the application fails to contain information on a relevant matter as required by law, the *identification of each failure and the supporting reasons for the petitioner's belief;* and

(F) under subsection 2.714(d)(2)(ii), demonstrate that the contention, if proven, would be of consequence in the proceeding because it would entitle the petitioner to specific relief.

Also, as indicated in the text of subsection 2.714(b)(2)(iii), for issues arising under [the National Environmental Policy Act], contentions must be based on the applicant's environmental report, and the petitioner can amend such contentions or file new contentions "if there are data or conclusions in the NRC draft or final environmental impact statement, environmental assessment,

or any supplements relating thereto, that differ significantly from the data or conclusions in the applicant's document.[20]

If a proposed contention fails to comply with *any* of the NRC's threshold requirements, it must be dismissed.[21] Moreover, the Commission has repeatedly emphasized that its "contention rule is 'strict by design.'"[22] The Commission adopted the rule in 1989 as part of the NRC's deliberate effort to prevent the litigation of contentions based on little more than speculation or policy disagreements. In this regard, the Commission recently re-emphasized that its contention requirements "seek to assure that NRC hearings 'serve the purpose for which they are intended: to adjudicate genuine, substantive safety and environmental issues placed in contention by qualified intervenors.'"[23]

As a practical matter, the NRC's rules on the admission of contentions establish an evidentiary threshold more demanding than a mere pleading requirement. The rules require precision in the contention pleading process and require that a proposed contention have plausible and relevant factual support. A petitioner "must do more than merely make unsupported allegations."[24] If a proposed contention offers no specific explanation, factual or

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20 *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Unit 2), LBP-03-3, 57 NRC 45, 64-65 (2003), *citing Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), LBP-02-4, 55 NRC 49, 67-68 (2002).

21 *Id.* at 63, *citing Arizona Pub. Serv. Co.* (Palo Verde Nuclear Generating Station, Units 1, 2, and 3), CLI-91-12, 34 NRC 149, 155-56 (1991).

22 *Id.* at 65; *see also Millstone,* CLI-03-14, slip op. at 7 (internal citations omitted); *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 358 (2001), *citing Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 334 (1999).

23 *Millstone,* CLI-03-14, slip op. at 8.

24 *Millstone,* LBP-03-3, 57 NRC at 65.

legal, as to why the consequences that the petitioner fears will occur, then the requirements of the contention rule are not satisfied.[25] Thus, if the contention and supporting material fail to demonstrate a genuine issue as required by Section 2.714(b)(2), the Licensing Board must refuse to admit the contention.[26] *See also* 10 C.F.R. § 2.714(d)(2)(i).

The threshold "basis" rule requires that an intervenor provide a reason for its proposed contention and demonstrate that there is a "genuine dispute." "The intervenor must do more than submit 'bald or conclusory allegation[s]' of a dispute. . . He or she must 'read the pertinent portions of the application, including the Safety Analysis Report and the Environmental Report, state the applicant's position and the petitioner's opposing view.'"[27] The petitioner must:

> either allege with particularity that an applicant is not complying with a specified regulation, or allege with particularity the existence and detail of a substantial safety issue on which the regulations are silent. In the absence of a 'regulatory gap,' the failure to allege a violation of the regulations or an attempt to advocate stricter requirements than those imposed by NRC regulations will result in a rejection of the contention, the latter as an impermissible collateral attack on the Commission's rules (10 CFR § 2.758.).[28]

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25 *Id.*, *citing Millstone*, CLI-01-24, 54 NRC at 359.

26 *See Palo Verde*, CLI-91-12, 34 NRC at 155, *citing* Final Rule, Rules of Practice for Domestic Licensing Proceedings — Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168, 33,171 (Aug. 11, 1989)).

27 *Millstone*, CLI-01-24, 54 NRC at 358 (*citing* 54 Fed. Reg. at 33,170-171).

28 *Pub. Serv. Co. of N.H.* (Seabrook Station, Units 1 & 2), LBP-82-106, 16 NRC 1649, 1656 (1982). More recently, *see Millstone*, CLI-03-14, slip op. at 13 ("A contention alleging that an application is deficient must identify 'each failure and the supporting reasons for the petitioner's belief.'")

Similarly, a contention must also be rejected when, even if proven, it "would be of no consequence in the proceeding because it would not entitle petitioner to relief."[29]

With respect to documentary or factual information alleged to provide the basis for a contention, a petitioner cannot simply refer to voluminous reports, but rather has the obligation to provide the analysis as to why particular sections of the document provide a basis for a contention.[30] The Licensing Board also "is not to accept uncritically the assertion that a document or other factual information or an expert opinion supplies the basis for a contention."[31] Rather, the Licensing Board should review the information to ensure that it does indeed provide such a basis.[32] Moreover, a petitioner's imprecise reading of a document cannot serve to generate an issue suitable for litigation.[33]

In addition to meeting the requirements of 10 C.F.R. § 2.714, the subject matter of a contention is necessarily limited to issues that are "germane to the application pending before

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29 *See* 10 C.F.R. § 2.714(d)(2)(ii); *Yankee Atomic Electric Co.* (Yankee Nuclear Power Station), CLI-96-7, 43 NRC 235, 249 (1996) (*citing Sacramento Mun. Util. Dist.* (Rancho Seco Nuclear Generating Station), CLI-93-3, 37 NRC 135, 142 (1993)); *Pacific Gas & Elec. Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), LBP-02-23, 56 NRC 413, 437-38 (2002).

30 *Fansteel Inc.* (Muskogee, Oklahoma Site), CLI-03-13, 58 NRC ___ (Oct. 23, 2003, slip op. at 9-10); *see also Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-98-10, 47 NRC 288, 298 (1998).

31 *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 181 (1998), *reconsideration granted in part and denied in part on other grounds*, LBP-98-10, *aff'd on other grounds*, CLI-98-13, 48 NRC 26 (1998).

32 *Id.*; *see also Yankee Atomic Elec. Co.* (Yankee Nuclear Power Station), LBP-96-2, 43 NRC 61, 90 (1996), *rev'd in part on other grounds*, CLI-96-7, 43 NRC 235 ("A document put forth by an intervenor as the basis for a contention is subject to scrutiny both for what it does and does not show") (internal citations omitted).

33 *Ga. Inst. of Tech.* (Georgia Tech Research Reactor, Atlanta, Georgia), LBP-95-6, 41 NRC 281, 300 (1995).

the Board." A contention is not cognizable unless it is "material to matters that fall within the scope of the proceeding for which the licensing board has been delegated jurisdiction as set forth in the Commission's notice of opportunity for hearing."[34] In this proceeding seeking NRC authorization to use four MOX fuel lead assemblies at Catawba, the scope of the safety and environmental issues raised was defined in the NRC's notice of opportunity for hearing, as follows:

> The proposed amendments, requested by the licensee in a letter dated February 27, 2003, would revise the Technical Specifications (TSs) to allow the use of four mixed oxide (MOX) lead assemblies at either the Catawba Nuclear Station or the McGuire Nuclear Station. The licensee has proposed changes to two sections of the TSs that address the storage of MOX fuel assemblies in the spent fuel storage racks: Section 3.7.15, "Spent Fuel Assembly Storage" and Section 4.3, "Fuel Storage." The licensee has also proposed changes to TS Section 4.2, "Reactor Core," to reflect the use of MOX fuel in addition to the currently specified slightly enriched uranium dixoide fuel and to reflect the use of fuel rods clad with an M5™ zirconium alloy that has a different material specification than the materials currently referenced in the TS. Associated changes are proposed for TS Section 5.6.5, "Core Operating Limits Report (COLR)," to add several more methodologies that will be used to develop the limits that will be included in the COLR. Associated changes have also been proposed for the TS Bases section.[35]

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34 *Duke Energy Corp.*, LBP-02-4, 55 NRC at 68; *citing Pub. Serv. Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-316, 3 NRC 167, 170-71 (1976); *see also Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-00-23, 52 NRC 327, 329 (2000). A corollary of this principle of NRC adjudication is that any contention challenging an NRC regulation, whether directly or indirectly, is always outside the scope of the proceeding and therefore inadmissible. *See Oconee*, CLI-99-11, 49 NRC at 334; *see also Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-01-35, 54 NRC 403, 422 (2001).

35 *See* 68 Fed. Reg. 44,107 (July 25, 2003).

Because NRC licensing boards are not empowered to explore matters beyond those embraced by the notice of hearing for the particular proceeding, the Petitioners' contentions in this proceeding must focus on the proposed amendments as identified in the July 25, 2003 notice of hearing.[36]

V. PETITIONERS' PROPOSED CONTENTIONS

BREDL Contention 1

> Duke's risk impact analysis is inadequate, because it presents the results of its analysis in qualitative terms only.

Response

In the basis for this proposed contention, BREDL focuses on Section 3.8 of Attachment 3 of the LAR, and addresses the conclusion there that the use of four MOX fuel lead assemblies will not significantly change the risk to public health and safety. BREDL challenges this qualitative conclusion and complains that Duke "does not attempt to calculate the changes in core damage frequency (CDF) and Large Early Release Frequency (LERF) associated with the proposed license amendment." BREDL Contentions, at 5. BREDL claims that this assessment is therefore inadequate for "risk-informed decision-making" under the criteria of Regulatory Guide 1.174, Rev. 1.[37] *Id.* The contention, however, lacks a sufficient regulatory or factual basis to demonstrate that BREDL would be entitled to any relief in this proceeding.

First, the fundamental basis for the contention is flawed and therefore inadequate to support an admissible contention. Duke's amendment application is *not* a risk-informed application for a change to the licensing basis within the scope of Reg. Guide 1.174, Rev. 1.

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36 *See Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), LBP-91-39, 34 NRC 273, 282 (1991).

37 Regulatory Guide ("Reg. Guide") 1.174, Rev. 1, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions in Plant-Specific Changes to the Licensing Basis" (November 2002).

That regulatory guide provides a method for applicants and the NRC Staff to assess proposed licensing basis changes that go beyond current NRC Staff positions, regulatory guides, standard review plans, and the like, where the proposal is based on an analysis grounded in probabilistic risk assessment. *See generally* Reg. Guide 1.174, at 1.174-3 to 1.174.5. In contrast, Duke's lead assembly application is based on a traditional deterministic engineering evaluation, including a safety analysis of the effect of four MOX fuel assemblies on the design basis transients and accidents described in the facility Updated Final Safety Analysis Report ("UFSAR"). Thus, Reg. Guide 1.174, Rev. 1, is inapplicable. Duke's safety analysis is included in Section 3.7 of Attachment 3 of the LAR, and is not challenged by the proposed contention.

Using the traditional evaluation approach, Duke has demonstrated in the LAR — as it is required to do — that applicable acceptance criteria for the design basis transients and accidents are met considering the use of four MOX fuel lead assemblies.[38] In particular, for postulated transients and accidents, Duke has demonstrated that radiological consequences (in terms of dose) remain within the limits of the relevant regulatory criteria. *See* LAR, Section 3.7.3. The proposed contention fails to show that an additional quantitative assessment of risk is required for the NRC to make the "reasonable assurance" of safety findings necessary in connection with a license amendment under 10 C.F.R. §§ 50.92(a) and 50.57(a). In addition, no basis is provided to suggest that such an assessment should be required to assure adequate protection of public health and safety. The contention specifically seeks further calculations of changes in CDF and LERF associated with the proposed amendment. However, there is no NRC

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[38] A deterministic approach is also premised upon the NRC's defense-in-depth philosophy reflected in the Commission's requirements. These include requirements for engineering margin in equipment design; safety systems; and quality assurance in design, manufacture, and construction.

requirement (and BREDL has not cited any) that license amendment applications include an assessment of changes in CDF or LERF. The risk assessment provided in Section 3.8 of the LAR is for information and perspective only. The relief requested — further quantitative risk analysis — would exceed NRC regulatory requirements, and the basis for the contention does not establish how or why the relief could be granted in this proceeding.

The factual premise for the proposed contention is also flawed. It is readily apparent from the LAR that the proposed changes in the core (four assemblies) will not significantly change the decay heat produced, and will not increase the likelihood of design basis events or change the ability of the plant to mitigate the consequences of design basis events. *See* LAR, Attachment 3, Section 3.7.2. BREDL has provided no basis on which to assert that the proposed amendment would change either CDF or LERF in any material manner. Moreover, as discussed below in connection with BREDL Contentions 2 and 3, there is no basis presented to support a proposition that four MOX fuel assemblies (as opposed to other factors) will increase public health and safety risk in any significant way. The LAR *does* introduce changes in fission products and source term, but the impact of those changes is addressed in the traditional design basis safety analysis in Section 3.7 of the application.[39] There is no basis in the contention to challenge these conclusions.

In sum, this proposed contention is inadmissible under 10 C.F.R. § 2.714(b)(iii) because it lacks a sufficient regulatory or factual basis to demonstrate the existence of a genuine dispute on a material issue, and under 10 C.F.R. § 2.714(d)(2)(ii) because it would not entitle the petitioner to any relief in this proceeding.

BREDL Contention 2

> Duke has failed to support its claim that the increase in severe accident consequences associated with the MOX LTA loading will not be significant. In particular: (1) Duke has incorrectly scaled the results from DOE's SPDEIS; (2) Duke should have used the most recent version of its PRAs, not the SPDEIS, in the calculation of radiological consequences; (3) Duke does not take into account published research that discusses flaws in DOE's analysis; and (4) the risk impact cannot be fully evaluated because the NRC Staff has not completed final guidance on how Reg. Guide 1.174 Rev. 1 should be applied in the case of MOX fuel use.

Response

This safety contention is also directed to the risk assessment included in Section 3.8 of Duke's technical justification (*see* LAR, Attachment 3, Section 3.8). Therefore, this proposed contention — like BREDL Contention 1 — also relates to a risk assessment that is not required by the NRC. The contention asserts that Duke must further "support" the assessment. However, no basis is provided to support the premise that the risk assessment itself, much less further support for that assessment, should be required to assure adequate protection of public health and safety. Accordingly, the proposed contention is not admissible because it fails to establish a genuine dispute regarding a *material* issue of fact. 10 C.F.R. § 2.714(b)(2)(iii). It is also inadmissible because, if proven, the contention would not entitle the petitioner to any relief in this proceeding. 10 C.F.R. § 2.714(d)(2)(ii). Further, each of the particular assertions in the contention is inadmissible for the additional reasons discussed below.

1. Improper Scaling

As noted above, in Section 3.8 of the LAR Duke provided an overview of the risk impact of the proposal as a supplement to the traditional safety analysis included in LAR Section

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[39] This is a safety contention, not an environmental contention such as BREDL Contentions 4 through 9. In this context, there is also no requirement for any analysis of beyond-design-basis "severe accidents."

3.7. In the discussion in Section 3.8, Duke explained that its assessment was based on the DOE evaluation of several severe accident sequences included in the SPDEIS, for cores containing approximately 40% MOX fuel (*i.e.*, "batch quantities"). In the DOE analysis, the change in offsite consequences from severe accidents ranged from minus 4% to plus 14%, as compared to cores with all low enriched uranium ("LEU") fuel. LAR, at 3-37. By scaling those results for cores with 40% MOX fuel to the current proposal for cores with 2% MOX fuel (*i.e.*, four lead assemblies), the application concludes that "the potential impact on offsite consequences from severe accidents would range from about minus 0.1% to plus 0.3% compared to LEU fuel." *Id.* In the LAR, this supports the conclusion that operation with up to four MOX fuel lead assemblies will have "no significant impact on public health risk." *Id.*

As a basis for the contention that the risk assessment is inadequate, BREDL first challenges Duke's scaling of the severe accident consequences from the DOE SPDEIS — pointing out that a correct linear scaling (multiplying by a factor of 4/76 instead of 4/193) would lead to a result that is greater by a factor of two. BREDL Contentions, at 5. That is, the change in public health risk from severe accidents would more correctly be in a range from minus 0.2% to plus 0.7% (rather than minus 0.1% to plus 0.3%). BREDL's point is quantitatively correct. However, the point does not establish a basis for an admissible contention. First, a change in consequences from severe accidents in the revised range is still not, in any sense, significant in the context of a probabilistic risk assessment.[40] The revised numbers in the contention *on their*

[40] For example, in NUREG-1150, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants" (December 1990), the NRC studied risks from severe accidents at five commercial nuclear power plants, including Sequoyah, an ice condenser containment plant similar to Catawba. As part of the work, NRC generated quantitative risk values, and it also examined the uncertainty inherent in the results. It is apparent that the results include considerable uncertainty, with a range of two orders of magnitude between the

face, therefore, are not sufficient to establish a genuine dispute on a material issue of fact. *See* 10 C.F.R. § 2.714(b)(2)(iii). The required critical examination of the contention (*see, e.g.*, *Private Fuel Storage*, LBP-98-7, 47 NRC at 181) reveals the lack of a sufficient basis; no "merits" determination is necessary. Second, given that no public health risk assessment is even required (as opposed to the analysis of changes in dose consequences discussed in Section 3.7 of the LAR), and given that this basis asserts only a change in risk of, at most, plus 0.7%, there is no reasonable basis on which to conclude that this aspect of the contention would entitle BREDL to any relief in this proceeding. *See* 10 C.F.R. § 2.714(d)(2). This too is a threshold determination based on the basis statement itself, rather than a "merits" conclusion.[41]

2. Use of PRA v. Use of SPDEIS

As a second basis for this proposed contention, BREDL asserts that Duke has "inappropriately" relied upon the SPDEIS for its LAR Section 3.8 calculation of consequences. BREDL asserts that the SPDEIS "is outdated" and that the risk assessment of the impact of four MOX fuel test assemblies should be based on "the most recent version" of Duke's plant-specific Probabilistic Risk Assessment ("PRA"). BREDL Contentions, at 5-6. This assertion, however, lacks a regulatory basis. As discussed above, Duke has supported its amendment request with a traditional safety analysis. There is no requirement that Duke perform *any* probabilistic risk assessment of the proposed amendment. Even a qualitative risk perspective would be

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5th and 95th percentile results, and a difference of approximately a factor of 3 between the mean and the median. In this context, a change of less than 2% in risk is much smaller than the uncertainty inherent in the calculations and therefore is not significant.

[41] Indeed, if Duke amended the LAR to reflect revised numbers based on a corrected scaling, the relief requested by BREDL would be granted. This amendment, however, is not necessary given that the Staff can incorporate correct numbers in its documents to the extent it even considers such numbers as necessary for its findings.

unnecessary. It follows that there is also no NRC requirement that Duke prepare a quantitative risk assessment based on a plant-specific PRA rather than an assessment based on the DOE SPDEIS. There is no NRC requirement that Duke even maintain an updated PRA,[42] much less apply it to every license amendment application. Finally, there is no specificity or explanation in this part of the contention with respect to the assertion that the SPDEIS is "outdated."[43] Therefore, in total, this is not an admissible issue.

3. Flaws in SPDEIS

BREDL next challenges the risk assessment in Section 3.8 of the LAR based on "published research that discusses flaws in DOE's analysis." BREDL cites two documents — a study authored by Edwin Lyman on the public health risks of MOX fuel[44] and an NRC contractor report on source terms for MOX fuels.[45] Offering no specific references to those documents, the basis statement asserts only that the "increase in consequences associated with using MOX fuel depends strongly on the assumed values of the actinide release fractions, which are parameters with large uncertainties." BREDL Contentions, at 6. However, this basis also fails to demonstrate a genuine, admissible issue.

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42 *See, e.g., Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2, Catawba Nuclear Station, Units 1 and 2), LBP-03-17, ___ NRC ___ (Oct. 2, 2003, slip op. at 12) ("Furthermore, NRC regulations do not require Duke to publish its entire PRA, and the Intervenors fail to provide any legal support for that proposition.").

43 Indeed, as is also discussed below, the "outdated" SPDEIS results are actually on the same order of magnitude as those cited by BREDL's witness.

44 E. Lyman, "Public Health Risks of Substituting Mixed-Oxide for Uranium Fuel in Pressurized Water Reactors," *Science & Global Security* 9 at 33-79 (2001) ("Lyman Study"). This is the report noted above that concludes (*e.g.*, pages 13, 20) that health risks due to RG MOX fuel are substantially greater than those due to WG MOX fuel.

45 ERI/NRC 02-202, "Accident Source Terms for Light-Water Nuclear Power Plants: High Burnup and Mixed Oxide Fuels" (November 2002).

BREDL's broad reference to two documents and its single assertion regarding "uncertainties" do not establish a genuine, material issue that could make a difference in the outcome of this matter. In general, broad references to documents are not a sufficient basis for an admissible contention. A petitioner "has the obligation not just to refer generally to voluminous documents (here totaling several hundred pages), but to provide analysis and supporting evidence as to why particular sections of those documents. . . provide a basis for the contention." *Fansteel*, CLI-03-13, 58 NRC ___ (slip op. at 10); *Private Fuel Storage*, LBP-98-10, 47 NRC at 298 (merely "[a]ttaching a document in support of a contention without any explanation of its significance does not provide an adequate basis for a contention"), *citing La. Energy Servs., L.P.* (Claiborne Enrichment Center), LBP-91-41, 34 NRC 332, 338 (1991). On this basis alone, this aspect of BREDL Contention 2 should be rejected.[46] Beyond that, the Licensing Board is not constrained to simply accept a citation to documentary or factual information alleged to provide the basis for a contention. The Licensing Board "is not to accept uncritically the assertion that a document or other factual information or an expert opinion supplies the basis for a contention." Rather, the Licensing Board should review the information to ensure that it does indeed provide such a basis. *Private Fuel Storage*, LBP-98-7, 47 NRC at 181; *Yankee*, LBP-96-2, 43 NRC at 90 ("A document put forth by an intervenor as the basis for a

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[46] Of course, a petitioner should not be permitted to supplement a contention and basis after filing, such as at the prehearing conference. A licensing board "is not authorized to admit conditionally, for any reason, a contention that falls short of meeting the specificity requirements." *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-687, 16 NRC 460, 467 (1982) *vacated in part on other grounds*, CLI-83-19, 17 NRC 1041 (1983). *See also Palo Verde*, CLI-91-12, 34 NRC at 155-56 (A licensing board erred in inferring a basis for a proposed contention when the petitioner proffering that contention did not satisfy NRC basis requirements in Section 2.714(b)(2)).

contention is subject to scrutiny both for what it does and does not show"). A critical review in this case shows the lack of sufficient basis.

The significance of the contractor report cited in the proposed contention is never explained. An examination of the Lyman Study reveals Dr. Lyman's conclusion that the radiological consequences (in terms of public health) would increase by as much as 30% — depending on the assumed fraction of actinides released — for a 40% MOX fuel core (76 MOX fuel assemblies). *See, e.g.*, Lyman Study, at Table 5 (ST-H latent cancer fatalities). Without even engaging the merits of the study itself, a linear scaling of the limiting 30% increase for 40% MOX fuel cores to cores with only four MOX fuel lead assemblies (*i.e.*, multiplying the results by 4/76) would lead to a maximum change in public health consequences associated with the current lead assembly application of 1.6%. As noted earlier, in a risk analysis of hypothetical severe or beyond-design-basis accidents, this is not a significant number. Therefore, applying a critical reading of the basis offered for the proposed contention, as demanded by the Commission precedent discussed above,[47] and considering also that no public health consequences assessment is even required by the regulations, this basis does not establish a genuine dispute that would be of consequence in this proceeding.

Finally, with respect to arguments that the SPDEIS is "outdated" or "flawed," it bears noting that BREDL was aware of the SPDEIS when it was issued by DOE in 1999, and apparently did not mount any legal challenge to that document in an appropriate forum.[48] The relief requested now is not available in this proceeding. *See* 10 C.F.R. § 2.714(d)(2)(ii).

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47 *See Private Fuel Storage*, LBP-98-7, 47 NRC at 181; *Yankee*, LBP-96-2, 43 NRC at 90.

48 Both BREDL and NIRS submitted comments to DOE in 1998 concerning the SPDEIS. BREDL representatives also attended a DOE public meeting concerning the SPDEIS.

4. Regulatory Guide 1.174

The final basis for BREDL Contention 2 is an argument that Reg. Guide 1.174 has not yet been applied by the NRC Staff in the case of MOX fuel use, and that the NRC Staff "must reach a position on this issue before the risk impacts of the MOX [lead assembly] license amendment can be assessed." BREDL Contentions, at 6. As previously discussed, Reg. Guide 1.174 provides guidance to be used by the NRC Staff in assessing proposed risk-informed licensing basis changes. The Reg. Guide specifically implements the Commission's Policy Statement on the use of PRA to risk inform NRC decision-making.[49] The present application is not a risk-informed licensing basis change. Reg. Guide 1.174, therefore, provides no basis for a specific contention that a public health risk assessment is required (in addition to the deterministic analysis of dose consequences for design basis accidents as discussed in Section 3.7 of the LAR). With the assertions that the NRC Staff must complete "final guidance" on Reg. Guide 1.174 and "reach a position" on impacts of MOX fuel on LERF, the Petitioner seeks relief that is not required for a decision on the LAR and therefore is not available in this forum. This basis, in total, also fails to demonstrate a genuine dispute that would be of consequence in this proceeding.

BREDL Contention 3

> The discussion of risk impacts of MOX fuel lead assemblies in Section 3.8 of the lead assembly application is incomplete, because it does not include an evaluation of the effect of containment sump failure on risk impacts of operating Catawba with four MOX fuel assemblies.

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[49] *See generally* "Use of Probabilistic Risk Assessment Methods in Nuclear Activities: Final Policy Statement," 60 Fed. Reg. 42,622 (August 16, 1995).

Response

The basis for this contention is several reports addressing the issue of potential containment sump clogging in the event of a loss-of-coolant accident ("LOCA"). This issue is currently being addressed by the NRC as Generic Safety Issue 191 ("GSI-191"). The contention asserts that this issue is "a particularly severe problem for ice condenser plants such as Catawba." BREDL Contentions, at 7. This proposed contention, however, raises an issue that is outside the scope of this proceeding.

Catawba is currently authorized to operate under an NRC Part 50 operating license. The NRC has determined that plant operation, including the use of ice condenser containments, presents no undue risk to plant workers and members of the public from possible releases of radiation. The NRC is evaluating certain safety issues — including GSI-191 as referenced in this contention and GSI-189 related to ice condensers as referenced in other contentions — as generic matters. Inherently, the NRC has determined that continuing operation pending resolution of these issues presents no undue risk.[50] Any challenge to the adequacy of the existing licensing basis is an impermissible challenge to the Commission's regulations, and one for which relief would need to be pursued in accordance with 10 C.F.R. § 2.802. *See Millstone*, CLI-01-24, 54 NRC at 364 (petitioners may not demand an adjudicatory hearing to attack generic NRC regulations or to express generalized grievances about NRC policies). Moreover, in accordance with longstanding practice, the NRC does not address generic safety

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50 As acknowledged in the contention, on August 7, 2003, Duke filed with the NRC a response to NRC Bulletin 2003-01 providing plant-specific information regarding the impact of debris blockage in emergency sump recirculation. Enclosure II to that submittal describes "interim compensatory measures" that have been or will be implemented at Catawba. The response notes that the Westinghouse Owners Group has

issues in individual licensing proceedings. *See Potomac Elec. Power Co.* (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-218, 8 AEC 79, 85 (1974); *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-813, 22 NRC 59, 86 (1985); *Private Fuel Storage,* LBP-98-7, 47 NRC at 179. In *Douglas Point*, the NRC's Appeal Board specifically found that "consideration in adjudicatory proceedings of issues presently to be taken up by the Commission in rulemaking would be, to say the least, a wasteful duplication of effort." *Douglas Point*, ALAB-218, 8 AEC at 85.

In the present circumstances, there is an additional reason the generic safety issue is outside the scope of the proceeding: the amendment application at issue here does not make any change that affects the potential for containment sump blockage. As discussed above, use of four MOX fuel lead assemblies does not change the likelihood of events such as the small break LOCA that are of concern in GSI-191. The proposed amendment does not increase the amount of fibrous material at Catawba that could cause sump clogging or otherwise alter any aspect of the equipment or procedures relevant to the potential for containment sump blockage or the ability to mitigate such events. The proposed amendment also does not change the CDF. The contention argues that "a recent Los Alamos study found that LOCA CDF for many [reactors] would increase by a factor of [sic] 50 on average if sump recirculation were not available." BREDL Contentions, at 8. However, even accepting this assertion at face value, the CDF change alleged is not based on the introduction of MOX fuel; rather, it is based on the hypothesized loss of sump recirculation (caused, for example, by the blockage concern identified in GSI-191 that exists regardless of whether or not there are four MOX fuel assemblies in the

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committed to its members to issue revisions to Emergency Response Guidelines to

core).[51] Given that the scope of this proceeding is limited to the *changes proposed in the license amendment application*, the issues raised in GSI-191 and in the contention are beyond the scope of the proceeding. Any licensing basis modifications (*e.g.*, plant or procedure modifications, revised analyses) necessary to address the generic issue will be determined based upon the resolution of GSI-191.[52]

As also discussed above, the application includes a traditional safety analysis in Section 3.7. This analysis addresses precisely what would change if the amendment were granted. Specifically, Duke analyzed the impacts of modified fission product inventories on the results of design basis accident analyses. The results are demonstrated to be within the relevant NRC requirements as derived from 10 C.F.R. Part 100. This proposed contention does not challenge any aspect of those required safety analyses.[53]

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address containment sump blockage issues by March 31, 2004.

51 The scenarios of concern in GSI-191 are not presently modeled in the Duke PRAs. To the extent CDF would change based on GSI-191, it would change completely independent of use of MOX fuel.

52 BREDL would likely argue that total public health risk depends upon the product of any CDF change associated with GSI-191 and the small calculated change in consequences attributable to four MOX fuel lead assemblies. However, if this logic were sufficient to bring GSI-191 within the scope of this proceeding, then it would follow that total risk (including CDF associated with GSI-191 or any other GSI) is an issue in *every* license amendment case. In other words, any amendment application (and hearing) would be an opportunity to reopen the current licensing basis of the plant and to litigate pending GSIs. This is not the policy of the Commission as reflected in the cases above.

53 To the extent that the contention is premised on the notion that Duke must show that the application is somehow neutral with respect to CDF, LERF or public health risk, it also is inadmissible. There is no such requirement. Rather, Duke must show that the dose consequences of design basis accidents remain within Part 100 levels given the proposed changes.

Accordingly, BREDL Contention 3 is inadmissible because it raises generic matters outside the scope of the proceeding. Moreover, because the contention does not address possible changes that might be caused by or relate to the use of four MOX fuel lead assemblies, it fails to demonstrate a *genuine* dispute with respect to a *material* issue. Finally, because the contention does not challenge the required safety analysis, it fails to demonstrate how the petitioner would be entitled to any relief in this proceeding. *See* 10 C.F.R. §§ 2.714(b)(2)(iii) and 2.714(d)(2)(ii).

BREDL Contention 4

> The Environmental Report for the lead assembly application is deficient because it completely fails to address the environmental impacts of using batch quantities of MOX fuel. This failure is inconsistent with Council on Environmental Quality ("CEQ") regulations and NRC decisions interpreting NEPA to require consideration of connected actions as well as cumulative impacts.

Response

BREDL Contention 4 asserts that Duke's Environmental Report ("ER") for the MOX LAR is deficient because it does not address "the environmental impacts of using batch quantities of MOX fuel in the Catawba and McGuire reactors." BREDL Contentions, at 9. BREDL contends that the testing of four MOX lead assemblies at Catawba (which is the subject of this proceeding) and the possible future use of "batch" quantities of MOX fuel at McGuire or Catawba (which is *not* the subject of this proceeding) constitute "connected actions" within the meaning of Section 1508.25(a)(1) of the Council on Environmental Quality ("CEQ") regulations[54] that should both be addressed in the current ER to avoid "illegal segmentation of

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[54] CEQ regulations in 40 C.F.R. § 1508.25(a)(1)(i)-(iii) define "connected actions" as actions that: (i) Automatically trigger other actions which may require environmental impact statements; (ii) Cannot or will not proceed unless other actions are taken

the decision-making process with respect to MOX fuel." *Id.* BREDL's argument lacks a legal basis and fails to demonstrate that the relief requested would be available in this proceeding.

As discussed above, in the LAR Duke is currently seeking only the NRC's authorization for use of four MOX lead assemblies at Catawba. In the future, should the plutonium disposition program go forward and assuming satisfactory lead assembly performance, a completely separate license amendment will be necessary for the "batch use" of MOX fuel. As a general rule, the NRC properly sequences and apportions its safety and environmental reviews in accordance with the timing and scope of each application put before it. *See, e.g.*, *Duke Energy Co.* (McGuire Nuclear Station, Units 1 and 2, Catawba Nuclear Station, Units 1 and 2), CLI-02-14, 55 NRC 278, 294 (2002) ("An NRC proceeding considers the application presented to the agency for consideration and not potential future amendments that are a matter of speculation at the time of the ongoing proceeding."); *Pacific Gas and Elec. Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), LBP-86-21, 23 NRC 849, 858-59 (1986) (Licensing Board limited scope of admitted contentions, concluding that it had "no authority to look beyond the license amendment application" and could not "speculate on events that might occur in the future").

Regarding the specific assertion in BREDL Contention 4 that NEPA requires the *environmental* review of a future "batch use" application now, in conjunction with the lead assembly application, the Commission has articulated a two-prong standard that it will apply:

> [T]o bring NEPA into play, a possible future action must at least constitute a 'proposal' pending before the agency (*i.e.*, ripeness), and must be in some way interrelated with the action that the agency is actively

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previously or simultaneously; (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.

considering (*i.e.*, nexus). The United States Court of Appeals for the District of Columbia Circuit said as much in *National Wildlife Federation v. FERC*:

> [*Kleppe v. Sierra Club*, 427 U.S. 390 (1976)] . . . clearly establishes that an EIS need not delve into the possible effects of a hypothetical project, but need only focus on the impact of the particular proposal at issue and *other pending or recently approved proposals that might be connected to or act cumulatively with the proposal at issue.*

McGuire/Catawba, CLI-02-14, 55 NRC at 295 (internal citations omitted) (emphasis in original). As shown below, this same standard precludes BREDL's current effort to expand this amendment proceeding.

1. Ripeness

The first prong of the Commission's test derives from the *Kleppe* case and its progeny. *See also National Wildlife Federation v. FERC,* 912 F.2d 1471, 1478 (D.C. Cir. 1990) (Ruling that *Kleppe* "clearly establishes that an EIS need not delve into the possible effects of a hypothetical project, but need only focus on the impact of the particular proposal at issue and other pending or recently approved proposals that might be connected to or act cumulatively with the proposal at issue"). In an analogous situation, in *Society Hill Towers Owners' Ass'n v. Rendell,* 210 F.3d 168 (3rd Cir. 2000), neighborhood residents challenged a Housing and Urban Development approval of a grant to the city of Philadelphia to assist in funding a hotel and parking garage. The residents claimed that the city's NEPA review of the project was deficient because it did not consider, in addition to the impacts of the hotel and garage, the impact of future development — including a proposed "mega" entertainment complex. The Court rejected

this claim because it was not clear that the additional projects would ever be completed. *Id.* at 182.[55]

In this case, there is no application or "proposal" for approval of "batch use" of MOX fuel pending before the NRC. Duke does not plan to submit the "batch" amendment application until late 2004 at the earliest, and does not expect to use the batch assemblies until at least 2009. Indeed, no definitive decision has yet been made as to whether Duke will ever submit a "batch use" license amendment request. Substantial uncertainties still surround the MOX fuel project. Over the next several months or years, any one of a number of events could occur that would render a subsequent license amendment application unnecessary. As in *Society Hills Towers*, the variables and uncertainties inherent in this project clearly dictate against a premature assessment of MOX fuel "batch use" issues in conjunction with the lead assembly LAR.

For example, NRC licensing authority must be obtained for other aspects of DOE's MOX fuel program in the United States. The NRC Staff is currently reviewing the 10 C.F.R. Part 70 Construction Authorization Request ("CAR") for DOE's MOX Fuel Fabrication Facility ("MFFF") at the Savannah River Site in South Carolina, which was submitted by DOE contractor Duke Cogema Stone & Webster ("DCS"). The NRC's current schedule calls for the issuance of a decision on the CAR by the end of 2003. However, because outstanding licensing

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[55] In a case similar to *Society Hill Towers,* the Fifth Circuit ruled that the city of New Orleans appropriately limited its environmental review under the urban development action grant program to a proposed hotel, retail, and parking development project. The review excluded other aspects of the city's master plan for the affected area that the Court found to be indefinite and speculative. No design work or land acquisition had been conducted for the excluded aspects and no final plans or private funding commitments had been obtained. *Vieux Carre Property Owners v. Pierce,* 719 F.2d 1272, 1275 (5th Cir. 1983).

issues remain, this schedule could slip. Additionally, contested hearings associated with the CAR will not commence until 2004. Therefore, it is not clear that DOE will be able to begin construction of the MFFF during the summer of 2004, as planned. In addition, the second phase of the NRC licensing process for the MFFF, which will require DCS to apply for a Part 70 license to operate the MFFF, has not yet begun. An application must be filed, must be reviewed by the NRC, and will be subject to the NRC hearing process.

In addition, the future of the MOX fuel program may be affected by the success or failure of certain international agreements. Use of MOX fuel for plutonium disposition in the United States is intended to parallel Russian use of MOX fuel for the same purpose. The governments of the United States and Russia have agreed to a primary technical approach for the Russian plutonium disposition program that involves replicating the MFFF in Russia and using the plant to manufacture MOX fuel for use in Russian reactors.[56] The Russian plutonium disposition program, however, is contingent upon financial support to move forward. Pledges of financial support from donor countries reportedly approach $800 million, but Russian program cost estimates are upwards of $2 billion.[57] Another potential obstacle is the expiration in June 2003 of the 1998 U.S.-Russian agreement on technical cooperation for the plutonium disposition program, and with it liability protection provisions.[58] Negotiations regarding the implementation of a liability protection framework are ongoing, but significant differences reportedly remain.[59]

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56 *See* "Nuclear Weapons and Materials Monitor" (Jan. 20, 2003, at 13).

57 *Id.* (May 20, 2003, at 12; June 9, 2003, at 7).

58 *Id.* (Aug. 6, 2003, at 14).

59 *Id.* (Oct. 6, 2003, at 19).

This issue,[60] along with U.S. concerns over possible Russian support for the Iranian nuclear program, is also reportedly delaying the start of construction of a Russian MOX fuel fabrication facility.[61] In summary, therefore, there are substantial uncertainties associated with the Russian plutonium disposition program that directly affect the potential for future submittal of an amendment application for "batch use" of MOX fuel in Duke's reactors.

The Commission previously acknowledged that, based on the number and type of external factors involved, the currently contemplated schedule for the various components of the MOX fuel program, and indeed even the continuation of the program, are subject to change. *See McGuire/Catawba*, CLI-02-14, 55 NRC at 296 ("During the next 6 1/2 years, any number of events could occur that would render a license amendment application to use MOX fuel unnecessary. The mere possibility that Duke might, at some undetermined future time, file a MOX-related amendment application is speculative by its very nature"). It seems clear, therefore, that: (1) there is no "proposal" for use of more than four MOX fuel assemblies before the NRC; (2) the "batch use" of MOX fuel remains uncertain and speculative; and (3) the current LAR MOX fuel lead assembly LAR does not "automatically trigger" the filing and the regulatory approval of the MOX fuel "batch use" amendment request. Therefore, the CEQ regulations cited by BREDL do not provide legal support for the contention.

BREDL further argues that the proposed security plan changes and exemption request that Duke filed in connection with the MOX fuel lead assembly LAR "satisfy the Commission's two-part test for determining when actions are related enough to be covered in the same EIS." BREDL Contentions, at 11. However, Duke's submittal of the security plan

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60 *See* "Nuclear Fuel" (Platts/McGraw-Hill Publication) (Oct. 27, 2003, at 5).

61 *See* "Nuclear Weapons and Materials Monitor" (Oct. 6, 2003, at 1).

revisions and related exemption request does *not* elevate the possibility of a future MOX fuel "batch use" LAR to a current "proposal" before the NRC, nor does it vitiate any of the uncertainties surrounding "batch use" described above. This limited attempt at regulatory efficiency by Duke does not commit Duke to file a "batch" application, commit the NRC to approve "batch use," or make NRC authorization of "batch use" any more certain or likely. The security submittal is completely insufficient to bootstrap a future LAR (that may or may not ever be filed and/or approved) into a current "proposal" under NEPA.[62]

2. Nexus

The linchpin of BREDL's contention that the current LAR and future "batch" use are "connected actions" under the CEQ regulations is a bold assertion that:

> Given the commitment that Duke has made to MOX fuel testing, and given its commitment to plant modifications necessary for batch MOX fuel use [apparently referring to the security plan modifications discussed above], it would be "*unwise or irrational*" *not to go through with MOX fuel use after LTA testing.* *Id.*, 55 NRC at 297, citing *Webb v. Gorsuch*, 699 F.2df 157 [sic] (4th Cir. 1983).

BREDL Contentions, at 11 (emphasis added). The premise of this argument is illogical and incorrect on its face. In fact, accepting the standard of "nexus" from the *Webb* case cited by BREDL — that is, whether the lead assembly program would make it "*unwise or irrational*" not to go through with "batch use" — there is no improper segmentation here. Obviously, nothing in the lead assembly program binds or commits either Duke or DOE to go forward with "batch

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62 Indeed, notwithstanding the security plan revisions, the focus of the requested environmental review is *not* on security issues. The contention focuses on the impacts of the use of a 40% MOX fuel core. The assessment of environmental impacts associated with use of 40% MOX fuel cores remains premature because the detailed analysis necessary to support a "batch use" application has not been completed.

use."[63] Developments with respect to the uncertainties discussed above ultimately may even preclude Duke's pursuit of the "batch" phase of the licensing project. Contrary to BREDL's assertion, pursuing a testing program designed to demonstrate the viability of a full-scale program does not commit the applicant to go forward. Should the lead assembly program reveal unexpected problems, Duke would not move forward with "batch use" until the problems are resolved.

In the *Webb* case, the Court of Appeals specifically found that the Environmental Protection Agency did not need to consider the "cumulative impacts" of permits for water discharges from underground mines together with the impacts of discharges from future proposed mines, if the current projects "did not represent a practical commitment to the others." Federal agencies are required to consider projects together only when the projects are "so interdependent that it would be unwise or irrational to complete one without the others." 699 F.2d at 161. Similarly, in *Airport Neighbors Alliance v. United States,* 90 F.3d 426, 433 (10th Cir. 1996), the Court of Appeals found that the Federal Aviation Administration did not inappropriately ignore "cumulative impacts" when its environmental assessment related to a runway upgrade at the Albuquerque airport did not analyze extensively the remaining future components postulated as part of the airport's future master plan, including expansion of the passenger terminal, construction of an additional parking structure and new cargo terminal, and expansion of surface access roads. The Court observed that the remaining components of the plan were not "so interdependent . . . that it would be unwise or irrational" to complete the runway upgrade without them. *Id.* at 433. The initial runway upgrade did not necessarily signal

63 As noted above, MOX fuel has been used in the past in the United States in several demonstration programs. None of these programs ever led to large scale use of MOX

a commitment to proceed with the rest of the master plan, and there was "no 'inextricable nexus'" between that discrete project and other aspects of the master plan. Accordingly, no EIS addressing cumulative impacts from possible future actions was required. *Id.* at 431.[64]

Applying the case law (and the similar CEQ standard advocated by BREDL) to the two licensing actions at issue here (one of which is not even yet a proposal before the agency, as discussed above), there is no "inextricable nexus." The first is a test or demonstration program; by definition it does not commit Duke to the second. Indeed, after completion of the lead assembly program, or even before, it may prove perfectly *wise* and perfectly *rational* not to pursue further approvals. Use of the lead assemblies (1) does not "automatically trigger" the second phase; (2) can proceed even if batch use does not; and (3) can be justified by its current, limited testing purpose regardless of the future of the larger action. The current amendment would simply allow Duke to demonstrate the performance characteristics of the MOX fuel to guide future decisions on MOX fuel use at Catawba or McGuire.[65] The lack of nexus, like the lack of a ripe proposal, is not changed by the proposed security plan revisions. The proposed

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fuel at the reactors involved (or anywhere else in the United States).

64 *See also Wetlands Action Network v. U.S. Army Corps of Engineers*, 222 F.3d 1105, 1118-19 (9th Cir. 2000), *cert. denied*, 534 U.S. 815 (2001).

65 BREDL's segmentation argument would imply that an NRC approval of any test program would necessitate a full EIS, including consideration of subsequent approvals for full-scale use. For example, a lead assembly program related to new fuel clad material would trigger an environmental review of full deployment. Similarly, an NRC approval of a plant using a demonstration or modular technology would trigger an environmental review of potential future plants using that technology or future modules. This would defeat the purpose of a test program designed to determine whether the full program should even be pursued and, if so, under what terms and conditions. Indeed, in this situation, in order to evaluate both the first and the later actions, the applicant and agency would need to know the results of the test first.

security plan revisions do not bind either Duke or the NRC to any particular course of action on MOX fuel.

3. Conclusion

In the context of arguments regarding segmentation of the environmental reviews of MOX fuel authorizations and license renewal at McGuire and Catawba, the Commission made it clear that it expected that a ruling on the basis for such contentions would be made at the contention admissibility stage and prior to any evidentiary hearings. *McGuire/Catawba*, CLI-02-14, 55 NRC at 292, n. 25.[66] Here, the Licensing Board can and should address this issue at this stage and determine that BREDL Contention 4 lacks sufficient regulatory or legal basis to demonstrate the existence of a genuine dispute of fact or law. The future "batch use" of MOX fuel remains uncertain and an environmental review is not yet ripe. Moreover, given that the four assemblies are part of a demonstration effort, there is not sufficient nexus between the LAR and future potential proposals. The implication of the contention is that the NRC cannot approve a test program without also first evaluating full-scale implementation of the technology being tested — even where subsequent approvals will be required and will have full environmental review. The contention should be rejected as a matter of law. *See* 10 C.F.R. § 2.714(b)(2)(iii).

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[66] Although a licensing board is not permitted to make determinations concerning the merits of otherwise admissible contentions at the admissibility stage, "a licensing board may under certain circumstances reject contentions on legal grounds on the pleadings." *Project Mgmt. Corp.* (Clinch River Breeder Plant), LBP-76-14, 3 NRC 430, 432 (1976), citing Douglas Point, ALAB-218, 8 AEC at 85, 89. *See also Philadelphia Elec. Co.* (Limerick Generating Station, Units 1 & 2), LBP-82-43A, 15 NRC 1423, 1488 (1982) (The licensing board denied two contentions arguing that the NRC cannot issue an operating license until the applicant has received a water quality certification under Section 401 of the Clean Water Act, as well as certain state discharge permits. The board stated: "[I]t is not legally necessary that all such permits be obtained before the operating license is issued by the NRC. Therefore, this contention, objected to by the Applicant

BREDL Contention 5

> The Environmental Report is deficient because it fails to consider alternative nuclear power plants for testing and batch fuel use, other than Catawba and McGuire. In particular, the Environmental Report must discuss new information related to ice condenser containments and the potential for containment sump clogging (GSI-189 and 191, respectively), and the resulting increased risk of an accident at Catawba relative to other nuclear power plants if MOX fuel were used.

Response

In this contention BREDL asserts that Duke's ER is deficient "because it fails to consider alternative nuclear power plants for testing and batch MOX fuel use, other than Catawba and McGuire." BREDL Contentions, at 12. BREDL seeks in the environmental review a comparative assessment of the public health risk of use of MOX fuel assemblies at Catawba versus the risk at other, non-Duke nuclear plants, particularly given the pending GSIs related to ice condenser containments and containment sump clogging. Fundamentally, the contention seeks to evaluate alternatives that are not presently available to either Duke or DOE and that are beyond the scope of the present environmental review.

NEPA's directive that federal agencies consider alternatives to the proposed federal action when preparing EISs or EAs is not unlimited, and is governed by a "rule of reason." The agency's analysis need not consider the environmental effects of alternatives that are "deemed only remote and speculative possibilities." *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council*, 435 U.S. 519, 551 (1978); *La. Energy Servs.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77 (1998). Similarly, under NEPA:

> Agencies need only discuss those alternatives that are reasonable and 'will bring about the ends' of the proposed action. *Citizens Against Burlington*

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and believed by the Staff to be admissible only as to the legal issue of whether the NRC could act without the permits having been issued, is not admitted.")

> *v. Busey*, 938 F.2d 190, 195 (D.C. Cir.), *cert. denied*, 502 U.S. 994 (1991). 'When the purpose is to accomplish one thing, it makes no sense to consider the alternative ways by which another thing might be achieved.' *Id.* (citing *City of Angoon v. Hodel*, 803 F.2d 1016, 1021 (9th Cir. 1986), *(per curiam), cert. denied*, 484 U.S. 870 (1987).)

Hydro Resources, Inc., CLI-01-4, 53 NRC 31, 55 (2001). Duke's MOX LAR is the "proposed action" here, and Duke's purpose in filing the license amendment request is to obtain NRC authorization to use four MOX fuel lead assemblies at Catawba. The only viable alternative to *Duke's* proposal for Catawba is the continued use of LEU fuel — that is, the "No Action" alternative which is addressed in the LAR. The alternative suggested in the contention — DOE contracting to use the MOX fuel lead assemblies at another, non-Duke nuclear plant — is not available to Duke and would not achieve the purpose and need of the *applicant*. *See City of Angoon*, 803 F.2d at 1021. More broadly, McGuire and Catawba are the only identified mission reactors for the DOE plutonium disposition program. Even DOE has no other alternatives presently available. The premise behind the contention — that other nuclear power plants are alternatives for the MOX lead assembly program — is unfounded and speculative. *Compare Seacoast Anti-Pollution League v. NRC*, 598 F. 2d 1221, 1230 (1st Cir. 1979) (the Court held that the NRC was not required to consider alternative sites for a nuclear power plant outside the state where the plant was to be built. It found the other sites to be "too remote and speculative").

To buttress its assertion that Duke's ER is deficient with respect to alternatives, BREDL contends that the environmental assessment must "re-evaluate" conclusions previously reached by DOE. In the SPDEIS, DOE addressed the use of MOX fuel at mission reactors (at the time, McGuire, Catawba and North Anna).[67] BREDL provides a general reference to "new

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[67] In addition, in the 1996 PEIS, DOE evaluated impacts associated with large scale use of MOX fuel at a representative reactor site.

information" from NUREG/CR-6427,[68] which purportedly shows that McGuire and Catawba are "particularly vulnerable to accidents, including containment breach." This is the ice condenser issue being generically addressed by the NRC Staff in GSI-189. Similarly, BREDL alludes again to the containment sump clogging issue being addressed by the NRC as GSI-191, and discussed above in connection with BREDL Contention 3. This, therefore, is in reality an attempt to bootstrap issues that cannot be addressed in a safety review into the environmental review. NRC regulations in 10 C.F.R. § 51.30(a) require only that an environmental assessment include a "brief discussion" of alternatives. Accordingly, even if the alternative of use of MOX fuel at other power plants were within the scope of review, BREDL seeks too much when it seeks to inject a full evaluation of currently existing generic safety issues into an environmental review for a site-specific amendment request.

Moreover, the risk impact of concern to BREDL is not — as previously discussed — driven by the proposal to use four MOX fuel lead assemblies. To the extent there is an increased risk at Catawba due to the issues being addressed in GSI-189 and GSI-191, that increase in risk remains to be determined in the context of the GSIs and exists independent of MOX fuel lead assemblies. As discussed above, there is no showing in the contention, or anywhere in BREDL's filing, that use of the four lead assemblies will *itself* significantly increase risk. To the extent BREDL wishes to litigate GSI-189 and GSI-191, those issues are outside the scope of this LAR. To the extent BREDL maintains that there is increased risk due to use of 40% MOX fuel cores, that issue is being raised prematurely and is similarly outside the scope of the LAR.

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[68] NUREG/CR-6427, "Assessment of the DCH [Direct Containment Heating] Issue for Plants with Ice Condenser Containments" (April 2000).

This contention is, in essence, a challenge to the *DOE* SPDEIS. Such a challenge is in the wrong forum. The NRC, and the Licensing Board, do not have jurisdiction with respect to DOE's environmental obligations. Furthermore, even if they did, and focusing on the four lead assemblies presently proposed, there would not be a basis for relief with respect to the SPDEIS. As the NRC recently held, "Not every change requires a supplemental EIS; only those changes that cause effects which are significantly different from those already studied." *Hydro Resources, Inc.*, CLI-01-4, 53 NRC at 52, *citing Davis v. Latschar*, 202 F.3d 359, 369 (D.C. Cir. 2000). The contention does not establish any basis for concluding that *four lead assemblies* will cause significantly different effects from what was considered in the SPDEIS.

In sum, BREDL Contention 5 is not admissible. The contention raises generic, technical issues outside the scope of this proceeding, and inappropriately attempts to insert those issues into an environmental review for the lead assembly LAR. The contention also lacks any legal basis for the proposition that speculative alternatives not available to Duke should be further analyzed. Finally, this contention is an attack on the SPDEIS in the wrong forum. Even as such, it lacks a basis for the proposition that new information is available to support a conclusion that *four lead assemblies* will cause new and different environmental effects. Accordingly, the contention fails to demonstrate the existence of a genuine issue for which relief can be granted in this proceeding. *See* 10 C.F.R. § 2.714(d)(2)(ii).

BREDL Contention 6

> Duke fails to provide quantitative support for its assertion that the consequences of a severe accident involving use of MOX fuel lead assemblies will increase 0.3% at most. In particular, in violation of 10 C.F.R. § 52.45(c)[sic], Duke does not attempt to calculate the changes in CDF and LERF associated with the proposed license amendment. Duke must provide all details of its consequence assessment, including a full description of core inventory release fractions, consequence modeling, techniques used, and a full accounting of uncertainties.

Response

In this contention, BREDL is essentially seeking in an Environmental Report a full-blown plant-specific PRA of the public health consequences of beyond-design-basis accidents at Catawba, updated to include four MOX fuel lead assemblies. Other than the citation to 10 C.F.R. § 52.45(c) — presumably intended to be 10 C.F.R. § 51.45(c) — BREDL provides no legal or regulatory support for such extraordinary relief. BREDL also fails to provide any factual support for its proposition that the plant risk would substantially change as a result of the four lead assemblies, and that such a full-blown risk analysis is justified in an environmental or safety context. In total, the contention lacks a basis for the proposition that either NRC regulations or safety/environmental considerations would dictate such relief in this proceeding.

NRC regulations provide a categorical exclusion for certain licensing actions from the requirement for an environmental review. In particular, 10 C.F.R. § 51.22(c)(9) excludes license amendments such as the present one:

> Issuance of an amendment to a permit or license for a reactor pursuant to Part 50 of this chapter which changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined in Part 20 of this chapter, or which changes an inspection or a surveillance requirement, provided that (i) the amendment involves no significant hazards consideration, (ii) there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite, and (iii) there is no significant increase in individual or cumulative occupational radiation exposure.

As shown in the LAR, the present amendment involves no significant hazards consideration (*see* LAR, Attachment 4), no significant changes in types or amounts of effluents (*see* LAR, Attachment 5, at 5-6 - 5-7), and no significant increase in occupational exposures (*see* LAR, Attachment 5, at 5-7). Therefore, rather than mandating the detailed quantitative PRA

assessment requested in this contention, NRC regulations would support a categorical exclusion from environmental review.[69]

Nonetheless, assuming an environmental assessment ("EA") is performed, Section 51.45(c) also does not drive an analysis on the scale of the relief requested in this contention. The regulation states only that:

> The analysis for environmental reports shall, to the extent practicable, quantify the various factors considered. To the extent that there are important qualitative considerations or factors that cannot be quantified, those considerations or factors shall be discussed in qualitative terms. The environmental report should contain sufficient data to aid the Commission in its development of an independent analysis.

Responsive to this regulation, the LAR includes a *quantitative* assessment of the impacts of postulated accidents. Based on the safety analysis in Section 3.7 of the LAR technical justification, Section 5.6.3.1 of the ER includes *quantitative* results for changes in dose consequences that would derive from the introduction of four MOX fuel assemblies in the core. The limiting cases remain within regulatory limits. LAR, Attachment 5, at 5-8. In the public health risk assessment in Section 3.8 of the technical justification, the LAR also includes a *quantitative* assessment of the changes in consequences of severe accidents. Drawn from the SPDEIS, as discussed above, the quantitative results show that the use of four MOX fuel lead assemblies does not significantly increase public health risk.

Contrary to BREDL's assertion, nothing in 10 C.F.R. § 51.45(c) requires Duke to provide additional quantitative information concerning the "risk analysis on which Duke relies

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[69] For the Ginna MOX fuel lead assembly program approved by the NRC, there was no environmental assessment or environmental impact statement. *See* 45 Fed. Reg. 29,450 (May 2, 1980) ("The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR

for its conclusions regarding environmental impacts," including "a full description of core inventory, release fractions, consequence modeling, techniques used, and a full accounting of uncertainties." BREDL Contentions, at 14. The NRC's requirement that an applicant quantify the various factors considered in its ER "to the fullest extent practicable" does not specifically require Duke to provide a probabilistic risk analysis.[70]

In the ongoing NRC licensing proceeding for the MOX fuel fabrication facility proceeding, the petitioner submitted a similar contention asserting in part that the applicant's accident analysis in the ER violated Section 51.45(c) because the ER did not quantify the probability of accidents or explain why it is not practicable to quantify them. In dismissing the proposed contention as inadmissible, the licensing board specifically ruled that 10 C.F.R. § 51.45(c) did not support the petitioner's argument:

> This unambiguous regulation implementing the Commission's responsibility under NEPA . . . does not by its terms mandate the preparation of a probabilistic risk assessment. Further, no other Commission environmental or safety regulation requires DCS to prepare a probabilistic risk assessment for the MFFF.

Duke Cogema Stone & Webster, LBP-01-35, 54 NRC at 448. Similarly, Section 51.45(c) does not require Duke to include a "risk analysis" to support its conclusions regarding environmental impacts.[71]

51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of this amendment.").

70 *See McGuire/Catawba*, LBP-03-17, slip op. at 12 (NRC regulations do not require Duke to publish its PRA).

71 *See also Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-98-29, 48 NRC 286 (1998) (An intervenor's proposed late-filed contention challenged the applicant's proposal in a license amendment to build a rail spur to transport spent fuel shipping casks to the ISFSI. The board specifically rejected the

At bottom, an environmental report is not a safety assessment. Moreover, it is not a probabilistic risk assessment. There is no showing in the contention, or any basis in fact, on which to conclude that it would be "practicable" for the NRC to require an environmental report, including a quantitative PRA, on the scale requested in this contention. Furthermore, given the level of detail already included in the SPDEIS, there is no basis on which to conclude that further information must be developed for this proceeding or to aid the Commission in its analysis.[72] The contention therefore should be rejected for lack of sufficient basis to demonstrate a genuine issue (10 C.F.R. § 2.714(b)(2)(iii)), and because it seeks relief that cannot be granted in this proceeding (10 C.F.R. § 2.714(d)(2)(ii)).

BREDL Contention 7

> Duke has failed to support its claim that the increase in severe accident consequences associated with the MOX fuel lead assembly loading will not be significant.

Response

This contention is a reprise of contentions discussed above, differing only in its assertion that the ER (rather than the LAR Section 3.8 risk assessment) "misrepresents" the impacts of the proposed amendment. BREDL Contentions, at 14. In particular, the contention again raises the issue of the change in public health risk calculated in the application, based on

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intervenor's assertion that the applicant's amendment application did not comply with 10 C.F.R. § 51.45(c) because it allegedly did not quantify and analyze the attendant costs and cumulative environmental impacts. The board stated that Section 51.45(c) imposes a burden on an applicant to provide a quantification discussion only 'to the fullest extent practicable.' 48 NRC at 296, n. 8. The board further suggested that this proposed contention impermissibly challenged NRC regulations or rulemaking-associated generic determinations, and lacked adequate factual or expert opinion support.)

72 As discussed above, the Duke ER conclusions are also generally consistent with BREDL's own numbers — that is, a maximum 1.6% change in consequences associated with four lead assemblies.

scaling the results from DOE's SPDEIS for a 40% MOX fuel core to a 2% MOX fuel core. The contention asserts that "Duke must use its own-up-to-date PRA" to calculate severe accident consequences. *Id.*, at 15. The contention concedes that the increase in consequences may be no more than 2%, but argues that the "change in risk could be significant for CDFs 100 times higher than what Duke assumed, as may be the case of sump recirculation is not available." *Id.*

First, as discussed in connection with BREDL Contention 6, there is no regulatory or legal basis — either in this contention or elsewhere — for the proposition that an ER for a license amendment must include a quantitative assessment of public health consequences of beyond-design-basis ("severe") accidents based on a detailed, updated plant-specific PRA. The LAR already includes quantitative assessments of the dose consequences of design basis accidents and of the change in public health consequences of severe accidents. Neither NEPA nor NRC regulations requires licensees to maintain PRAs, and it is illogical to assume that PRAs are nonetheless required to support the environmental assessment of license amendments.[73] Therefore, the relief requested cannot be granted consistent with current NRC regulations and practice.

Second, as discussed in connection with BREDL Contention 3, this contention in effect seeks an assessment of the change in plant risk deriving from the containment sump blockage issue being considered in GSI-191 — not from the use of four MOX fuel lead assemblies. No basis is provided here for the proposition that the lead assemblies will change CDF. Inherently, the contention also recognizes (consistent with the Lyman Study discussed above) that an increase in public health consequences due to MOX fuel (due to source term changes, not changes in CDF) will be "no more than 2%" — a clearly insignificant number in a

risk assessment context. The contention is focused on a change in CDF "100 times higher than what Duke assumed" based on the GSI-191 issue. No basis is referenced here for the assertion that the sump blockage issue will increase CDF by 100 times (in BREDL Contention 3, the assertion is that the change is 50 times). But in any event, it is quite clear that the focus of the contention is on GSI-191. The veracity of the claims of change in risk due to that issue should be evaluated in the context of the generic issue — which is outside the scope of this proceeding.

BREDL Contention 8/NIRS Contention 3

> BREDL: The Environmental Report is deficient because it fails to address the environmental impacts of shipping plutonium oxide to France, and the impacts of shipping lead assemblies back to the United States.
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> NIRS: There has been, to date, no supplemental environmental review or environmental impact statement (in the public record) by DOE on the proposed action to transport 300 pounds of plutonium by land and water to France. This "regulatory gap" should be addressed by the NRC as part of the license amendment.

Response

These two contentions are identical in focus and intent, and therefore are addressed here together. The contentions focus upon DOE's alleged failure to prepare an environmental impact statement or other environmental analysis concerning DOE's proposed shipment of plutonium oxide abroad to be fabricated into four MOX fuel lead assemblies — the Eurofab option. However, the proposed contentions raise an issue beyond the scope of NRC's purview with respect to Duke's *Part 50* license amendment application. The issue is a Part 110 export license issue that is subject to a separate licensing process. Moreover, DOE (not NRC)

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73 *See Duke Cogema Stone & Webster*, LBP-01-35, 54 NRC at 448.

has now completed its required NEPA review and issued its ROD on the Eurofab option for manufacture of MOX fuel lead assemblies.

As described in Duke's LAR, DOE's Eurofab option for fabrication of lead assemblies involves preparation (polishing) of the plutonium oxide (PuO_2) powder at LANL, shipment of the polished powder to a European plant for pellet and fuel rod fabrication, assembly of the fuel rods, and shipment of the four completed MOX fuel lead assemblies back to Catawba for irradiation. LAR, Attachment 5, Section 5.3, at p. 5-2.[74] Petitioners assert that the current absence of a DOE environmental analysis of the transportation aspects of the Eurofab option create a "regulatory gap" that *the NRC* must address as part of its review of Duke's MOX fuel license amendment application for Catawba. However, the transportation of plutonium oxide powder from the United States to France for fabrication into the MOX fuel lead assemblies is a *DOE* activity, not an activity which requires authorization by the NRC as part of Duke's 10 C.F.R. Part 50 LAR. As explained in the LAR, and consistent with Executive Order 12114,[75] any NEPA obligations that arise in connection with transportation of feed material to France apply to DOE. LAR, Attachment 5, at 5-2. (Thus, Duke's ER is not deficient with respect to its treatment of this issue.) Neither of these two proposed contentions establishes a basis for relief that could be granted in this proceeding.

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74 Since the LAR was submitted, it has been publicly announced that under this option fabrication of the fuel pellets and fuel rods for the MOX fuel lead assemblies would be performed for DOE by Cogema at Cogema's Cadarache facility in France. The lead assemblies will be assembled at the MELOX facility in France. This is explained in DOE's export license application discussed below.

75 Executive Order 12114, "Environmental Effects Abroad of Major Federal Actions" (January 4, 1979).

Additionally, DOE has addressed the transportation question. In the 1996 PEIS, DOE evaluated the environmental impact of overseas transport of large-scale quantities (50 tons) of plutonium oxide for fabrication into MOX fuel.[76] As Duke anticipated in the ER, and as noted in Section II.B above, DOE has now issued a "Supplement Analysis" that focuses more specifically on the impacts of the Eurofab option for manufacture of the MOX lead assemblies:

> The environmental impacts of domestic transportation and overseas ship transport are being addressed by DOE in a supplemental environmental analysis in accordance with DOE implementing procedures (10 CFR Part 1021) and will not be addressed in this ER.[77]

See LAR, Attachment 5, Section 5.3, at 5-3. As noted above, the Supplement Analysis was issued by DOE on November 7, 2003. Thus, to the extent that either contention suggests that DOE has no plans to conduct an environmental review of the impacts of transportation of plutonium oxide to France, such claims are simply incorrect.

As recognized by NIRS in this contention, and BREDL in its Contention 9, DOE has also submitted to the NRC an October 1, 2003 export license application which seeks authorization to ship 140 kilograms of plutonium oxide to France for the purpose of fabricating that material into MOX fuel lead assemblies.[78] The present Part 50 application and hearing

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[76] *See* PEIS, at Section 2.4.5.1 and Appendix G (Section G-1). The 1999 SPDEIS subsequently included an evaluation of environmental impacts of transportation of feed material up to 3,100 miles for lead assembly fabrication.

[77] *Id.*, at 5-3. DOE's Record of Decision associated with the SPDEIS indicated DOE's selection of LANL as the preferred site to fabricate the MOX lead assemblies. DOE subsequently reconsidered this decision, and is currently pursuing the Eurofab approach.

[78] *See* Letter, E.J. Siskin (DOE) to Deputy Director, Office of International Program, NRC, Attachment to NRC Form 7, Application for License to Export Nuclear Material and Equipment, at 2 (October 1, 2003). DOE's export license application seeks NRC authorization under 10 C.F.R. Part 110 to ship 140 kilograms of plutonium oxide to France for the purpose of fabricating that material into four MOX fuel lead assemblies. This application also serves as a request to import the finished MOX lead assemblies and

opportunity do not provide a proper forum to assess the environmental implications of the export license. The export license is a completely separate licensing action under 10 C.F.R. Part 110.[79] The NRC is not required to perform an environmental analysis in connection with DOE's export license request, because export licensing matters under 10 C.F.R. Part 110 are explicitly excluded from the scope of the Commission's environmental regulations in 10 C.F.R. Part 51.[80] NRC precedent further confirms that the Commission does not consider individual fuel exports or component exports to be major Federal actions under NEPA, and that the Commission will not consider health, safety and environmental impacts when considering exports of special

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"left over material" to the United States under the import general license provisions of 10 CFR § 111.27. The NRC published notice of receipt of the export license application, pursuant to NRC requirements in 10 C.F.R. § 110.70(b)(2). *See* 68 Fed. Reg. 61238 (Oct. 27, 2003).

79 The Commission's regulations in Part 110 also provide an opportunity for a hearing on an NRC license application "for an import or export requiring a specific license." *See* 10 C.F.R. § 110.82(a). The timing of hearing requests concerning import or export license applications is addressed in Section 110.82(c).

80 In this regard, Section 51.2 (*Scope*) provides:

> This part contains environmental protection regulations applicable to NRC's domestic licensing and related regulatory functions. These regulations do not apply to export licensing matters within the scope of part 110 of this chapter or to any environmental effects which NRC's domestic licensing and related regulatory functions may have upon the environment of foreign nations.

See also 10 C.F.R. § 51.22(c)(1), which contains a Categorical Exclusion for requests for amendments to Part 110 and actions on petitions for rulemaking under Part 110. In the 1984 amendments to Part 51, the Commission explained that the applicable procedures and criteria for export licenses were specified by the Nuclear Non-Proliferation Act of 1978 (Pub. L. 95-242, 92 Stat. 120), "which does not include environmental impact as a factor to be considered." Thus, consistent with the statutory mandate, the Commission limited the scope of revised Part 51 to NRC's "domestic licensing and related regulatory functions." 49 Fed. Reg. 9352, 9371 (Mar. 12, 1984).

nuclear material. *See Westinghouse Electric Corp.* (Exports to the Philippines), CLI-80-15, 11 NRC 672 (1980), *citing Edlow International*, CLI-76-6, 3 NRC 563, 584 (1976). Accordingly, the issue raised in these two contentions cannot be bootstrapped into the NRC's Part 50 licensing process. The relief requested is inconsistent with existing NRC requirements, and cannot be granted in this proceeding. Both of these contentions are inadmissible under 10 C.F.R. § 2.714(d)(2)(ii).

BREDL Contention 9

> The LAR fails to identify the quantity of plutonium that will be shipped to France for processing. There is a discrepancy (40kg) between the amount of plutonium oxide that DOE seeks to ship to France and the amount of plutonium needed to make four lead assemblies. This discrepancy and environmental impacts should be addressed.

Response

This contention, like BREDL Contention 8/NIRS Contention 3, addresses the alleged environmental impacts associated with transportation of plutonium oxide to France for manufacture of the lead assemblies. For the same reasons discussed in connection with those contentions, this is an issue outside the scope of the present proceeding. The environmental impacts of transportation of plutonium oxide to France and the transportation of MOX fuel assemblies back to Catawba — to the extent they are within the scope of NEPA and require assessment under Executive Order 12114 — were evaluated by DOE in the Supplement Analysis discussed above. Thus, Duke's LAR was not required to address this *DOE* issue. Export and other issues associated with transportation outside the United States are not within the scope of this Part 50 license amendment application.

Furthermore, the contention focuses on an alleged 40 kg "discrepancy" between DOE's Part 110 export license application and the SPDEIS estimate of the amount of plutonium oxide necessary to manufacture four MOX fuel lead assemblies. This is an issue that is

appropriately addressed in the context of the Part 110 export license application. As described above, NRC regulations dictate a specific process for public participation with respect to export license applications.

Finally, the "basis" for the contention is in any event misleading and insufficient to demonstrate the existence of a genuine issue. BREDL asserts that there is a "stray" 40 kg, because the export license application seeks authorization to export up to 140 kg of plutonium oxide. The contention is that, if only 100 kg are needed for four assemblies, the additional 40 kg are somehow lost "into the wrong hands" with "enormous" consequences. However, in reality the export license application is for export of "up to 140 kg." The export application further explains that:

> Upon completion of lead assembly fabrication, the complete assemblies, along with archive and extra material, will be returned to Cherbourg via overland shipment and loaded onto the [Pacific Nuclear Transport, Ltd.] ships. Left over feed material in France will be pelletized in the form of MOX fuel, inserted into fuel rods, and welded closed as is the practice with other fuel rods. The left over material, as well as spare and archive fuel rods, will be returned to the U.S. in the same shipment as the finished [lead assemblies].

The DOE export license application, therefore, explicitly recognizes that there will be "archive and extra material" and explains that "left over material" will be returned to the United States under the same controls as the lead assemblies. This contention, therefore, does not raise a genuine issue.

In sum, BREDL Contention 9 should be dismissed because it is outside the scope of this proceeding, and because it fails to demonstrate the existence of a genuine dispute on a material issue of law or fact. *See* 10 C.F.R. § 2.714(b)(2)(iii).

NIRS Contention 1

> In order to show in the future that the present tests of lead assemblies are representative or bounding of future larger scale (*i.e.*, batch) use of weapons plutonium fuel, benchmarks are needed. Duke's proposal is deficient at two key junctures: documentation of the plutonium oxide process history and content, and also independent certification of the test fuel.

Response

By its terms, this contention is addressed to whether sufficient information is being developed during the lead assembly manufacturing process to assure that the lead assemblies will be "representative or bounding" of the MOX fuel that would ultimately be used in batch quantities. Therefore, as a threshold matter, NIRS has not raised an issue within the scope of the review of the *lead assembly* LAR. Rather, this is an issue relevant to a potential future application addressing batch use, and therefore outside the scope of the present proceeding.[81]

Information is included in the lead assembly LAR to support the request for license authority to utilize a limited number of assemblies for a limited number of cycles. The design considerations relevant to the lead assemblies are addressed in the LAR and in referenced, docketed material (discussed further below). Moreover, as already discussed, the LAR includes the necessary safety analysis for postulated transients and accidents. All of this information will form the basis for any NRC approval and any license conditions. Any contention in the current proceeding would need to focus on the safety issues and environmental impacts associated with the proposed lead assembly design information and with the proposed limited use of lead assemblies. Conversely, if in connection with a batch assembly application NIRS believes that

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[81] *Compare McGuire/Catawba*, CLI-02-14, 55 NRC 278, 289-90; *Private Fuel Storage*, LBP-98-7, 47 NRC at 179.

the lead assemblies are not representative of the batch assemblies proposed to be authorized *at that time,* NIRS would have a potential issue related to *that* approval (subject to the requirements of 10 C.F.R. § 2.714(b)(2) for an admissible contention) rather than to the present approval. The contention, therefore, fails to establish a genuine dispute with respect to a material issue.

As discussed further below, the two more specific aspects of the contention fail to support an admissible contention.

1. Plutonium Oxide

In this aspect of the basis, NIRS focuses on whether there will be sufficient "information about the history" of the plutonium oxide used to manufacture the lead assemblies and "the types of treatments used in processing it" to "discern in the future whether it is representative of any prospective future fuel production." NIRS Contentions, at 3. In particular, NIRS raises the issue of whether gallium will be present in the plutonium oxide, because "all studies that make a favorable finding [regarding MOX fuel] assume that in fact, gallium has been reduced to a low number of parts per million." *Id.*, at 4. Again, directed to future batch use of MOX fuel, NIRS asserts that it "is important to document the level of gallium (or lack thereof), and other contaminants remaining in the plutonium oxide to be able to use the data from this test fuel when considering any future loading of MOX fuel in the Duke reactors." All of these assertions, however, fail to demonstrate a genuine dispute regarding the acceptability of using *four lead* assemblies — the issue in this proceeding.

First, as discussed above, the central concern in this proposed contention is on use of batch assemblies (that is, whether the data generated from the lead assembly program is representative and bounding of the batch fuel assemblies that may be used under a subsequent NRC license authorization). Therefore, the proposed contention is premature. The issue in the

present proceeding is the safety of the use of four MOX fuel lead assemblies, and this contention does not address that issue. Whether the data generated from the lead assembly program ultimately proves useful to Duke and DOE to support a batch use amendment application is not a present *NRC* licensing concern. Stated another way, there is no NRC requirement that use of lead assemblies of any type of fuel can only be authorized if the data generated will prove useful to the fuel vendor or the licensee in the future.

Second, regarding the more relevant issue of the safety of the MOX fuel lead assemblies, this aspect of the proposed contention vaguely suggests that there are technical studies showing that gallium must be reduced to "parts per million" to make a favorable finding. While the focus of the contention is clearly not on any present safety issue, this vague suggestion does not, in any event, demonstrate the existence of a genuine dispute. As shown in the LAR and the materials referenced therein, the gallium issue has been addressed for the MOX fuel lead assemblies by incorporation of a specification limiting gallium to *parts per billion* — orders of magnitude below the concern identified as a basis for the contention. As with other specifications, the fuel assembly manufacturer (DOE's contractor) will be required to manufacture the fuel under a quality assurance ("QA") program, to document that the fuel assemblies meet specifications, and to maintain QA records. Therefore, there is no genuine dispute for litigation in this proceeding.

To illustrate the point, the description of the MOX fuel lead assembly design is in Section 3.5 of the LAR, which includes a discussion of the design evaluation for the Mark-BW/MOX1 fuel assembly design (at 3-16 - 3-17). This discussion refers to the Framatome *MOX*

Fuel Design Report (LAR Reference 1).[82] That report includes the relevant design specifications. It also includes a discussion of "impurities" (Section 3.2) and a discussion of the gallium content in the fuel and components (Section 3.2.2). The report states:

> To eliminate the potential harmful effects of gallium, the DCS fabrication process will utilize an aqueous polishing step to remove gallium from the WG plutonium prior to conversion to the oxide form. The polishing step to be implemented at the MOX Fuel Fabrication Facility (MFFF) utilizes a solvent-extraction process to purify the feed material for conversion to PuO_2 powder. Other processes, such as ion exchange, may be used for lead assembly fabrication, but the same specifications will apply.
>
> Based on COGEMA experience and predictions, the use of a polishing process will allow production of MOX fuel pellets with gallium levels in the parts-per-billion (ppb) range. Gallium at these extremely low concentrations will not have a detrimental effect on processing equipment or cladding performance for the reasons discussed below.

MOX Fuel Design Report, at 3-4 - 3-5. The contention does not challenge the conclusions in the publicly-available application materials and does not explain how a fuel specification on gallium would be insufficient. Therefore, the contention does not demonstrate the existence of a genuine, admissible dispute.[83]

2. Certification of Test Fuel

NIRS, in its "benchmarking" contention, next questions whether there will be "quality certification" of the test fuel pellets, rods, and assemblies. NIRS Contentions, at 5. This seems, again, a question rather than a contention with basis. Petitioner cites and quotes a report regarding "technical concerns" about the Cadarache facility — but that discussion focuses on safe operation of the Cadarache *facility* in light of seismic concerns, not the quality of fuel pellets

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82 BAW-10238, *MOX Fuel Design Report*, Revision 0, March 2002. This non-proprietary document is available on the NRC's ADAMS at #ML021260551. The non-proprietary Revision 1 (May 2003) is available on ADAMS at #ML031550349.

83 *See Seabrook*, LBP-82-106, 16 NRC at 1656; *Millstone*, CLI-03-14, slip op. at 12-13.

or fuel rods created at the facility. The contention basis also questions where the assemblies will be manufactured and generally discusses quality concerns related to MOX fuel manufactured by a completely different vendor, British Nuclear Fuels ("BNFL"), for a Japanese customer. Finally, the basis includes an "NRC Staff White Paper"[84] cited for the proposition that "inhomogeneities (plutonium clusters) in MOX fuel may affect fuel behavior during reactivity accidents, especially at high burnups." NIRS Contentions, at 6. For reasons similar to those discussed above, none of this provides a sufficient basis to demonstrate the existence of a genuine dispute regarding the quality of the lead assembly fuel pellets, rods, or assemblies to be used at Catawba.

First, as mentioned above, the lead assemblies will be manufactured by Framatome under a QA program. As stated in the LAR, that program must meet 10 C.F.R. Part 50, Appendix B. *See* LAR, Attachment 3, Section 3.5.4. Further details on the QA program have been provided in the publicly available Duke responses to NRC Staff Requests for Additional Information ("RAIs"), filed on October 1, 2003.[85] The answer to NIRS's first question — *i.e.*, whether there will be "quality certification" — is quite clearly a "yes," as explained in the LAR. In this regard, the basis statement does not engage the LAR or the supplemental RAI responses, nor does it demonstrate in any specific manner how the Framatome

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84 *See* Memorandum, W.D. Travers to Commission, "Mixed Oxide Fuel Use in Commercial Light Water Reactors" (April 14, 1999) and attached "White Paper."

85 *See* October 1, 2003 letter to NRC from M. Tuckman, "Response to Request for Additional Information Regarding the Use of Mixed Oxide Fuel Lead Assemblies" (ADAMS #ML032880370). Duke's RAI responses state that Framatome ANP is a qualified supplier of nuclear fuel to Duke and that the lead assemblies will be fabricated in accordance with the current Framatome *Fuel Sector Quality Management Manual*, which is included with the RAI response submittal.

QA program will be inadequate to assure the quality of the fuel pellets and fuel rods. Therefore, it does not present an admissible issue. *Millstone*, CLI-01-24, 54 NRC at 361.[86]

Second, the vague references to seismic concerns at the Cadarache facility quite obviously do not implicate the *quality* of the lead assemblies or safety at *Catawba*. In fact, NIRS specifically states that it is not challenging the MIMAS process to be used to make fuel pellets. NIRS Contentions, at 5. The answer to NIRS's additional question regarding the assembly of the lead assemblies is suggested in the contention itself (*id.*): final assembly will be at the MELOX facility (as also stated in DOE's Part 110 export license application) and will be subject to the same Framatome QA program as other aspects of the manufacturing process. As discussed above, there is no specific challenge in the contention to the adequacy of the QA program.

Likewise, the reference in the contention to events at BNFL related to the manufacture of MOX fuel assemblies for Japan (involving deliberate misconduct in the performance of redundant quality checks[87]) has no relevance to the capabilities and integrity of Framatome with respect to implementation of its QA program. The NRC cannot accept a

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86 "Setting forth with specificity the contention's basis is crucial to the admission of any contention, but particularly one involving potentially broad quality assurance and quality control issues." *Commonwealth Edison Co.* (Braidwood Nuclear Power Station, Units 1 and 2), LBP-85-11, 21 NRC 609, 634 (1985), *rev'd on other grounds*, CLI-86-8, 23 NRC 241 (1986). In *Braidwood*, the licensing board noted that the proposed QA contention should have included "a precise specification of each occurrence of an alleged QA/QC deficiency," the data on which each alleged deficiency was based, all existing unacceptable patterns of behavior and how each proposed deficiency supported that unacceptable pattern.

87 The issue of falsification of data by BNFL when fabricating MOX fuel is discussed extensively in the following report: "An Investigation into the Falsification of Pellet Diameter Data in the MOX Demonstration Facility at the BNFL Sellafield Site and the Effect of this on the Safety of MOX Fuel in Use," *Nuclear Installations Inspectorate of the Health and Safety Executive* (HSE) (Feb. 18, 2000). The report is available on the website http://www.hse.gov.uk/nsd.

contention with such tenuous support. Under 10 C.F.R. § 2.714(b), "presiding officers may not admit open-ended or ill-defined contentions lacking in specificity or basis." *Millstone*, CLI-01-24, 54 NRC at 359. Rather, petitioners "must articulate at the outset the specific issues they wish to litigate as a prerequisite to gaining formal admission as parties." *Id.* Moreover, the NRC will not accept character or integrity issues without a specific, relevant basis. *Id.*, at 366-67 ("When 'character' or 'integrity' issues are raised, we expect them to be directly germane to the challenged licensing action.").

With respect to the NRC Staff White Paper, NIRS quotes only the text related to the potential for inhomogeneities in MOX fuel. However, this text does no more than identify an issue that must be addressed in the lead assembly design and fabrication. It does not suggest any particular problem in the Framatome design or the manufacturing/assembly processes at issue here. Indeed, NIRS's basis contains no reference at all to the LAR and related materials where such considerations are addressed. For example, as discussed above in connection with the gallium issue, Section 3.5 of the LAR technical justification discusses the MOX fuel design. LAR Reference 1, the *MOX Fuel Design Report*, includes a section on "Pellet Homogeneity and Microstructure" (Section 2.3). This section specifically explains how homogeneity is provided by the manufacturing process, how maximum size of plutonium agglomerates are determined and controlled by specification and the manufacturing process, and how the processes are controlled and verified through specific examinations and tests. The proposed contention fails to identify any genuine dispute with respect to any of these aspects of the manufacturing process.

The *MOX Fuel Design Report* referenced in the LAR also includes (in Section 7.0) a discussion of the substantial experience base in both the United States and Europe with MOX fuel and the MIMAS manufacturing process. This discussion summarizes the historic

reliability of MIMAS-produced MOX fuel as well as the reliable performance of the Mark-BW fuel design. In light of this publicly available material, the basis for this proposed contention is completely insufficient to establish the existence of a genuine dispute. 10 C.F.R. § 2.714(b)(2)(iii).

The contention further suggests that the MOX fuel program might benefit from "independent certification" of the MOX fuel assemblies. NIRS Contentions, at 6. However, NIRS provides neither a factual nor a regulatory basis for such relief. The NRC requires that the fuel assemblies be manufactured under a 10 C.F.R. Part 50, Appendix B, QA program. The LAR makes clear that this will be the case. Without a basis to challenge the QA program, there is no basis for further relief in this proceeding. 10 C.F.R. § 2.714(d)(2)(ii). Therefore, there is no admissible contention.

NIRS Contention 2

> Provisions must be made for the irradiated MOX fuel test assemblies. Specifically, given the higher thermal power of irradiated MOX fuel, slower decay than irradiated LEU fuel, greater quantity of fissile plutonium than LEU waste, uncertainties, complications from inhomogeneities and residues, and the durability of the cladding, a plan is needed for storage, transportation, and disposition of the high level waste.

Response

This contention does not include any documentary or expert basis at all. It includes only one broad reference — without any page citations — to a book on the disposition of excess weapons plutonium prepared by a committee of the National Academy of Sciences. Such broad references are inadequate to support a proposed contention. *See Fansteel*, CLI-03-

13, slip op. at 9-10.[88] Therefore, the contention is deficient on its face with respect to the Commission's basis and specificity requirements in 10 C.F.R. § 2.714(b)(2).

With respect to the challenge inherent in the contention to storage of the irradiated MOX fuel assemblies in the spent fuel pool after discharge from the core, there are no facts alleged — only questions and NIRS's own "uncertainties." The amendment application, in the technical justification, includes a criticality evaluation of MOX fuel storage in the Catawba spent fuel pool. *See* LAR, Attachment 3, Appendix 3-1. This contention does not challenge that analysis and it provides no basis to support a proposition that further evaluations of storage in the spent fuel pool should be considered. Specifically, it offers no basis to support the proposition that any of the characteristics or uncertainties itemized (*e.g.*, "greater thermal power," slower decay, potential inhomogeneities, durability of the cladding) would impact other spent fuel pool performance considerations (such as spent fuel pool cooling). To be admissible, all contentions must have a basis to support the petitioner's assertion that an issue should be addressed (*see* Section 2.714(b)(2)(i)); a contention of omission is no different. The present amendment would authorize four MOX fuel assemblies. The contention does not establish how these four assemblies would pose a significant challenge to the Catawba spent fuel pool.[89]

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88 *See Duke Cogema Stone & Webster*, LBP-01-35, 54 NRC 403, 422 (NRC contention rule prohibits "'vague, unparticularized contentions' resulting from 'notice pleading' with details to be filled in later." *See also Millstone*, CLI-01-24, 54 NRC at 362 ("Full adjudicatory hearings should be 'triggered only by those able to proffer at least some minimal factual and legal foundation in support of their conclusions.'" *Id.* at 362.

89 As a general matter, and as discussed in the LAR, the MOX fuel design, cladding, and performance are very similar to LEU fuel currently in use. Concerns regarding inhomogeneities and residues are addressed by fuel specification, as discussed above. As for fuel pool cooling, the normal pool cooling systems will continue to apply. As for fuel cladding, cladding performance in fuel pool storage is not affected by pellet material.

The contention also asserts the "need to provide for lower density packaging for transport in the event a [high level waste] repository becomes available." NIRS Contentions, at 7. However, as with the other questions, uncertainties, and concerns identified in the contention, no further specificity or basis is provided with respect to this statement. Therefore, the contention lacks a basis sufficient to demonstrate a genuine dispute. More importantly, this aspect of the contention concerns an area outside the scope of the present amendment application. Duke is not seeking in the Part 50 LAR any approval to transport the irradiated MOX fuel assemblies from Catawba to a waste repository. That transportation is a DOE responsibility to be addressed in an appropriate forum at an appropriate time, such as the DOE environmental impact statement for the proposed high level waste repository at Yucca Mountain.[90]

NIRS Contention 3

This contention is discussed above in connection with BREDL Contention 8.

NIRS Contention 4

> Only the "No Action" alternative is consistent with the overall goal for plutonium. While the NRC may not be in the position to reverse decisions made by other federal agencies, the NRC should end the fatally flawed and dangerous plutonium disposition program by selecting the "No Action" alternative and by denying the amendment application.

Response

One could argue that NIRS Contention 4 addresses the adequacy of the discussion in the ER of the "No Action" alternative. (This is in slight contrast to BREDL Contention 5, which challenges the adequacy of the ER discussion of alternatives.) However, in reality, NIRS

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[90] The relevant DOE document is referenced in the LAR, Attachment 5, Section 5.3.6.

Contention 4 is largely an argument with the U.S. public policy for disposal of surplus plutonium from nuclear weapons by converting the material into MOX fuel and using that fuel in nuclear reactors. NIRS contends that: "It is not credible to support the weapons MOX program as a means of non-proliferation." NIRS Contentions, at 10. NIRS further argues that the NRC should undo the government policy choice and select the "No Action" alternative in its environmental evaluation of the MOX fuel LAR. *Id.*[91] For the reasons discussed below, NIRS Proposed Contention 4 must be rejected.

First, the proposed contention is inadmissible because it merely sets forth NIRS's opposing view of the MOX fuel program, rather than alleging any specific perceived deficiencies in Duke's LAR. *See Pub. Serv. Co. of N.H.* (Seabrook Station, Units 1 and 2), LBP-82-76, 16 NRC 1029, 1035 (1982), referencing *Philadelphia Elec. Co.* (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-216, 8 AEC 13, 20-21 (1974) (A contention must be dismissed where "it is nothing more than a generalization regarding the Intervenor's views of what applicable policies ought to be; it seeks to raise an issue which is not proper for adjudication in the proceeding, or does not apply to the facility in question; or it seeks to raise an issue which is not concrete or litigable.")[92] As NIRS itself recognizes in the contention, the NRC is not in a position to reverse the decision of another agency on plutonium disposition. NIRS Contention 4, therefore, does not seek any specific relief that could be granted in this proceeding, and must therefore be dismissed under 10 C.F.R. § 2.714(d)(2)(ii).

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91 *See also* NIRS Proposed Contention 1, which asserts that "the No Action Alternative is the only credible action for NRC to take . . . ." NIRS Contentions, at 2.

92 *See also Duke Cogema Stone & Webster*, LBP-01-35, 54 NRC at 456 ("Any issues relating to the federal government's nonproliferation policy clearly go to matters beyond the scope of the DCS [Construction Authorization Request, Environmental Report, or Quality Assurance Plan]").

NIRS veils its policy argument only slightly by adopting NEPA rubric and asserting that the NRC must select the "No Action" alternative. However, this is still relief that is simply not available under NEPA or under the NRC's regulations implementing NEPA. As NIRS acknowledges, Duke has addressed the "No Action" alternative in its ER submitted as part of the MOX LAR.[93] By doing so, Duke has satisfied its obligation on this issue. NIRS asserts that the NRC Staff should *choose* the "No Action" alternative in connection with the agency's future environmental review of the LAR, effectively denying the amendment application. Indeed, NIRS intimates that it is the NRC's duty to do so, asserting that the Commission has "the authority and the responsibility under the Atomic Energy Act to engage US nuclear policy matters and should work to end this fatally flawed and dangerous program." NIRS Contentions, at 9-10. NEPA, however, does not provide for such relief.

CEQ regulations articulate the goals of NEPA as ensuring that "environmental information is available to public officials and citizens before decisions are made and before actions are taken," and that "the policies and goals defined in the Act are infused into the ongoing programs and actions of the Federal Government."[94] As the U.S. Supreme Court has

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93 *See* LAR, Attachment 5, Section 5.2.1 (No-Action Alternative), which states:

> The no-action alternative is to deny the license amendment. The consequence of the no-action alternative is that without the use of lead assemblies to confirm MOX fuel performance characteristics neither Catawba Nuclear Station nor McGuire Nuclear Station would use any MOX fuel at the reactors, and would therefore not provide irradiation services to the Department of Energy (DOE) for the surplus plutonium disposition program. McGuire and Catawba would continue to operate with LEU fuel. For DOE to continue the plutonium disposition program, it would need to either find other reactors to use MOX fuel or use other methods to dispose of the surplus plutonium.

94 40 C.F.R. §1500.1(b); 1502.1. (2003).

repeatedly emphasized, the duties that NEPA imposes upon federal agencies, including the NRC, are "essentially procedural" in nature.[95] NEPA does not mandate the agency's substantive decision on a proposed action. If the adverse environmental effects of a proposed action are adequately identified and evaluated by the NEPA process, NEPA does not prescribe that the agency reach a particular result in its environmental analysis of the impacts of a proposed action.[96]

Assuming that an environmental assessment is even necessary in the present case, NEPA mandates only that the assessment address certain issues, including alternatives — as discussed above in connection with BREDL Contention 5. NRC's regulations in 10 C.F.R. § 51.30(a)(1) require that an environmental assessment identify the proposed action and include a brief discussion of: (i) the need for the proposed action; (ii) alternatives "as required by section 102(2)(E) of NEPA;" (iii) the environmental impacts of the proposed action and alternatives as appropriate."[97] NRC regulatory guidance further indicates that the "No Action" alternative will be addressed in environmental assessments.[98] The agency's discussion of the "No Action"

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95 *Vermont Yankee Nuclear Power Corp.*, 435 U.S. at 558; *Kelley v. Selin*, 42 F.3d 1501, 1512 (6th Cir. 1995).

96 *See Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989); *Northeast Nuclear Energy Co.* (Millstone Nuclear Power Station, Unit 3), CLI-01-3, 53 NRC 22, 44 (2001); *La. Energy Servs. L.P.* (Claiborne Enrichment Center), LBP-96-25, 44 NRC 331, 341-42 (1996). As one NRC licensing board has recognized, "NEPA is designed to lead the mule to water, but NEPA cannot make it drink." *La. Energy Servs.*, LBP-96-25, 44 NRC at 341 (additional citations omitted).

97 With respect to Environmental Assessments, CEQ regulations in 40 CFR § 1508.9(b) require a "brief discussion" of "alternatives as required by section 102(2)(E)." This reference to NEPA Section 102(2)(E) is consistent with the conclusion that an EA should address the no-action alternative.

98 *See* NRR Office Instruction LIC-203, "Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues," Appendix B, at 2 ("LIC-203").

alternative, however, may be brief.[99] The NRC may reject the "No Action" alternative if a proposed action complies in all respects with its safety requirements under the Atomic Energy Act.

At bottom, the LAR includes a brief discussion of the "No Action" alternative that is entirely consistent with NEPA and NRC regulations. There is no regulatory or factual basis in the contention that would demonstrate that further analysis or discussion of that alternative is required. Certainly, there is no basis for a contention that a discussion of the "No Action" alternative in connection with the very narrow LAR now before the NRC must reopen the policy decision of DOE and the United States government on the plutonium disposition program. Accordingly, this contention is inadmissible. *See* 10 C.F.R. § 2.714(d)(2)(ii).

NIRS Contention 5

> An environmental impact statement is needed to inform the NRC's decision on the lead assembly application. The overall decision to use weapons grade plutonium fuel from nuclear weapons sources is a major federal action for which an environmental impact statement is required by 10 C.F.R. § 51.20(a)(1). The NRC's decision on the LAR cannot be separated from the intention to use "batch" quantities of MOX fuel.

Response

In this contention NIRS raises a pot pouri of issues, many of which have been addressed above. Most fundamentally, this contention again challenges the broad policy choice of DOE and the federal government to pursue the MOX fuel option for plutonium disposition. That policy issue is clearly beyond the scope of the LAR presently before the Licensing Board. No corresponding relief can be granted in this proceeding. *See* 10 C.F.R. § 2.714(d)(2)(ii).

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[99] LIC-203, Appendix B, at 2. *See also Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-4, 53 NRC 31, 54 (2001) ("Generally, one of the alternatives proposed in an FEIS is the agency alternative of taking 'no action.' For the

Moreover, to the extent that this contention argues that the environmental review of the lead assembly application must include an environmental review of a possible, future "batch" use application, the contention lacks basis for the reasons explained in response to BREDL Contention 4. That discussion need not be repeated here.

This proposed contention also dismisses DOE's programmatic EIS completed in 1996 and the DOE environmental review documented in the SPDEIS in 1999. NIRS, in effect, again engages in a collateral attack on the DOE SPDEIS and environmental review — hoping, perhaps, for the NRC to provide another forum on the same issues. NIRS Contentions, at 12-14. However, the NRC is not the judge of the sufficiency of DOE's review and process. To the extent NIRS would challenge DOE with respect to DOE's NEPA obligations, NIRS should select (or should have already selected) a more appropriate legal forum.

NIRS also asserts that there are particular substantive flaws in Duke's Environmental Report, NIRS Contentions, at 15. However, these arguments are not well-developed with either the specificity or clearly stated basis that would be sufficient for an admissible contention. NIRS does not engage the analysis actually included in the LAR of issues such as occupational exposures (*see* LAR, Attachment 5, Section 5.6) or provide any analysis showing increased exposures. With respect to low level waste disposal and reactor decommissioning, no approval is currently before the NRC on these matters and no showing is made as to any impact four lead assemblies would have with respect to these issues. Therefore, these issues are inadmissible under 10 C.F.R. § 2.174(b)(2)(iii) because NIRS fails to demonstrate the existence of a genuine dispute on a material issue.

'no action' alternative, there need not be much discussion. *See Headwaters, Inc.* v.

Finally, NIRS alludes to differences between WG MOX fuel and RG MOX fuel (NIRS Contentions, at 16) and generally to the work of Dr. Lyman (*id*, at 17). Again, these broad arguments lack the focus that is necessary under 10 C.F.R. § 2.714(b)(2). In general, contrary to the contention, there are decades of experience using significant quantities of MOX fuel worldwide. NIRS points to no data or analysis that would substantiate that a limited MOX fuel demonstration program at Catawba would pose a significant threat to public health and safety or to the environment. Accordingly, there is no admissible issue in this contention.

VI. CONCLUSION

For the reasons stated above, Petitioners' proposed contentions should not be admitted. The requests for hearing and petitions to intervene should be denied.

Respectfully submitted,

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ATTORNEYS FOR DUKE ENERGY CORPORATION

Dated in Washington, District of Columbia
This 11th day of November 2003

Bureau of Land Management, 914 F.2d 1174, 1181 (9th Cir. 1990).")

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
	)	
DUKE ENERGY CORPORATION	)	Docket Nos. 50-413 OLA
	)	50-414 OLA
	)	
	)	
Catawba Nuclear Station,	)	
Units 1 and 2)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the "ANSWER OF DUKE ENERGY CORPORATION TO THE 'BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE'S SUPPLEMENTAL PETITION TO INTERVENE' AND THE "'CONTENTIONS OF NUCLEAR INFORMATION AND RESOURCE SERVICE'" in the captioned proceeding have been served on the following by deposit in the United States mail, first class, this 11th day of November, 2003 (for pick up on November 12, 2003). Additional e-mail service, designated by **, has been made on November 11, 2003, as shown below.

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ADDENDUM A

DOE/EIS-0229-SA3

National Nuclear Security Administration

SUPPLEMENT ANALYSIS

FABRICATION OF MIXED OXIDE FUEL LEAD ASSEMBLIES IN EUROPE

November 2003

U.S. Department of Energy
National Nuclear Security Administration
Office of Fissile Materials Disposition
Washington, D.C.

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SUPPLEMENT ANALYSIS
FABRICATION OF MIXED OXIDE FUEL LEAD ASSEMBLIES IN EUROPE

1.0 INTRODUCTION

The Department of Energy/National Nuclear Security Administration (DOE/NNSA) is proposing to fabricate, on a one-time basis, mixed oxide (MOX) fuel lead assemblies[1] in existing facilities in Europe (referred to as Eurofab) rather than at Los Alamos National Laboratory (LANL) as previously decided (65 *Federal Register* [FR] 1608, January 11, 2000). In May 2000, DOE determined that cost and schedule impacts and programmatic considerations precluded lead assembly fabrication at LANL and discontinued related activities (DOE 2000a). As a result, an initial assessment of alternatives for lead assembly fabrication was conducted by Duke COGEMA Stone & Webster (DCS), the team that was awarded the contract for mixed oxide (MOX) fuel fabrication and irradiation services. This assessment concluded that fabrication of lead assemblies in Europe is feasible.

DOE/NNSA is considering the potential environmental impacts of this proposed change in lead assembly fabrication location before deciding to proceed.[2] Council on Environmental Quality regulations at Title 40, Section 1502.9(c) of the Code of Federal Regulations (40 CFR 1502.9[c]) require Federal agencies to prepare a supplement to an environmental impact statement (EIS) when an agency makes substantial changes in the proposed action that are relevant to environmental concerns or there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. DOE regulations at 10 CFR 1021.314(c) direct that when it is unclear whether a supplement to an EIS is required, a Supplement Analysis (SA) be prepared to assist in making that determination.

This SA evaluates the potential environmental impacts of fabricating lead assemblies in Europe with plutonium oxide from LANL in accordance with these requirements to determine if either of DOE's previous EISs evaluating surplus plutonium disposition, the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* (*Storage and Disposition PEIS*) (DOE/EIS-0229, December 1996) (DOE 1996a), or the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS), (DOE/EIS 0283, November 1999) (DOE 1999b), should be supplemented; a new EIS should be prepared; or that no further National Environmental Policy Act (NEPA) documentation is necessary. This SA includes an analysis of activities that could affect the global commons outside the jurisdiction of any nation, e.g., the oceans or Antarctica. As discussed in Section 5.4 of this SA, DOE/NNSA has concluded that the environmental impacts associated with fabricating lead assemblies in Europe are not significantly different than those for lead assembly fabrication alternatives evaluated in DOE EISs, including an alternative to fabricate some fuel assemblies in Europe. Therefore, no further NEPA documentation is necessary.

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[1] Lead assemblies are small quantities of nuclear fuel used by commercial nuclear power plant operators to confirm that a new fuel design will perform safely and predictably.

[2] If DOE/NNSA decides not to proceed with Eurofab, the first MOX fuel assemblies produced by the MOX Fuel Fabrication Facility at the Savannah River Site would be used as lead assemblies.

2.0 PURPOSE

To implement the MOX fuel disposition alternatives considered in the *Storage and Disposition PEIS* and the SPD EIS, fuel lead assemblies need to be fabricated, irradiated, and inspected to support Nuclear Regulatory Commission (NRC) licensing activities and fuel qualification efforts. The lead assembly program would collect data from irradiation of lead assemblies fabricated with surplus weapons-grade plutonium[3] under actual operating conditions to confirm that the fuel can be used safely in the domestic, commercial nuclear reactors that would be used for the MOX fuel program.

3.0 BACKGROUND

Storage and Disposition PEIS. The *Storage and Disposition PEIS* evaluated environmental impacts of fabricating lead assemblies (and some initial MOX assemblies) in Europe in the event that it would be necessary to begin production more quickly than could be accomplished in the U.S. This PEIS evaluated overland transport of plutonium oxide using DOE's safe, secure trailer (SST) system from a storage facility at an existing DOE site to a U.S. port (hypothetically located at Sunny Point, NC); material handling at the U.S. port; ocean transport to the European ports of Barrow, United Kingdom, and Cherbourg, France; ocean transport of MOX fuel back to the U.S.; and SST transport of MOX fuel from the U.S. port to either an existing commercial reactor site or a storage site in the U.S. (DOE 1996a:4-827). The shipping schedule projected two shipments of plutonium oxide and a maximum of four shipments of fresh MOX fuel assemblies per year (DOE 1996a:G-3). The *Storage and Disposition PEIS* also discussed the potential effect of ocean transport on the global commons, citing other studies including an environmental assessment of the import of Russian plutonium-238 and the *Final Environmental Impact Statement on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Fuel* (FRR EIS) (DOE/EIS-0218) (DOE 1996b).

Section 4.4 of the *Storage and Disposition PEIS* presents the potential impacts of transportation related to MOX fuel fabrication, including lead assembly fabrication. The analysis indicates that total transportation fatalities resulting from both radiological and nonradiological risk to the public and workers for both routine and accident conditions associated with European MOX fuel fabrication of the entire 50-metric-ton surplus plutonium inventory would range from 1.69 to 4.62 fatalities, depending on the hypothetical distance to be traveled (i.e., 1,000 km to 4,000 km) (DOE 1996a:4-827–4-829).

Port handling impacts associated with fabricating MOX fuel in Europe are addressed in Appendix G of the *Storage and Disposition PEIS.* The analysis determined that annual accident risks from exporting two shipments of plutonium oxide and importing four shipments of MOX fuel would not result in any latent cancer fatalities (LCFs) among workers or the general public. Additionally, the *Storage and Disposition PEIS* indicates that the probability that these shipments would be involved in a maritime accident of sufficient severity to cause release of radioactive materials resulting in catastrophic consequences would be extremely small (on the order of 1.0×10^{-7}/yr to 1.0×10^{-8}/yr) (DOE 1996a:G-5, G-6).

[3] This material is part of the U.S. program to disposition plutonium surplus to defense needs by fabricating it into MOX fuel for use in civilian nuclear power reactors in accordance with the September 2000 *Agreement Between the Government of the United States and the Government of the Russian Federation Concerning the Management and Disposition of Plutonium Designated as No Longer Required for Defense Purposes and Related Cooperation* (U.S.–Russia Agreement).

SPD EIS. Domestic fabrication of lead assemblies was evaluated in detail as part of the MOX fuel fabrication alternatives in the SPD EIS. Specific facilities at five DOE sites were considered for this effort, based on site capabilities existing at that time: the Hanford Site (Hanford) in Washington, Idaho National Engineering and Environmental Laboratory (INEEL) Argonne National Laboratory West (ANL–W) facilities in Idaho, the Savannah River Site (SRS) in South Carolina, LANL in New Mexico, and Lawrence Livermore National Laboratory (LLNL) in California.

The SPD EIS evaluated the environmental impacts, including those from transportation, of fabricating up to 10 lead assemblies using plutonium oxide from LANL. This evaluation includes archive and scrap material storage at the lead assembly fabrication site, irradiation of the lead assemblies at existing commercial reactors (Catawba Nuclear Station [Catawba] in South Carolina, or McGuire Nuclear Station [McGuire] in North Carolina) and post-irradiation examination at the Oak Ridge National Laboratory (ORNL) or ANL-W. The SPD EIS transportation analysis includes shipping:

- 320 kg of plutonium dioxide from LANL in SST/SafeGuards Transport (SSTs/SGTs)[4] to the lead assembly fabrication site (SRS, ANL-W, Hanford, and LLNL)

- MOX fuel assemblies to the reactor site (Catawba or McGuire) for irradiation and unirradiated archive and scrap material fuel rods from each of the proposed lead assembly fabrication facility sites to each of the proposed MOX facility sites (Hanford, INEEL, the Pantex Plant, and SRS)

- Irradiated fuel assemblies or fuel rods from the reactor to either ORNL or ANL-W for post-irradiation examination

- Uranium dioxide and additional materials needed to complete the fuel assemblies (i.e., new, empty fuel rods, end caps and other metallic components)

Section 2.18 of the SPD EIS presents a summary of potential impacts from lead assembly fabrication. The analyses, detailed in Section 4.27 of the SPD EIS, indicate that potential environmental impacts from modification and routine operation of lead assembly fabrication facilities would be relatively small; no LCFs would be expected in the general population from the postulated bounding design basis accident; nor would there be any traffic fatalities or LCFs expected from the associated transportation.

4.0 PROPOSED ACTION

DOE/NNSA proposes, on a one-time basis, to use U.S. surplus plutonium from LANL to fabricate up to four lead assemblies in existing facilities in France. Lead assemblies would be

[4] The SST/SGT is a specially designed component of an 18-wheel tractor-trailer vehicle. Although the details of the vehicle enhancements are classified, key characteristics are not, and include: enhanced structural supports and a highly reliable tie-down system to protect cargo from impact; heightened thermal resistance to protect the cargo in case of a fire; deterrents to protect unauthorized removal of cargo; couriers who are armed Federal officers that receive rigorous training and are closely monitored through DOE's Personnel Assurance Program; an armored tractor to protect the crew from attack, equipped with advanced communications equipment; specially designed escort vehicles containing advanced communications and additional couriers; 24-hour-a-day real-time monitoring of the location and status of the vehicle; and stringent maintenance standards.

returned to the U.S. and transported to Catawba for irradiation. After irradiation, selected rods from the lead assemblies would be transported to ORNL for post-irradiation examination. Irradiation and post-irradiation examination would occur as described and analyzed in the SPD EIS and decided in the January 2000 ROD. (See Sections 2.17, 2.18.2, and 4.27 of the SPD EIS.) Archive and scrap material would be returned to the United States along with the lead assemblies, then transported to LANL for storage. As described in Section 5.1 of this SA, DOE plans to transport materials between the U.S. and Europe by sea in special dedicated ships designed for transport of fresh and spent MOX fuel.

Air transport is not considered for these shipments, primarily because there is no certified air transportation package for plutonium, and certifying a package for this isolated effort is not warranted since both an available mode of transportation and certified packages exist. Packages for air transport of plutonium must meet the special requirements delineated in 10 CFR 71.64. This section specifies that in addition to satisfying the requirements of 10 CFR 71.41 through 71.63 (which includes requirements for certification of Type B packages at 10 CFR 71.51), the package must be designed, constructed and prepared for shipment so that the acceptance criteria of this section are met when the package is subjected to the series of tests specified in 10 CFR 71.74. These tests and acceptance criteria, more rigorous than for Type B packages, are designed to ensure package integrity in the event of an air transport accident. Since there would be only one shipment to Europe and one return shipment, it is not reasonable to expend the time or the money to certify packages. In addition, the schedule for insertion of the lead assemblies does not allow for the time required to complete package certification. Furthermore, previous NEPA evaluations have demonstrated that ocean transport is safe, and would involve minimal environmental impacts. Analyses performed for this SA and discussed in Section 5 confirm those findings.

The following activities are evaluated in this SA:

- Overland truck transport (one shipment, consisting of 3 SST/SGTs) of approximately 150 kg of plutonium oxide from LANL to one of three Atlantic ocean ports—Charleston Naval Weapons Station (NWS) (South Carolina), Naval Station (NS) Norfolk (Virginia), or Yorktown NWS (Virginia)

- Transfer of plutonium oxide from SST/SGTs to Pacific Nuclear Transport Limited (PNTL) ships at the port

- Impact on the global commons of ocean transport of plutonium oxide and lead assemblies between the U.S. port and Cherbourg, France (one shipment each direction, consisting of a two-ship convoy)

- Transfer of lead assemblies from the PNTL ships to SST/SGTs at the port

- Transport of lead assemblies from one of the three ports to either Catawba or McGuire[5] (one shipment consisting of 4 SST/SGTs)

- Transport of archive and scrap material from one of the three ports to LANL for storage (one shipment consisting of 2 SST/SGTs)

- Transport of archive and scrap material from LANL to SRS (one shipment consisting of 2 SST/SGTs)

Scrap material discussed in this SA consists of pellets that have been formed from broken or otherwise out-of-specification MOX fuel pellets, and the remains from the pellet-grinding process. Scrap material is routinely returned to the MOX fuel fabrication process for reuse in pellet formation. All stored archive (MOX pellets meeting fuel specifications) and scrap materials would be in the form of MOX pellets. These archive and scrap pellets would be loaded into extra fuel rods (separate rods for archive and scrap materials) and welded closed in the same way that the MOX fuel rods used in the lead assemblies would be, then loaded into FS65 shipping packages for transport to the United States. It is anticipated that the archive and scrap materials would be stored in their Type B shipping packages at LANL. Once the MOX facility becomes operational, these archive and scrap materials would be used as feed material during pellet production for MOX fuel that would be irradiated in existing U.S. commercial nuclear reactors.

Figure 1 is a flowchart of the activities required to complete this effort. The shaded areas of the figure are outside the scope of this SA. Transportation of materials such as new, empty fuel rods, depleted uranium and process chemicals that will be supplied in Europe are not evaluated in this SA. **Figure 2** shows the locations of facilities involved in the proposed activities.

This SA focuses on the potential impacts of the transportation aspects (including cargo-handling activities at the potential U.S. ports and effects on the global commons) of the proposed action. This is because the domestic activities proposed, other than those associated with transportation, remain essentially unchanged compared to the manner in which they were analyzed in other NEPA documents, in particular the *Storage and Disposition PEIS* and the SPD EIS.[6] Canister and SST/SGT loading operations at LANL would be similar to those anticipated in the SPD EIS. However, only about half as much plutonium oxide would be involved as in the SPD EIS analysis. Therefore, there would not be as much waste generated, or dose received by those involved in the activities. There would be no modification to facilities or discharges to the environment associated with these proposed activities.

Ocean transit would occur as an armed convoy in PNTL vessels. PNTL vessels are special purpose vessels jointly owned by British Nuclear Fuel Limited (BNFL), COGEMA, and Japanese utilities and have transported fresh MOX fuel, spent fuel, and vitrified residues between

[5] In February 2003, Duke Power Company submitted license amendment requests to the NRC for both Catawba and McGuire because the final decision about which plant would receive the lead assemblies would be based on the plants' refueling schedules. Subsequently, as the timing of the availability of the lead assemblies has become more refined, it appears that Catawba would be in position to receive the lead assemblies, and the license amendment request for McGuire was withdrawn.

[6] Transportation of the same materials was evaluated in detail in these documents, but the exact routes were not. Also, this SA updates these previous analyses with new population data from the 2000 census and uses a more recent revision to the computer code used for transportation impact analysis.

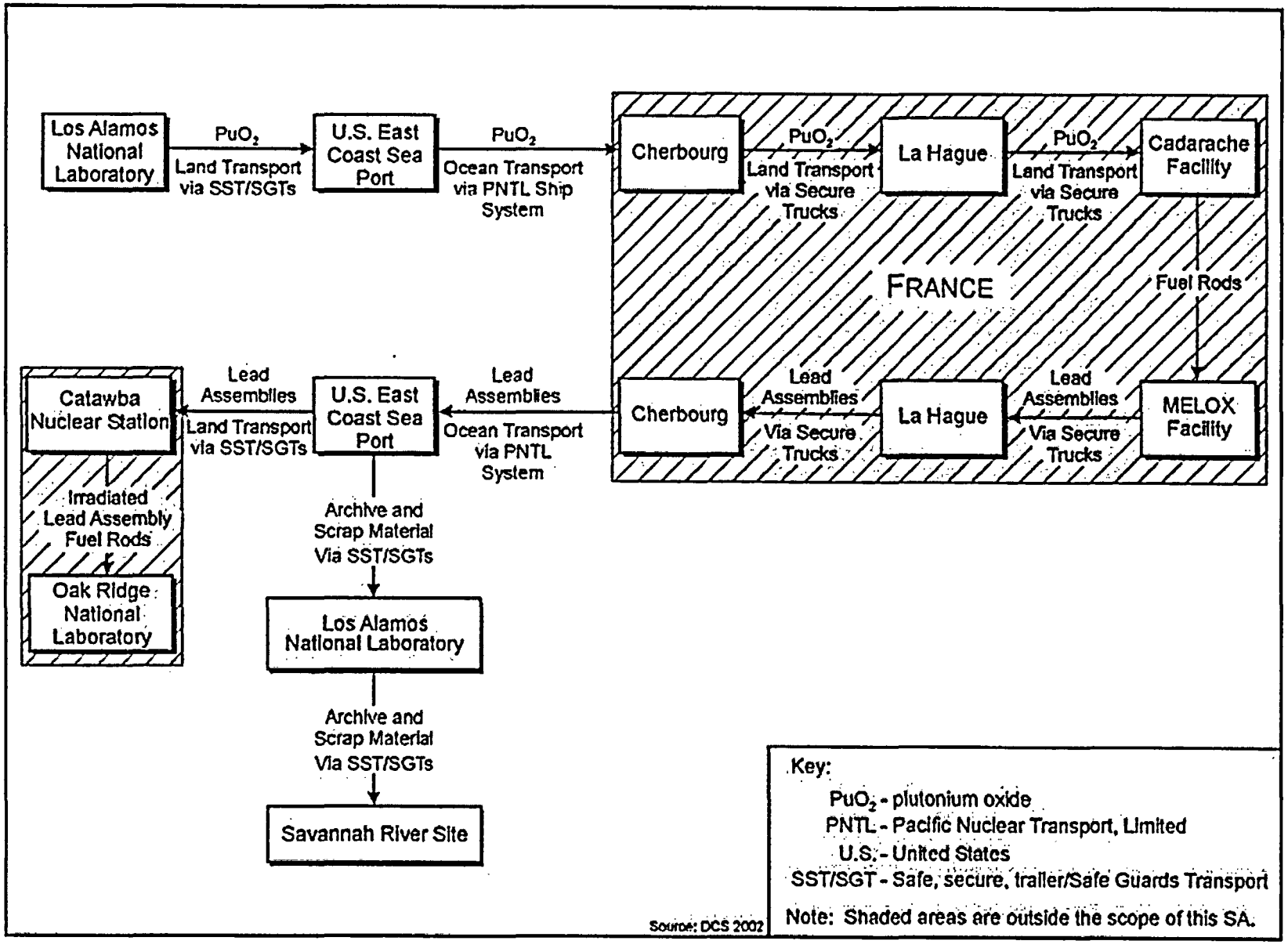

Figure 1. Eurofab Activities

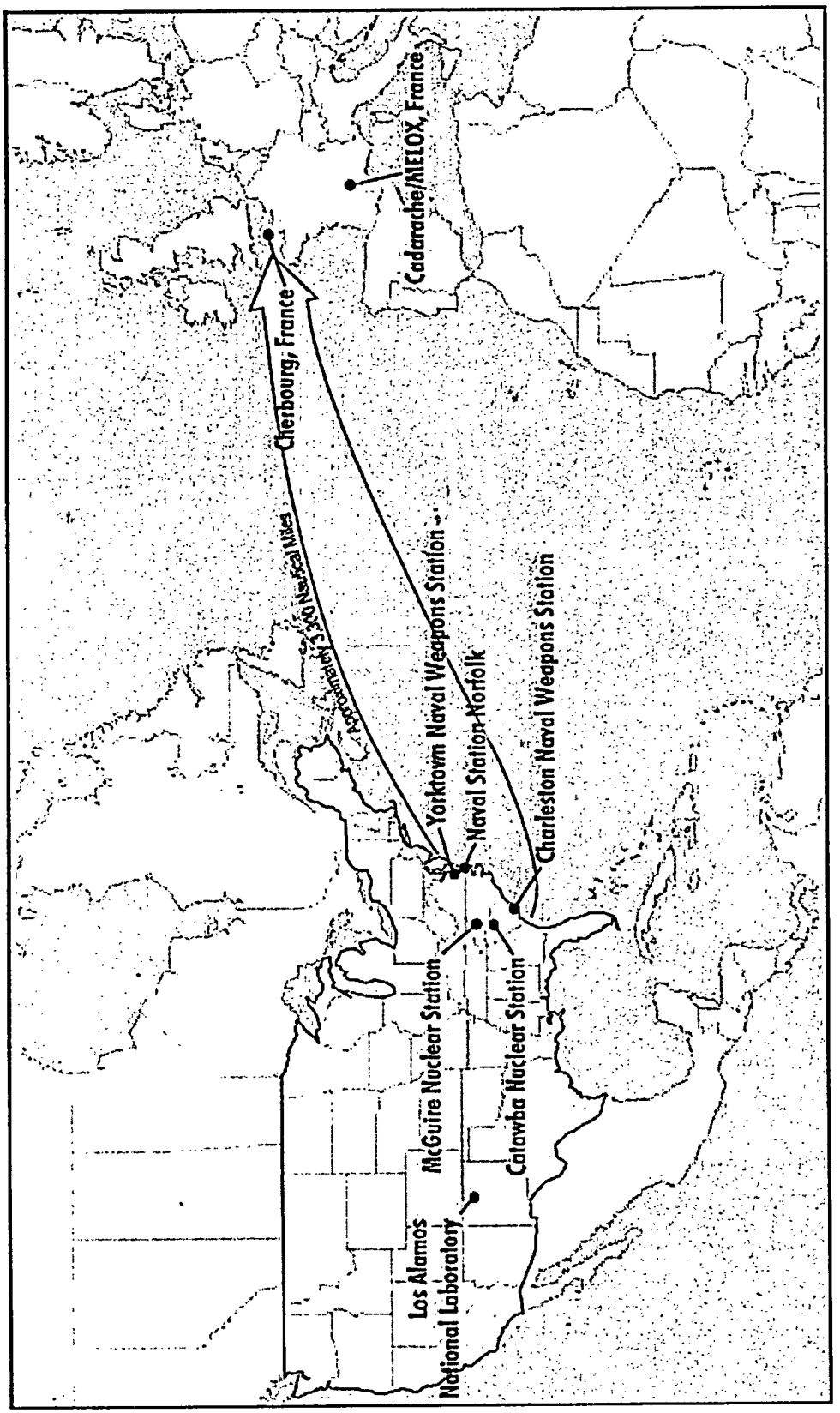

Figure 2. Facility Locations

Europe and Japan for more than 20 years without a radiological incident. These ships have covered more than 4.5 million miles and transported more than 4,000 casks in over 160 shipments (BNFL, COGEMA, ORC 2001).

Activities occurring within the territorial limits of other countries are not being evaluated in this SA. Only those activities potentially affecting the global commons, in this case only ocean transit, are addressed. Activities occurring within the territorial limits of other countries such as lead assembly fabrication at an existing MOX fuel fabrication facility or transportation to and from the facility will be evaluated by the owner/licensee of the MOX fuel fabrication facility in accordance with regulatory requirements in that country.

4.1 Ports Being Considered

Marine ports are generally located at the confluence of major rivers and oceans. These regions are commonly referred to as estuaries and provide a fragile habitat for much of the marine life found in the oceans. An estuary is a semi-enclosed body of water with a free connection to the open ocean, where the saltwater is considerably diluted with freshwater. In general, the freshwater flowing into the estuary eventually exits the system in the upper (water) layer of the estuary, while the denser seawater enters the estuary through lower subsurface layers (DOE 1996b).

The ports under consideration are military ports near the Atlantic Ocean, and are within or near large commercial port areas. Only military ports are considered to ensure maximum control and security for the cargo and the availability of port workers experienced in handling nuclear or other sensitive cargo.

4.1.1 Charleston Naval Weapons Station, Charleston, South Carolina

Charleston is the largest port city in South Carolina, and the greater Charleston area is one of the major seaports on the east coast of the United States. The city of Charleston is at the confluence of the Cooper and Ashley Rivers, about 7 mi inland from of the Atlantic Ocean. The city of Charleston is on a peninsula, bounded on the west and south by the Ashley River and on the east by the Cooper River. In general, the elevation of the area ranges from sea level to about 20 ft on the peninsula (DOE 1996b:3-5). The Charleston area highway system includes Interstates 26 and 526 and U.S. Routes 17 and 52. These major highways provide access to the Charleston NWS. Interconnecting primary state highways supplement these major routes (DOE 1996b:D-41).

Charleston NWS is on the west bank of the Cooper River, north of the city of North Charleston. Charleston NWS is about 17,500 acres in size and is in southeastern Berkeley County, South Carolina, about 19 mi from the Atlantic Ocean (DOE 1996b:3-6, 3-7). Charleston NWS has four wharves. Wharf Alpha, the wharf best suited for the proposed activities, is equipped with a crane for cargo handling. Trucks can be driven onto the wharf and cargo can be loaded and unloaded directly between trucks and ships. The facility offers a secure site conducive to transferring plutonium oxide and lead assemblies. In addition to the restricted access to the NWS, there are secure parking areas within the site where the SST/SGT convoys can be staged prior to driving out onto the wharf for cargo loading or unloading.

Charleston NWS is part of DOE's Foreign Research Reactor (FRR) Spent Nuclear Fuel (SNF) Program. Since May of 1996, 22 SNF shipments have been received through Wharf Alpha at Charleston NWS (Nigam 2003). The SNF casks have been offloaded from ships to either trains or trucks and transported to DOE facilities.

4.1.2 Yorktown Naval Weapons Station, Virginia

Yorktown NWS is located on the Virginia Peninsula in the central portion of York County. It is on the west bank of the York River approximately 3 mi from the city of Yorktown, Virginia and the confluence of the York River and the Chesapeake Bay. Yorktown NWS encompasses about 10,624 acres. As part of the Navy's Mid-Atlantic installation claimant consolidation, Cheatham Annex, formerly an annex of the Fleet Industrial Supply Center, Norfolk, was incorporated with the station in 1998. Yorktown NWS is serviced by three major highways, Interstate 64, US 17, and US 60; one railroad; and two major commercial and two military air terminals (GS 2003a:1, 3). York County contains a portion of four watersheds: Lower Chesapeake Bay, Lower James, Lynnhaven-Poquoson, and York (ED 2003).

Yorktown NWS provides ordnance logistics, technical, supply and related services to the Navy's Atlantic Fleet. As one of the Navy's "explosive corridors" to the sea, supply, amphibious, and combatant ships use the station's two piers (GS 2003a:1). At these piers, the Navy loads and offloads weapons and ordnance from Navy ships and submarines. The piers are equipped with cranes for cargo handling. Trucks can be driven onto the wharf and cargo can be loaded and unloaded directly between trucks and ships. The facility offers a secure site conducive to transferring plutonium oxide and lead assemblies. In addition to the restricted access to the NWS, there are secure parking areas within the site where the SST/SGT convoys can be staged prior to driving out onto the wharf for cargo loading or unloading.

4.1.3 Naval Station Norfolk, Norfolk, Virginia

NS Norfolk occupies about 3,400 acres on the Sewells Point Peninsula in the Hampton Roads area of Virginia. The facility is located on the south side of the Port of Norfolk, adjacent to the Norfolk International Terminal on the Elizabeth River Channel. NS Norfolk is about 18 nautical mi west of the entrance to the Chesapeake Bay from the Atlantic Ocean. Channels are maintained at a minimum depth of 45 ft. Except for areas close to shore, the water outside the channel is about 18 ft deep from the Atlantic Ocean to Hampton Roads (GS 2003b:1, 2).

Based on supported military population, NS Norfolk is the largest naval station in the world and is home to 78 ships, including 5 aircraft carriers. There are 14 piers available for cargo handling, repairs, refitting and training. Port Services controls more than 3,100 ship movements annually and oversees facilities that extend more than 4 mi along the waterfront and includes about 7 mi of piers and wharf space (GS 2003b:1). Cranes are available on every pier to handle cargo. Access to NS Norfolk is restricted and controlled. Because of its work for the U.S. Navy, the facility has security in place to support the transfer of plutonium oxide and lead assemblies between SST/SGTs and ships.

4.2 Global Commons

The Atlantic Ocean is the global commons area potentially impacted by the proposed action. The Atlantic Ocean is the second largest of the earth's four oceans and the most heavily traveled. It extends in a shape like the letter "S" from the arctic to the Antarctic regions between North and South America on the west and Europe and Africa on the east. It has a surface area of 32 million mi^2 and an average depth of 11,810 ft. Surface water temperatures range from 32° F near the Arctic to 81° F near the equator. The Atlantic Ocean contains some of the world's most productive fisheries, located on the continental shelves and marine ridges off the British Isles, Iceland, Canada, and the northeastern United States. Herring, anchovy, sardine, cod, flounder, perch, and tuna are the most important commercial species. Mineral resources are also actively mined in the Atlantic, including tin and iron ore, titanium, zircon, and monazite. The continental slopes of the Atlantic are also potentially rich in fossil fuels, with large amounts of petroleum already being extracted (Encarta 2003).

The Northern Right Whale (*Eubalaena glacialis*) is a federally endangered species that is also protected internationally under the convention for the regulation of whaling. There are currently about 300 right whales left in the North Atlantic, with ship strikes accounting for about 50 percent of their known deaths. Calving right whales usually winter in the waters between Savannah, Georgia, and West Palm Beach, Florida, with an area of high density between Brunswick, Georgia, and St. Augustine, Florida (NOAA 2003:1). The Maritime Safety Committee of the International Maritime Organization (IMO) adopted a mandatory ship reporting system that became effective in 1999. This system operates from November 15 to April 15 off the southeastern coast of the United States so as to include the calving season for the right whales in this area, and operates throughout the year on the northeastern coast, where the whales have been sighted year round (IMO 1998:5).

5.0 IMPACTS

This section presents estimates of both incident-free and accident risks associated with transportation in support of lead assembly fabrication in Europe. The risks of shipments of plutonium oxide from LANL through one of three Eastern U.S. ports to Europe; the return shipment of MOX lead assemblies and archive and scrap materials from Europe through the same three ports; and the transport of lead assemblies from each port to either Catawba or McGuire, the archive and scrap material to LANL, and the shipment of archive and scrap material from LANL to SRS have been evaluated. This section also presents estimates of the potential impacts from severe radiological accidents for the shipments and discusses the results in terms of individual risk.

The analysis uses methods similar to those used in the *Storage and Disposition PEIS* and the SPD EIS to facilitate comparison of potential impacts presented in these documents with impacts that are estimated in this SA. In addition, Section 5.5 discusses the potential impacts of the proposed activities on the global commons, and for completeness, Section 5.6 qualitatively discusses the potential impacts of the storage of archive and scrap materials. This section demonstrates that transportation-related impacts[7] associated with the current proposal to fabricate

[7] Transportation impacts are the only impacts evaluated in this SA because, as discussed in Section 4.0, the domestic activities proposed, other than those associated with transportation, remain unchanged compared to the manner in which they were analyzed in other NEPA documents.

lead assemblies in Europe are less than those previously evaluated in the *Storage and Disposition PEIS* for fabrication of lead assemblies in Europe or in the SPD EIS for fabrication in the United States.

5.1 Description of Transportation Activities

Shipments of plutonium would be made in approved Type B packages. Overland shipments in the United States containing plutonium, except irradiated assemblies, would be made in SST/SGTs. The plutonium oxide powder would be shipped from LANL in FS47 shipping casks to a European fabrication facility. At LANL, individual COGEMA convenience cans would be loaded with approximately 3.4 kg of plutonium oxide powder. Each can would be sealed and then loaded into an ARIES inner can. Five inner cans would be placed inside an AA-227 package. The AA-227 would in turn be loaded into a FS47 shipping cask. **Figure 3** illustrates this arrangement. It is anticipated that three SST/SGTs each containing three FS47 shipping casks would move all the plutonium oxide from LANL to the port. Once at the port, it is anticipated that the casks would be transferred directly to PNTL ships, which would travel in a two-vessel convoy across the Atlantic Ocean. The ships would sail as soon as the transfers, inspections, coordination with the port and escort vessels, and required documentation were complete. This two-vessel convoy approach is the same approach that the U.S. government approved for use in 1999 for shipment of commercial MOX fuel from Europe to Japan, and in 2002 for shipment back from Japan to the United Kingdom.[8] The U.S. government approved this plan only after an extensive review over several years including a formal review of the final plan by responsible Executive Branch agencies (BNFL, COGEMA, ORC 2001).

The procedure is for two PNTL ships to sail together, each providing armed escort for the other. The ships have a broad range of protection systems, including naval guns and armed officers. These officers would operate independently of the crew, would be responsible for constant surveillance and protection of the cargo, and would have authority to use deadly force in defense of the ships and their cargo.

The PNTL ships, among the safest in operation, are specially designed to carry radioactive materials. Special safety features include (BNFL, COGEMA, ORC 2001):

- Double hulls to withstand damage from a severe collision and remain afloat
- Enhanced buoyancy to ensure the ship stays afloat and maintains a stable attitude even in the most extreme circumstances
- Duplicate navigation, communications, electrical and cooling systems
- Dual propulsion systems, specialized fire fighting equipment, satellite navigation and tracking, and highly experienced crew members

[8] The 1988 U.S.–Japan Agreement for Cooperation Concerning Peaceful Uses of Nuclear Energy elaborates in detail the extensive physical protection measures required for the transportation of plutonium oxide or MOX fuel by sea. Prior to each shipment, representatives from the U.S. government, including experts from the defense, foreign affairs, naval, and intelligence agencies review the transportation plan and confirm that the physical protection measures are adequate. The U.S. government then officially notifies Japanese authorities of this decision.

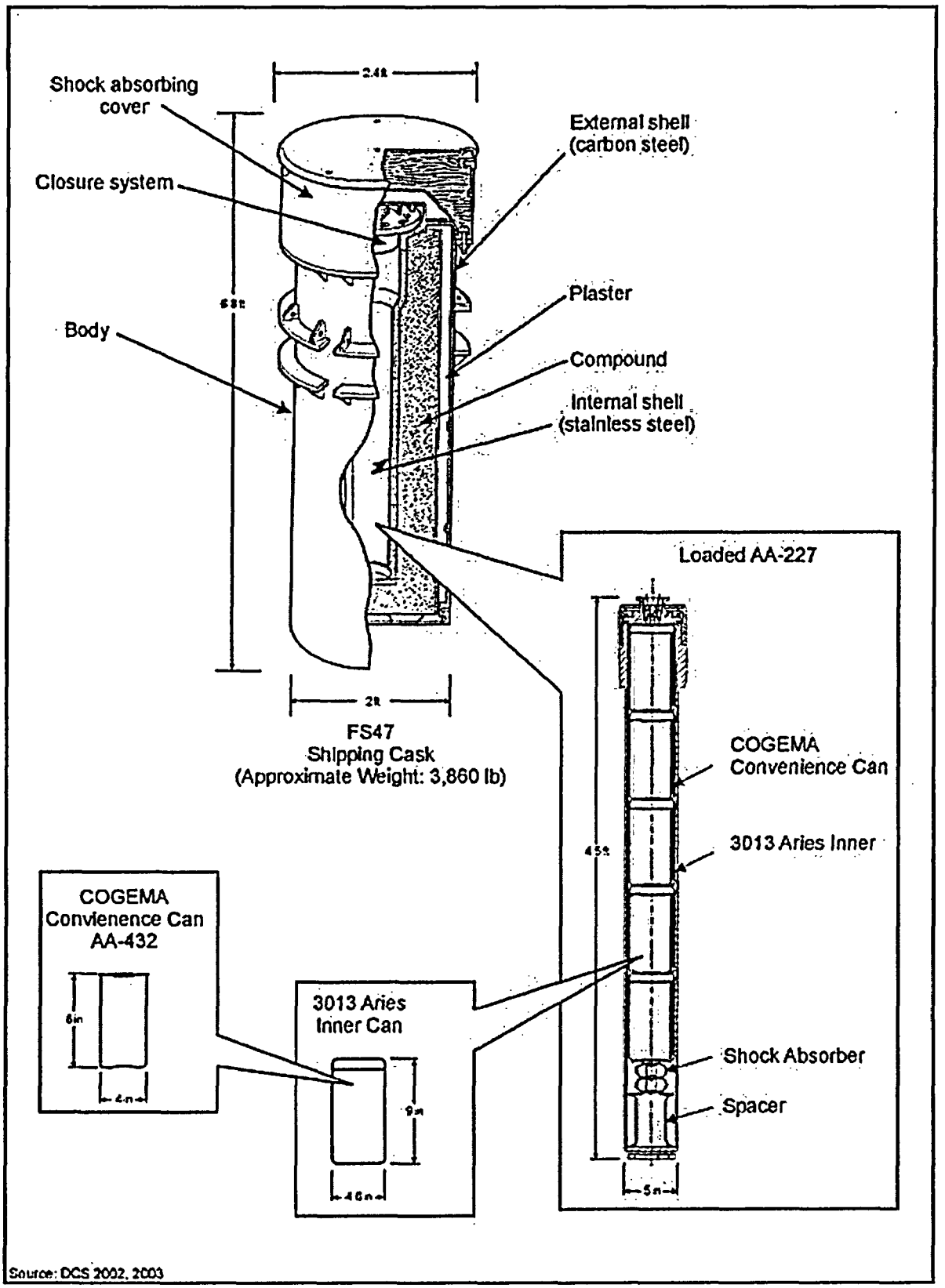

Figure 3. Plutonium Oxide Shipping Packages

Figure 4 is a cutaway view of a PNTL purpose-built ship showing some of the ship's protective features. The ship is approximately 350 ft long and 50 ft wide.

The ships would cross the Atlantic Ocean and make port at Cherbourg, France. From there, the casks would be loaded onto trucks with armed escorts and transported to La Hague, France, where they would be reloaded onto French Secured Transport trucks for transport to Cadarache, the pellet and fuel rod fabrication plant (DCS 2002:9). Fuel rods would be transferred from Cadarache to MELOX, the assembly plant, as appropriate.

Lead assemblies, archive, and scrap material would be returned to the United States in FS65 packages (baskets and bodies) as shown in **Figure 5**. The FS65 package is a cylindrical cask placed into an aluminum frame and linked to the frame by anti-vibration pads.

Six FS65 packages (four with fuel assemblies and two with rods containing archive and scrap material) would be loaded onto French Secured Transport trucks at MELOX and transported to La Hague, France. In La Hague, the packages would be transferred to other trucks with armed escorts for transport to Cherbourg, France. In Cherbourg, the FS65 packages would be placed into specially designed overpacks for ocean transport. At the port, the casks would be loaded onto the PNTL ships for the return voyage. At the U.S. port, the lead assemblies would be loaded onto SST/SGTs and shipped overland to Catawba. Archive and scrap materials would be transported by SST/SGT to LANL for storage until the MOX fuel fabrication facility is operational (DCS 2002:12, 15).

There are a number of regulations and standards that govern international shipments of radioactive and fissile materials. Lead assembly shipments would meet requirements to ensure that the ships and their cargo are protected against threats of theft or sabotage. Physical protection measures would meet the recommendations published by IAEA in INFCIRC 225, Recommendations on the Physical Protection of Nuclear Material, and INFCIRC 274, Convention on the Physical Protection of Nuclear Material (BNFL, COGEMA, ORC 2001).

5.2 Risks of Truck Transportation

The risks of incident-free transportation as well as accidents for all overland shipments were calculated using the RADTRAN 5 code. For incident-free transportation risk, the RADTRAN 5 code calculates the dose and corresponding risk based on the external dose rate from the shipping vehicle, the transportation route and the population density along the route. For accident transportation risk, RADTRAN 5 also uses state-specific accident rates and a conditional accident frequency-severity relationship that considers the route conditions (urban, suburban, rural). For this analysis, the accident rate for SST/SGT transport and the accident severity category classifications of NUREG-0170 (NRC 1977) were used consistent with the SPD EIS analyses. The nonradiological accident risks (fatalities resulting from potential transportation accidents) were also calculated using RADTRAN 5.

An important determinant in transportation risk is the route, including its length, the states through which the route passes, and the population along the route. Representative routes for each of the shipments were selected using a code called WebTRAGIS. This code identifies routes consistent with current routing practices and applicable routing regulations and guidelines,

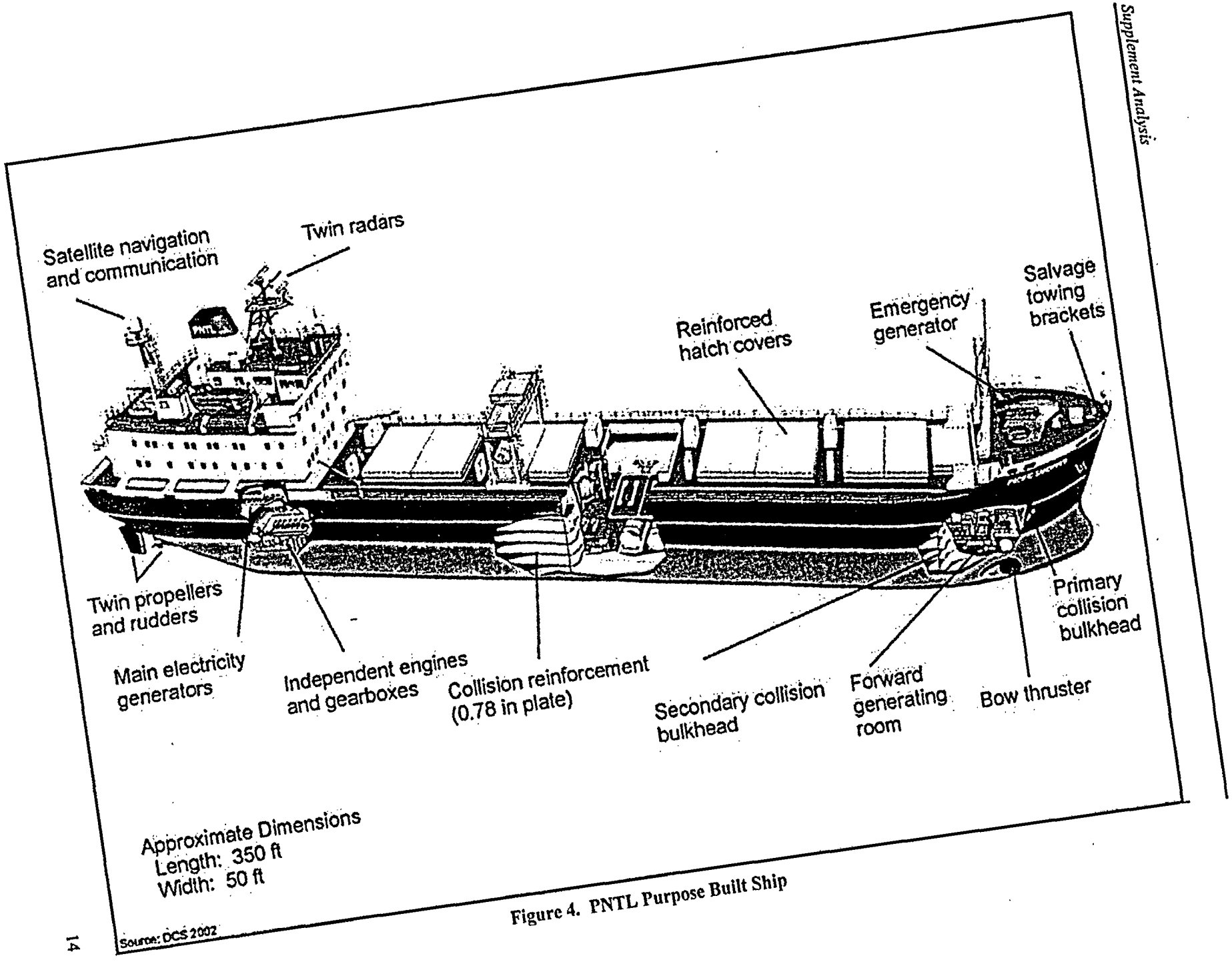

Figure 4. PNTL Purpose Built Ship

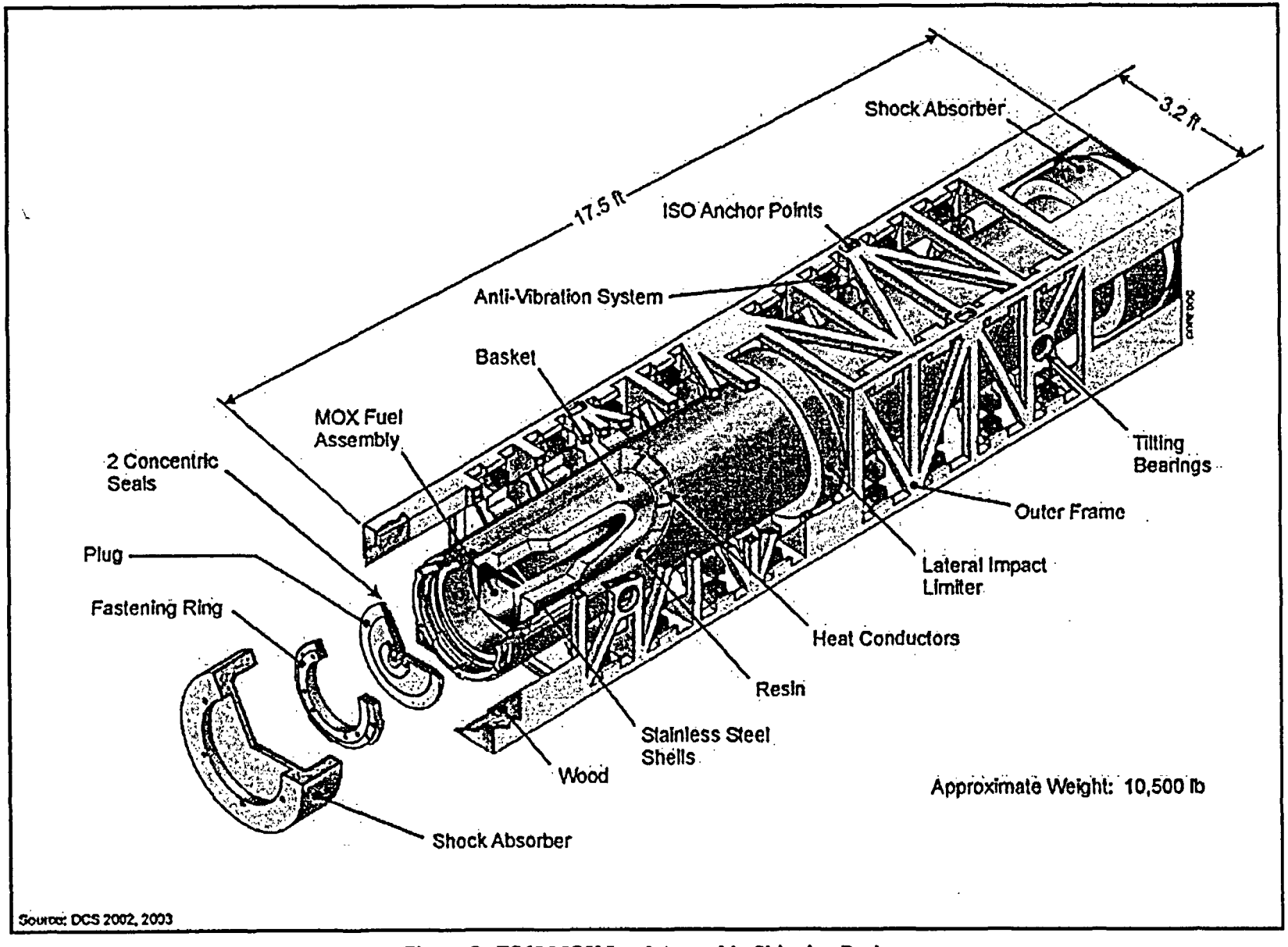

Figure 5. FS65 MOX Lead Assembly Shipping Package

and identifies the population living within 0.5 mi of the route using 2000 U.S. Bureau of Census data. Route characteristics for all overland transportation legs are summarized in **Table 1.**

Table 1. Potential Truck Route Characteristics for Shipments to Support European Fabrication of Lead Assemblies

From	To	Distance (mi)	Percentage in Zones			Population Density in Zones (per mi^2)			Number of Affected Persons
			Rural	Suburban	Urban	Rural	Suburban	Urban	
Plutonium Oxide									
LANL	Charleston NWS	1,887	69.8	26.7	3.6	30	856	5,941	865,410
LANL	NS Norfolk	2,011	70.2	27.0	2.8	33	780	5,770	790,161
LANL	Yorktown NWS	1,992	70.7	26.8	2.5	33	765	5,698	729,824
Lead Assemblies									
Charleston NWS	McGuire	236	50.9	44.7	4.4	37	986	6,022	169,312
Charleston NWS	Catawba	204	57	39.8	3.2	36	902	6,171	116,844
NS Norfolk	McGuire	381	45.2	49.6	5.2	49	950	5,575	297,080
NS Norfolk	Catawba	406	42.7	52.0	5.3	50	936	5,663	326,380
Yorktown NWS	McGuire	362	46.9	49.6	3.5	50	913	5,189	236,925
Yorktown NWS	Catawba	387	44.2	52.1	3.7	51	903	5,363	266,010
Archive and Scrap Materials									
Charleston NWS	LANL	1,887	69.8	26.7	3.6	30	856	5,941	865,410
NS Norfolk	LANL	2,011	70.2	27.0	2.8	33	780	5,770	790,161
Yorktown NWS	LANL	1,992	70.7	26.8	2.5	33	765	5,698	729,824
LANL	Savannah River Site	1,732	71.4	24.9	3.7	30	861	5,902	783,380

Key: LANL, Los Alamos National Laboratory; NS, Naval Station; NWS, Naval Weapons Station.

The results of this transportation risk analysis, summarized in **Table 2,** are human health risk estimates that reflect the estimated number of fatalities resulting from the proposed transportation. The radiological risk is the estimated number of LCFs resulting from exposure of the affected populations. The nonradiological risk is the estimated number of fatalities that would result from traffic accidents involving movement of materials, and is independent of the type of material being transported. As can be seen in Table 2, the risk (the product of consequence and estimated frequency of occurrence) that would result from the proposed activities is very small, very much less than 1 LCF, is related to the distance traveled, and is the same for both Catawba and McGuire.

Table 2. Human Health Risk for Overland Shipments in Support of European Fabrication of Lead Assemblies

Port	Incident-Free Transportation Risk[a]		Accident Risk[a]	
	Radiological			
	Crew	Public	Radiological	Non-Radiological
Irradiation at Catawba				
Charleston NWS	3.7×10^{-6}	3.0×10^{-6}	1.9×10^{-7}	1.6×10^{-4}
Yorktown NWS	3.9×10^{-6}	3.2×10^{-6}	2.1×10^{-7}	1.7×10^{-4}
NS Norfolk	4.0×10^{-6}	3.2×10^{-6}	2.1×10^{-7}	1.7×10^{-4}
Irradiation at McGuire				
Charleston NWS	3.7×10^{-6}	3.0×10^{-6}	1.9×10^{-7}	1.6×10^{-4}
Yorktown NWS	3.9×10^{-6}	3.2×10^{-6}	2.1×10^{-7}	1.7×10^{-4}
NS Norfolk	4.0×10^{-6}	3.2×10^{-6}	2.1×10^{-7}	1.7×10^{-4}

[a] The risk is expressed as the expected number of latent cancer fatalities, except for the accident nonradiological risk which is expressed as the expected number of accident fatalities.

Key: NS, Naval Station; NWS, Naval Weapons Station; PuO_2, plutonium oxide.

The consequences of a severe accident for a maximum exposed individual (MEI) have also been estimated. The consequences of an accident that breaches a plutonium oxide shipping package would be greater than an accident that breaches a lead assembly shipping package because the plutonium oxide powder is more readily dispersed than the ceramic mixed plutonium/uranium oxide. The severe accident considered for estimating the dose to the MEI is one that damages a single Type B package (an FS47) with 17 kg of plutonium oxide. For this severe accident, it is estimated that the dispersed, respirable fraction is 3.5×10^{-2}, which means that 595 g of respirable plutonium oxide would be transported downwind toward the MEI. Using meteorological parameters consistent with those used in the SPD EIS, the dose to the MEI situated 330 ft downwind from the accident would be 2.2×10^{3} rem. The probability of occurrence of this severe truck transportation accident is estimated to be 1×10^{-8}, 2×10^{-10}, and 1×10^{-11} for rural, suburban, and urban segments, respectively. Although the consequences to the MEI of the severe truck transportation accident are high, the probability of occurrence is very low, and therefore, the risk is also very small.

This severe truck transportation accident has greater consequences for the MEI than the severe plutonium oxide shipment accident considered in the SPD EIS because the Type B package evaluated in the SPD EIS would hold only one can of plutonium oxide containing 4.3 kg of plutonium. As a result, less plutonium is available for release following the accident. The MEI dose in the SPD EIS is 684 rem for neutral meteorological conditions, and 23 rem for stable meteorological conditions. Because of the larger number of shipments and longer shipping distances, the SPD EIS estimates the probability of occurrence for this accident to be on the order of 1×10^{-7} in rural areas where the accident is most likely to occur. The estimated MEI risk for this SPD EIS accident is 3.5×10^{-8}, which is slightly higher than the MEI risk (1×10^{-8}) for the Eurofab accident.

The consequences of a severe truck accident involving lead assemblies or archive and scrap material were also considered. The impacts would be much lower because the ceramic MOX material is less dispersible than the plutonium oxide powder. The amount of material released is estimated to be about 0.001 percent of the same accident involving plutonium oxide based on the

reduced aerosol fraction and respirable fraction estimates for immobile material (ceramic MOX pellets) and fine powder (plutonium oxide powder) presented in *A Resource Handbook on DOE Transportation Risk Assessment, DOE National Transportation Program* (DOE 2002).

5.3 Risks of Port Operations and Ship Transportation

5.3.1 Port Operations

The risk of both incident-free operations and potential port accidents are analyzed in this SA. Implementation of the proposed action would involve a very small increase in the use of the port facilities. There would be no construction at or modification of port facilities. Only three trucks (SST/SGTs) would arrive at the port to deliver the plutonium oxide to the dock and plutonium oxide would be loaded on PNTL ships, which would travel as a two-ship convoy. The lead assemblies, archive and scrap material would be transported back to the United States on PNTL ships, and would leave the port in a total of six trucks (SST/SGTs). It is not expected that the minimal additional transportation and cargo handling activities associated with the proposed action would result in any impacts to the local environment.

The risk from incident-free port operations was estimated assuming that the number of personnel and length of time required for cask handling and inspection are the same as those used in the FRR EIS analysis[9]. For plutonium oxide cask inspection and handling, the cumulative dose is estimated to be 5.1×10^{-4} person-rem per cask. This would result in a total occupational dose at the port of 4.5×10^{-3} person-rem and a collective population risk of 1.8×10^{-6} LCF. For the lead assemblies and archive and scrap material, the occupational dose for cask inspection and handling is estimated to be 1.1×10^{-4} person-rem/cask. This would result in a total port occupational dose from these materials of 6.6×10^{-4} person-rem and a collective risk of 2.6×10^{-7} LCF. It is estimated that the various inspectors (i.e., Coast Guard and other Federal personnel) and observers, including some members of the ship's crew, would receive 85 percent of this dose while longshoremen handling the cask would receive 14 percent of the dose. Truck drivers and crane operators would receive the remaining population dose.

The potential for cask handling accidents during port operations was also considered. Consistent with the *Storage and Disposition PEIS*, the potential for a port handling accident that would result in the release of radioactive material is considered to be negligible because of the robustness of Type B packages. These packages are designed and tested for a drop from 30 ft into an unyielding surface, a drop on a punch bar, and exposure to a 1,470°F fire for 30 min (10 CFR 71). No cask handling accidents on docks were postulated that would involve situations more hazardous than those for which the casks were designed, so releases are not considered credible.

The nonradiological risk of port operations was also estimated using cask-handling information presented in the FRR EIS and fatality accident frequency statistics reported by the Bureau of

[9] The FRR EIS evaluates the potential environmental impacts that could result from the adoption of a joint DOE/Department of State policy to manage spent nuclear fuel from foreign research reactors that contains highly enriched uranium provided by the U.S. Implementation of this policy involves return of this spent nuclear fuel to the U.S. Evaluations in the FRR EIS include the receipt of this spent nuclear fuel at one or more U.S. marine ports of entry. In particular, the FRR EIS presents detailed environmental information for the global commons and 10 potential ports of entry, including the ports evaluated in this SA. The FRR EIS also established certain cask handling assumptions for the ports and accident scenarios that are used in both the *Storage and Disposition PEIS* and this SA.

Labor Statistics (Toscano and Windau 1996). The FRR EIS reports that up to four longshoremen in the hold and two on the dock may be necessary to move a cask from a ship hold to a dock and that the time required for the movement may be up to 3 minutes. Assuming the same labor requirements for loading of plutonium oxide casks, 1.3×10^{-3} worker-years would be required to accomplish the transfer of nine casks from the dock to the ship's hold. Using a fatality accident rate of 25 fatalities per 100,000 worker-years, the nonradiological risk estimate for loading the plutonium oxide casks at the U.S. port is 3×10^{-7}. On the return trip, six casks would be unloaded. Using the same labor productivity assumptions and fatality accident rate assumptions, the nonradiological risk for unloading the MOX and archive/scrap material casks would be 2×10^{-7}.

5.3.2 Ship Transportation

The exposure to members of the ship's crew during the voyage across the Atlantic Ocean has also been estimated. Ocean transit would not take longer than 1 week. Therefore, to estimate potential worker dose, it is assumed that a single cargo inspection would be conducted by a single crew member during the trip to verify the security of the casks. The inspection would be of limited duration (about 15 minutes) and at a moderate distance, estimated to be 5 ft from the casks. The total dose to the crew from inspections during the two voyages would be 0.37 mrem. This represents a total risk of 1.5×10^{-7} LCF. Because there is minimal radiation emanating from the casks, and the casks are isolated from the crew by steel bulkheads and decking, there would be no other exposure to the crew.

5.3.3 Ship Accidents

This SA analyzes a severe accident that involves a collision between the PNTL ship and another ship with an ensuing fire. This severe accident is consistent with the severe accident analyzed in the FRR EIS. The FRR EIS considered but did not analyze accidents where a ship containing a nuclear cargo hits a fixed structure (e.g., a bridge) or runs aground because these accidents usually do not involve cargo damage.

The severe accident analysis in this SA is postulated to damage all nine FS47 shipping packages that contain the entire inventory of 150 kg of plutonium oxide. The release periods for this collision/fire scenario are similar to those considered in the FRR EIS. The size of the release is adjusted from the FRR EIS to account for differences in the material properties and composition of the plutonium oxide powder.

The MACCS2 computer code was used to model the radiological consequences of the postulated severe PNTL accident resulting in the release of plutonium oxide powder. The identical accident scenario was analyzed for the three proposed ports. Both dock and channel locations were identified for each of the three ports. The 50-mile radius population distributions for both dock and channel locations were estimated using 2000 census data. This information was used to determine for each port whether the dock or channel location would result in higher consequences. Based on this analysis, higher consequences would occur at the dock for Yorktown NWS and NS Norfolk and in the channel for Charleston NWS. Therefore, these maximum consequence locations were used in the quantitative analysis of the severe accident, and are the locations at each port for which results are reported.

Consistent with the severe accident analysis in the FRR EIS, the source term was estimated to consist of two sequential plumes. The first plume would release 150 g of respirable plutonium oxide powder over a 10-minute period without any energy imparted to the plume. The second plume would release 600 g of respirable plutonium oxide powder over a 60-minute time period with 150 kilowatts of energy from the fire. Both releases were assumed to occur at an elevation of 33 ft, which corresponds to the estimated PNTL deck elevation. The fraction of plutonium estimated to be released and in a respirable form (5×10^{-3}) is consistent with that used in the SPD EIS severe accident analyses involving plutonium oxide powder. The population doses for this accident were estimated to be 49,000 person-rem in the channel leading to the Charleston NWS, 8,400 person-rem at the NS Norfolk dock, and 13,900 person-rem at the Yorktown NWS.

Combining these accident doses with a frequency estimate produces a risk estimate. The *Storage and Disposition PEIS* estimated the frequency of a maximum accident that results in the release of material from a Type B package as 5×10^{-9} accidents per port transit (DOE 1996a:G-4). The FRR EIS estimated the frequency of a ship collision involving serious cargo hold damage and a fire as 6×10^{-10} (DOE 1996b:4-23). Using the conservative estimate of 5×10^{-9} accidents per port transit results in a population accident risk of 1.2×10^{-7} LCF for Charleston NWS, 1.1×10^{-7} LCF for NS Norfolk, and 3.5×10^{-8} LCF for Yorktown NWS.

The dose to the MEI is estimated to be 14 rem for Charleston NWS, 17.2 rem for NS Norfolk, and 8 rem for Yorktown NWS. Using the conservative accident frequency of 5×10^{-9} accidents per port entry previously discussed, the resulting individual LCF risk to the MEI is 4.3×10^{-11} for NS Norfolk, 3.5×10^{-11} for Charleston NWS, and 2.0×10^{-11} for Yorktown NWS.

As with the severe truck accident, the consequences to both the population and the MEI from a severe accident involving a MOX assembly would be about 0.001 percent of that for plutonium oxide because of the smaller release and reduced respirable fractions.

The results of the risk analysis for port operations are summarized in **Table 3.** The table shows low radiological risk levels to port workers and no radiological risk to the public from incident-free operations. These risk estimates are the same regardless of the port. Accident radiological risks are also small, but they vary with the port. The port workers (longshoremen) have a nonradiological accident risk that is estimated to be comparable to the incident-free radiological risk.

Table 3. Human Health Risk of Port Operations in Support of European Fabrication of Lead Assemblies

	Incident-Free Risk[a]		Accident Risk[a]	
	Radiological			
Shipment	Crew	Public	Radiological	Nonradiological
Charleston NWS	2.1×10^{-6}	none	1.2×10^{-7}	5×10^{-7}
Yorktown NWS	2.1×10^{-6}	none	3.5×10^{-8}	5×10^{-7}
NS Norfolk	2.1×10^{-6}	none	1.1×10^{-7}	5×10^{-7}

[a] The risk is expressed as the expected number of latent cancer fatalities, except for the accident nonradiological risk which is expressed as the expected number of accident fatalities.

Key: NS, Naval Station; NWS, Naval Weapons Station.

5.4 Comparison of Impacts

Table 4 presents a comparison of the potential U.S. human health risk for transportation of materials for MOX lead assembly fabrication. The table compares the potential impacts of the Eurofab option with the potential impacts of the transportation component of two of the lead assembly fabrication alternatives analyzed in the SPD EIS. These two SPD EIS alternatives were selected for comparison because LANL was selected as the lead assembly site in the SPD EIS ROD, and SRS is in the region of the ports that would be used for the shipments to and from Europe. None of the estimates includes transportation of irradiated fuel rods to the post-irradiation examination facility because these impacts would be the same for each of the alternatives, and including them would dominate the overall human health risk impact (approximately 85 percent of the total transportation impact). Including this impact would therefore overshadow and mask the differences between the alternatives.

Table 4. Comparison of Human Health Risk Estimates for SPD EIS and European Lead Assembly Fabrication Options

Alternative	Risk[a]		
	Worker (radiological)	Public (radiological, incident-free and accident)	Nonradiological
SPD EIS[b]			
Lead Assembly Fabrication at LANL	5.8×10^{-6}	4.3×10^{-4}	3.3×10^{-4}
Lead Assembly Fabrication at SRS	4.2×10^{-6}	5.5×10^{-4}	2.8×10^{-4}
Fabrication of Lead Assemblies in Europe			
Irradiation at Catawba			
Use of Charleston NWS	5.9×10^{-6}	3.3×10^{-6}	1.6×10^{-4}
Use of Yorktown NWS	6.1×10^{-6}	3.4×10^{-6}	1.7×10^{-4}
Use of NS Norfolk	6.2×10^{-6}	3.6×10^{-6}	1.7×10^{-4}
Irradiation at McGuire			
Use of Charleston NWS	5.9×10^{-6}	3.4×10^{-6}	1.6×10^{-4}
Use of Yorktown NWS	6.1×10^{-6}	3.4×10^{-6}	1.7×10^{-4}
Use of NS Norfolk	6.2×10^{-6}	3.6×10^{-6}	1.7×10^{-4}

[a] The risk is expressed as the expected number of latent cancer fatalities, except for the accident nonradiological risk which is expressed as the expected number of accident fatalities.

[b] SPD EIS estimates include only transportation components so as to compare the same set of activities for the SPD EIS and lead assembly fabrication in Europe. Data from Table L-4, page L-21 and associated calculation package (DOE 1999b).

Key: LANL, Los Alamos National Laboratory; NS, Naval Station; NWS, Naval Weapons Station.

The results summarized in Table 4 show that the potential impacts of the Eurofab option using any of the three port alternatives are comparable or lower than for the lead assembly alternatives analyzed in the SPD EIS. This is primarily the result of fewer shipments. Minor differences also result from updated population estimates and revisions to the RADTRAN code.

The *Storage and Disposition PEIS* presented estimates of potential fatalities from transportation of 50 metric tons of plutonium oxide from the United States to Europe and the return of MOX fuel assemblies fabricated with that material using a range of representative shipping distances.

Scaling the transportation fatality estimates developed in the *Storage and Disposition PEIS* to reflect the transportation parameters analyzed in this SA results in 1.3×10^{-3} fatalities, which is approximately a factor of 10 higher than that calculated in this SA. Both analyses conclude that the risk is dominated by the nonradiological risk of transportation accidents. The fatalities estimated by the scaled *Storage and Disposition PEIS* analysis are higher than those estimated by this SA primarily because the *Storage and Disposition PEIS* used fatality frequency estimates for conventional truck transportation while this SA uses estimates that are specific to SST/SGT transport.

5.5 Impact on the Global Commons

The *Storage and Disposition PEIS* reported an earlier DOE study that estimated the likelihood of a maritime accident of sufficient severity to cause significant release of radioactive material to be in the range of 1.0×10^{-8} to 1.0×10^{-9} per port call (DOE 1996a:G-6). The probability of an accident at sea involving the PNTL is very unlikely because of the limited number of shipments (one two-ship convoy each way) as well as the redundant modern navigation systems on the ship. The probability of a significant release is further reduced because of the ruggedness of the PNTL design and the Type B packages.

If plutonium oxide were released to waters of the global commons, the *Storage and Disposition PEIS* reports that plutonium oxide would dissolve very slowly, and would preferentially combine with sediments rather than remaining dissolved in the ocean water (DOE 1996a:G-6).

5.6 Archive and Scrap Material Storage

The SPD EIS considered that fuel rods containing archive and scrap materials (stable, non-reactive ceramic pellets similar to fresh MOX fuel) would be stored in a metal box in an isolated area at the lead assembly fabrication site. At LANL, the SPD EIS assumed that an area in the basement of a facility in Technical Area (TA)-55, where the lead assemblies were proposed to be fabricated, would be used to store these materials. The dose rate at 1 m from storage of these materials is estimated to be 0.15 mrem/hr (DCS 2003).

Under the Eurofab option, as discussed in Section 4.0, archive and scrap materials from lead assembly fabrication would be stored in two Type B shipping packages (FS65s) at TA–55 at LANL. There would be very little hazard associated with storage and maintenance activities because the archive and scrap materials would have multiple levels of confinement and the external dose rate from the package would be minimal. The archive and scrap materials would be in the form of stable, non-reactive ceramic pellets inside fuel rods with an inert environment. The fuel rods would be welded closed, leak-tested, and inspected to insure their integrity. Each fuel rod would be inventoried and engraved with a unique identifier, and its contents would be recorded. Prior to shipment and subsequent storage, the fuel rods would be placed inside a stainless steel shell that would then be inserted into an FS65 package. The FS65 package would provide robust leak-tight double containment (the basket providing one barrier and the body providing the second).

The archive and scrap materials would meet the stabilization criteria of DOE Standard DOE-STD-3013-2000, *Stabilization, Packaging, and Storage of Plutonium-Bearing Materials* (3013 Standard) (DOE 2000b) for long-term storage. From a safety perspective, storing these

fuel rods would be even less of a concern than storing plutonium oxide powder or other forms of plutonium envisioned to be stored pursuant to this standard. The pellets would contain less than 6 percent plutonium, similar to the plutonium content of fresh MOX fuel. There is very little risk of either an inadvertent criticality, or dispersion of plutonium in the event of an accident, because the plutonium would be incorporated in a non-dispersible ceramic material. The dose rate at 1 m from the packages would not exceed 0.1 mrem/hr, which would result in only minimal personnel exposure, and would not exceed the dose rate (0.15 mrem/hr) estimated for storage of archive and scrap materials described in the SPD EIS. The present proposal to store archive and scrap materials at LANL would be consistent with ongoing activities at TA–55, and analyses in and RODs for the *Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory* (DOE 1999a) and the SPD EIS (DOE 1999b).

5.7 Sabotage or Terrorist Attack

Both the *Storage and Disposition PEIS* (at Section G.1.2.6) and the SPD EIS (at Section L.6.5) acknowledged that a threat could be presented by sabotage or terrorism, and concluded that adequate safeguards are in place to meet such a threat. In the aftermath of September 11, 2001, DOE is continuing to consider measures to minimize the risk and consequences of potential terrorist attacks on DOE facilities. LANL, both the source for the plutonium dioxide to be used in lead assembly fabrication and the facility where archived material would be stored, offers certain unique features from a safeguards perspective: a remote location, restricted access afforded by Federal land ownership, restricted airspace above the site, and access to a highly effective rapid-response security force. DOE expects that the safeguards applied to protecting LANL will involve a dynamic process of enhancement to meet threats, and that those safeguards will evolve over time.

There is also the potential for attempts at acts of sabotage or terrorist attacks during transport. DOE's proposed action includes physical safeguards aimed at protecting the public from harm. These protective measures include the use of SST/SGT vehicles for overland shipments and dedicated purpose-built vessels for ocean shipment. Safety features of transportation casks that provide containment, shielding, and thermal protection also provide protection against sabotage. The candidate ports analyzed in this SA are military ports that provide a heightened level of security, including trained security personnel and physical barriers such as perimeter fencing with controlled access and surveillance. DOE continues to examine the protections built into its transportation system. DOE would modify its methods and systems as appropriate based on the results of this examination to reduce the potential for sabotage or terrorist attack to be successful.

A company that has extensive experience in international shipping of nuclear fuels would conduct the overseas shipments using specially designed ships, as described in Section 5.1. Land transportation in Europe would be handled by existing specially designed safe and secure transport system developed for shipment of nuclear materials. MOX fuel shipments between the fuel fabrication facilities and nuclear reactors in Europe have been conducted safely for more than 20 years.

Although the likelihood of an attempted act of sabotage or terrorism occurring is not precisely knowable, the chance of success of any such attempt is judged to be very low, particularly in light of the transport methods to be employed by DOE in these shipments, which are specifically designed to afford security against sabotage or terrorism, as well as safety in the event of an

accident. In preparing this SA, DOE has again considered sabotage or terrorism and determined that adequate safeguards remain in place to meet such threats.

6.0 CONCLUSIONS

In accordance with Council on Environmental Quality regulations at 40 CFR 1502.9(c) and DOE regulations at 10 CFR 1021.314(c), this SA evaluates proposed changes in the surplus plutonium disposition program to determine whether the *Storage and Disposition PEIS* or SPD EIS should be supplemented, a new EIS should be prepared, or no further NEPA documentation is necessary.

Based on the analyses in this SA, the proposed fabrication of lead assemblies in Europe, specifically, overland transportation of plutonium oxide from LANL to any of the 3 military ports on the east coast of the United States, ocean transport to Europe, the return shipment of fresh MOX fuel lead assemblies and ancillary materials to the United States, and subsequent transport of the lead assemblies to Catawba and ancillary materials to LANL, would not result in impacts significantly different from or greater than those described in either the *Storage and Disposition PEIS* or the SPD EIS. Where there are differences in impacts, they are small changes to impacts that are themselves small. Therefore, the activities evaluated in this SA do not represent substantial changes in any proposed actions or result in any new circumstances relevant to environmental concerns.

Impacts additional to or different from those previously evaluated would result from transportation of materials to implement this activity, such as movement of archive and scrap materials from the port to LANL. Some of the origins and destinations, hence the routes, would be different than previously evaluated, and the shipping packages, although also approved Type B packages, would be different. However, there would be fewer shipments of material than previously anticipated. The greater consequences estimated in this SA from the overland transport of plutonium oxide occurs because there would be more plutonium available for release in the extremely unlikely event of a transportation accident involving a breach of the Type B package. However, the frequency of this accident is extremely low, and therefore, the risk to the MEI is extremely small. Furthermore, the human health risk from transportation of the materials for fabrication of lead assemblies and transportation of lead assemblies to the reactor constitutes only about 1 percent of the total risk of the MOX fuel fabrication program, which in itself represents very little risk.

7.0 DETERMINATION

The analyses in this SA indicate that the activities and potential environmental impacts associated with the proposed fabrication of lead assemblies in Europe as part of the MOX fuel fabrication program for surplus plutonium disposition are within the impacts evaluated in the *Storage and Disposition PEIS* and the SPD EIS. Fabricating lead assemblies at existing MOX fuel fabrication facilities in Europe would not constitute significant new circumstances or information relevant to environmental concerns and bearing on the previously analyzed action or its impacts either in the United States or affecting the global commons. Therefore, pursuant to 10 CFR 1021.314(c), no additional NEPA analyses are required in order to fabricate MOX fuel lead assemblies in Europe.

Issued in Washington, D.C., this 7TH day of NOVEMBER, 2003.

Linton F. Brooks
Administrator
National Nuclear Security Administration

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ADDENDUM B

[6450-01-P]

DEPARTMENT OF ENERGY

Surplus Plutonium Disposition Program

AGENCY: National Nuclear Security Administration, U.S. Department of Energy

ACTION: Amended Record of Decision

SUMMARY: The U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) is amending its January 11, 2000 Record of Decision (ROD) (65 FR 1608) to allow for the fabrication of mixed oxide (MOX) fuel lead assemblies in France on a one-time basis. The January 2000 ROD stated that DOE would fabricate a limited number of lead assemblies at Los Alamos National Laboratory (LANL). However, because of cost and schedule impacts and programmatic considerations, lead assembly fabrication at LANL is no longer feasible.

The environmental impacts of fabricating lead assemblies in Europe were first evaluated in the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* (*Storage and Disposition PEIS*) (DOE/EIS-0229, December 1996). In accordance with DOE National Environmental Policy Act (NEPA) Implementing Procedures at Title 10, Section 1021.314(c), DOE/NNSA has prepared a Supplement Analysis (SA) for the *Fabrication of Mixed Oxide Fuel Lead Assemblies in Europe* (DOE/EIS-0229-SA3). This SA updates the environmental impacts of fabricating lead assemblies in France using

plutonium oxide from LANL. The SA concludes that the proposed fabrication of lead assemblies in France would not result in impacts significantly different from or significantly greater than those described in previous DOE NEPA documents. Therefore, DOE/NNSA will now pursue the fabrication of up to four lead assemblies in France at the existing Cadarache and MELOX facilities, using surplus plutonium from LANL. The lead assemblies will be returned to the United States for irradiation at Catawba Nuclear Station (Catawba)[1] in South Carolina.

FOR FURTHER INFORMATION CONTACT: For further information concerning the fabrication of lead assemblies in France, the Supplement Analysis entitled *Fabrication of Mixed Oxide Fuel Lead Assemblies in Europe*, or this amended ROD, contact Hitesh Nigam, NEPA Compliance Officer, Office of Fissile Materials Disposition, National Nuclear Security Administration, 1000 Independence Avenue, S.W., Washington DC, 20585; or leave a message at 800-820-5134.

For further information concerning DOE's NEPA process, contact Ms. Carol Borgstrom, Director, Office of NEPA Policy and Compliance (EH-42), U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, DC 20585, telephone 202-586-4600, or leave a message at 800-472-2756. Additional information regarding the DOE NEPA process and activities is also available on the Internet through the NEPA home page at http://tis.eh.doe.gov/nepa.

[1] Because the plants' refueling schedules determine the availability for lead assembly use, Duke Power Company has submitted a license amendment request to the NRC to allow irradiation of MOX lead assemblies at Catawba. The SA also analyzes the use of the McGuire Nuclear Station (McGuire) in North Carolina, which could be used in lieu of Catawba, if a license amendment request were submitted and approved.

SUPPLEMENTARY INFORMATION:

I. Background

The *Storage and Disposition PEIS* evaluated the potential environmental consequences of alternative strategies for the long-term storage of weapons-usable plutonium and highly enriched uranium and the disposition of weapons-usable plutonium that has been or may be declared surplus to national security needs. As part of this evaluation, the *Storage and Disposition PEIS* analyzed the environmental impacts of fabricating lead assemblies (and some initial MOX batch assemblies) in existing facilities in Europe in the event that it would be necessary to begin production more quickly than could be accomplished in the United States. The fabrication of lead assemblies (small quantities of nuclear fuel used by a commercial nuclear power plant to confirm that a new fuel design will perform safely and predictably) involves the same basic process as full-scale fabrication of MOX fuel and is required to support Nuclear Regulatory Commission (NRC) licensing activities and fuel qualification efforts. The *Storage and Disposition PEIS* evaluated transport of plutonium oxide from a storage facility at an existing DOE site to a U.S. port (Sunny Point, NC); port handling at the U.S. port; ocean transport to the European ports of Barrows, United Kingdom, and Cherbourg, France; ocean transport of MOX fuel back to the United States; and safe, secure trailer (SST) transport of MOX fuel from the U.S. port to either an existing commercial reactor site or a storage site in the United States. The shipping schedule projected two shipments of plutonium oxide per year and a maximum of four shipments of fresh (unirradiated) MOX fuel assemblies per year. The

Storage and Disposition PEIS also discussed the potential effect of ocean transport on the global commons.

Although the *Storage and Disposition PEIS* indicated that fabrication in Europe, if it occurred at all, would only be an interim measure, the PEIS analysis included not only the annual transportation impacts of shipments to and from Europe, but also the overall transportation impacts of performing all fuel fabrication work for the entire 50-metric-ton surplus plutonium inventory in Europe. These analyses indicate that total transportation fatalities resulting from both radiological and nonradiological risk to the public and workers for both routine and accident conditions associated with European MOX fuel fabrication for the entire inventory would range from 1.69 to 4.62 fatalities, depending on the hypothetical one-way distance to be traveled (i.e., 1,000 km to 4,000 km). Port handling impacts were also analyzed in the PEIS. The analysis determined that annual accident risks from exporting two shipments of plutonium oxide and importing four shipments of MOX fuel would not result in any latent cancer fatalities (LCFs) among workers or the general public. The analysis also indicates that the probability that these shipments would be involved in a maritime accident of sufficient severity to cause release of radioactive materials resulting in catastrophic consequences would be extremely small (on the order of 1.0×10^{-7}/yr to 1.0×10^{-8}/yr).

The ROD for the *Storage and Disposition PEIS*, issued on January 21, 1997 (62 FR 3014), outlined DOE's decision to pursue a hybrid disposition strategy. This strategy allowed for both the immobilization of some (and potentially all) of the surplus plutonium and the fabrication of some of the surplus plutonium into MOX fuel to be

irradiated in existing domestic, commercial reactors. The ROD made no decisions concerning lead assembly fabrication.

The environmental impacts of domestic fabrication of lead assemblies were evaluated in detail as part of the MOX fuel fabrication alternatives in the *Surplus Plutonium Disposition EIS* (SPD EIS) (DOE/EIS-0283, November 1999), which tiered from the *Storage and Disposition PEIS.* Specific facilities at five DOE sites were considered for this effort, based on site capabilities existing at that time: the Hanford Site in Washington, Idaho National Engineering and Environmental Laboratory Argonne National Laboratory West (ANL–W) facilities in Idaho, the Savannah River Site (SRS) in South Carolina, LANL in New Mexico, and Lawrence Livermore National Laboratory in California. The SPD EIS evaluated the environmental impacts of fabricating 10 fuel assemblies, irradiating up to 8 of them at existing commercial reactors (Catawba or McGuire), and performing post-irradiation examination at the Oak Ridge National Laboratory (ORNL) or ANL–W. This analysis included evaluation of transportation impacts.

The SPD EIS analyses indicate that environmental impacts from modification and routine operation of lead assembly fabrication facilities would be small; no LCFs would be expected in the general population from the postulated bounding design basis accident; nor would there be any traffic fatalities or LCFs expected from the associated transportation.

Among other decisions made in the ROD for the SPD EIS issued on January 11, 2000, DOE selected LANL as the site for lead assembly fabrication, to be followed by irradiation in U.S. commercial reactors and post-irradiation examination of selected fuel rods at ORNL.

II. Lead Assembly Fabrication in Europe

In May 2000, DOE determined that cost and schedule impacts and other programmatic considerations precluded lead assembly fabrication at LANL, and DOE discontinued related activities at LANL. DOE/NNSA is now proposing to use U.S. surplus plutonium from LANL to fabricate up to four lead assemblies in the existing Cadarache and MELOX facilities in France, and return those lead assemblies to the United States for irradiation. Consistent with decisions in the January 2000 ROD for the SPD EIS, the lead assemblies would be irradiated at Catawba, after which selected rods from lead assemblies would be transported to ORNL for post-irradiation examination.

As part of this proposed action, up to 140 kg of plutonium oxide from LANL would be transported by truck (one shipment consisting of three SST/Safeguards Transport [SGTs])[2] to a U.S. military port. The plutonium oxide would then be transferred to

[2] The SST/SGT is a specially designed component of an 18-wheel tractor-trailer vehicle. Although the details of the vehicle enhancements are classified, key characteristics are not, and include: enhanced structural supports and a highly reliable tie-down system to protect cargo from impact; heightened thermal resistance to protect the cargo in case of a fire; deterrents to protect unauthorized removal of cargo; couriers who are armed Federal officers that receive rigorous training and are closely monitored through DOE's Personnel Assurance Program; an armored tractor to protect the crew from attack, equipped with advanced communications equipment; specially designed escort vehicles containing advanced communications and additional couriers; 24-hour-a-day real-time monitoring of the location and status of the vehicle; and stringent maintenance standards.

Pacific Nuclear Transport Limited (PNTL) ships[3] at the port and transported across the Atlantic Ocean to Cherbourg, France (one shipment consisting of a two-ship convoy). The plutonium oxide would then be transferred to existing fabrication facilities in France (Cadarache and MELOX). After fabrication, PNTL ships would transport the lead assemblies and remaining archive and scrap material across the Atlantic Ocean back to the same U.S. military port. The lead assemblies would be transferred from the PNTL ships to SST/SGTs, and transported from the port to Catawba (one shipment consisting of four SST/SGTs). Archive (MOX pellets meeting fuel specifications) and scrap (out-of-specification MOX fuel pellets and remains from the pellet-grinding process) material would be transported from the port to LANL for storage (one shipment consisting of two SST/SGTs). Once the MOX facility becomes operational, these archive and scrap materials would be used as feed material during pellet production for MOX fuel that would be irradiated in existing U.S. commercial nuclear reactors.

DOE would obtain an export license from the NRC to transport plutonium oxide from the United States to France and would require a Certificate of Competent Authority from the Department of Transportation (based on the NRC review) for the two shipping containers (FS47 and FS65) required for this project. DOE submitted the export license application to the NRC in October 2003, which is currently under review. The application for certification of the FS47 was submitted on August 2003 and the FS65 is scheduled to be filed in December 2003.

[3] The PNTL ships are vessels specially designed to carry radioactive materials. Special safety features include: double hulls to withstand damage from a severe collision and remain afloat; enhanced buoyancy to ensure the ship stays afloat and maintains a stable attitude even in the most extreme circumstances; duplicate navigation, communications, electrical and cooling systems; dual propulsion systems; specialized fire fighting equipment; satellite navigation and tracking; and highly experienced crew members.

III. NEPA Process for Amending ROD

The Council on Environmental Quality (CEQ) regulations implementing NEPA at 40 CFR 1502.9(c) require Federal agencies to prepare a supplement to an EIS when an agency makes substantial changes in the proposed action that are relevant to environmental concerns or when there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. DOE NEPA Implementing Procedures at 10 CFR 1021.314(c) direct that when it is unclear whether a supplement to an EIS is required, an SA be prepared to assist in making that determination. DOE/NNSA has recently prepared the *Supplement Analysis for the Fabrication of Mixed Oxide Fuel Lead Assemblies in Europe* (DOE/EIS-0229-SA3) in accordance with these CEQ and DOE Procedures. The conclusions of the SA are summarized in Section IV of this amended ROD.

IV. Summary of Impacts

The SA focuses on the potential impacts (from both routine operations and postulated accidents) of transportation of materials, including cargo-handling activities at three alternative U.S. military ports, and the effects on the global commons of ocean transport. This is because the domestic activities proposed, other than those associated with transportation, remain essentially unchanged compared to the manner in which they were analyzed in the *Storage and Disposition PEIS* and the SPD EIS.[4] The ports evaluated in

[4] The only additional action needed for lead assembly fabrication in France, beyond those evaluated in previous NEPA documents, is the transport of archive and scrap materials to LANL for storage.

the SA are Charleston Naval Weapons Station in South Carolina, and Yorktown Naval Weapons Station and Norfolk Naval Station in Virginia.

Based on the analyses in the SA, the proposed fabrication of lead assemblies in France, specifically, overland transportation of plutonium oxide from LANL to any of the three ports, ocean transport to France, the return shipment of fresh MOX fuel lead assemblies to the United States, and subsequent transport of the lead assemblies to Catawba and archive and scrap materials to LANL, would not result in impacts significantly different from or greater than those described in either the *Storage and Disposition PEIS* or the SPD EIS. Where there are differences in impacts, they are small changes to impacts that are themselves small. Therefore, the activities evaluated do not represent substantial changes in any proposed actions or result in any new circumstances relevant to environmental concerns.

Impacts additional to or different from those previously evaluated would result from transportation of materials to implement this activity, such as movement of archive and scrap materials from the port to LANL. Some of the origins and destinations, and hence the routes, would be different than previously evaluated, and the shipping containers, although also approved Type B packages, would be different. However, there would be fewer shipments of material than previously anticipated.

The risk to the maximally exposed individual from the postulated severe truck accident involving shipment of plutonium oxide powder is extremely low. The risk estimated in the SA, 1×10^{-8} latent cancer fatality, is less than the risk estimated in the SPD EIS,

3.5×10^{-8} latent cancer fatality. Although more plutonium oxide powder would be available for release from the accident in the SA in the extremely unlikely event of a transportation accident involving a breach of the Type B package, there are fewer shipments, so the frequency of occurrence, hence overall risk, is lower.

Implementation of the proposed action would involve a very small increase in the use of the port facilities, with no construction at or modification of these facilities. Only three trucks (SST/SGTs) would arrive at the port to deliver the plutonium oxide to the dock where two PNTL ships, traveling in a two-ship convoy, would receive the cargo. The lead assemblies, archive, and scrap material would be transported back to the United States, also in a two-ship convoy, and would leave the port in a total of six trucks. It is not expected that the minimal additional transportation and cargo handling activities would result in any impacts to the local environment.

The SA analyzes a severe accident that involves a collision between the PNTL ship and another ship with an ensuing fire, resulting in the release of plutonium oxide powder. The SA analyzed the identical accident scenario for each of the three proposed U.S. ports, which would result in a population accident risk of 1.2×10^{-7} LCF for Charleston NWS, 1.1×10^{-7} LCF for Naval Station Norfolk, and 3.5×10^{-8} LCF for Yorktown NWS. The resulting individual LCF risk to the maximally exposed individual is 3.5×10^{-11} for Charleston NWS, 4.3×10^{-11} for NS Norfolk, and 2.0×10^{-11} for Yorktown NWS. By way of comparison, the *Storage and Disposition PEIS* reported an earlier DOE study that estimated the likelihood of a maritime accident of sufficient severity to cause significant release of radioactive material to be in the range of 1.0×10^{-8} to 1.0×10^{-9} per port call.

The probability of an accident at sea involving the PNTL is very unlikely because of the limited number of shipments (one two-ship convoy each way) as well as the redundant modern navigation systems on the ship. The probability of a significant release is further reduced because of the ruggedness of the PNTL design and the Type B packages. If plutonium oxide were released to waters of the global commons, the *Storage and Disposition PEIS* reports that plutonium oxide would dissolve very slowly, and would combine with sediments rather than remaining dissolved in the ocean water.

Archive and scrap materials meeting the stabilization criteria of DOE Standard DOE-3013-2000 would be stored in two Type B shipping packages. There is very little risk of either an inadvertent criticality, or dispersion of plutonium in the event of an accident, because the plutonium would be incorporated in a non-dispersible ceramic material. The dose rate at 1 m from the packages would not exceed 0.1 mrem/hr, which would result in only minimal personnel exposure, and would not exceed the dose rate from storage of archive and scrap materials as anticipated in the SPD EIS, which is estimated to be 0.15 mrem/hr at 1m.

Both the *Storage & Disposition PEIS* (at Section G.1.2.6) and the SPD EIS (at Section L.6.5) acknowledged that a threat could be presented by sabotage or terrorism, and concluded that adequate safeguards are in place to meet such a threat. Although the likelihood of an attempted act of sabotage or terrorism occurring is not precisely knowable, the chance of success of any such attempt was judged to be very low, particularly in light of the transport methods to be employed by DOE in these shipments, which are designed specifically to afford security against sabotage or terrorism, as well as safety in the event of an accident. In preparing the SA, DOE

again considered sabotage or terrorism and determined that adequate safeguards remain in place to meet such threats.

Based on these analyses, DOE/NNSA has determined that the potential environmental impacts associated with lead assembly fabrication in France are within the impacts evaluated in the *Storage and Disposition PEIS* and the SPD EIS. Fabricating lead assemblies at existing MOX fuel fabrication facilities in France would not constitute significant new circumstances or information relevant to environmental concerns and bearing on the previously analyzed action or its impacts either in the United States or affecting the global commons. Therefore, pursuant to 10 CFR 1021.314(c), no additional NEPA analysis is required by DOE/NNSA in order to fabricate MOX fuel lead assemblies in France.

V. Response to Public Comments

DOE has received letters requesting that it prepare a supplemental EIS on the fabrication of lead assemblies in Europe. These requests convey concerns that public safety is put at risk by the proposal to fabricate MOX fuel lead assemblies in Europe. In particular, concerns have been expressed about the transportation of plutonium to and from Europe and the safety of the facilities in France. One letter received by DOE alleges that the proposal to fabricate lead assemblies in Europe has not been analyzed in an EIS, and therefore that an SA is not an appropriate document in which to analyze the proposal.

DOE disagrees with the last assertion. Fabrication of MOX fuel assemblies in Europe was specifically analyzed in the *Storage and Disposition PEIS.* In that evaluation, the transportation impacts of fabricating the entire 50 metric tons of surplus plutonium in Europe (as opposed to the current proposal to use up to 0.14 metric tons to fabricate four lead assemblies) was analyzed. The *Storage and Disposition PEIS* was issued for public review and comment in accordance with NEPA requirements. DOE/NNSA believes that this afforded the public ample opportunity to comment on fabrication of MOX fuel in Europe.

As the analysis presented in the SA makes clear, the potential environmental impacts associated with lead assembly fabrication in Europe are within the impacts evaluated in the *Storage and Disposition PEIS* and the SPD EIS. In this analysis, particular attention has been given to the impacts of transportation. As part of this analysis, the SA evaluates impacts of activities that affect the global commons outside the jurisdiction of any one nation. The SA does not address the impacts of the proposal in France, however, because DOE believes that it is neither required nor appropriate under NEPA to evaluate the safety or environmental impacts of an activity within and under the jurisdiction and control of another sovereign nation. Nevertheless, DOE wishes to emphasize that the transportation activities and facilities in France will be government-licensed and conducted and operated under strict standards. Accordingly, DOE/NNSA has concluded that preparation of a supplemental EIS is not needed.

VI. Amended Decision

DOE/NNSA will use U.S. surplus plutonium from LANL to fabricate up to four mixed oxide fuel lead assemblies in France on a one-time basis. The plutonium oxide will be transported overland from LANL to Charleston NWS,[5] and then shipped across the Atlantic Ocean to Cherbourg, France. The plutonium oxide will be fabricated at existing facilities in France (Cadarache and MELOX). After fabrication, lead assemblies and archive and scrap materials will be returned to the United States through Charleston NWS.

Consistent with decisions in the January 2000 ROD for the SPD EIS, these lead assemblies will be transported to Catawba[6] for irradiation, and selected rods from the irradiated lead assemblies will be transported to ORNL for post-irradiation examination. Archive and scrap materials will be stored at LANL. This decision will allow DOE to fabricate lead assemblies on a schedule compatible with DOE's MOX fuel fabrication schedule.

Issued in Washington, DC, this 7th day of Nov, 2003

C S Przybylek

Charles S. Przybylek
Chief Operating Officer
National Nuclear Security Administration

[5] However, if Charleston Naval Weapons Station is not available to support the schedule, either Yorktown Naval Weapons station or Naval Station Norfolk could be used for both the outbound and return shipments, after appropriate notifications and agreements have been made.

[6] The plants' refueling schedules determine availability for lead assembly use. Duke Power Company submitted a license amendment request to the NRC for Catawba. However, if needed, McGuire could also be used, provided a license amendment request was submitted and approved.