November 10, 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)	)	

NRC STAFF'S RESPONSE TO (1) BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE'S SUPPLEMENTAL PETITION TO INTERVENE AND (2) NUCLEAR INFORMATION AND RESOURCE SERVICE'S CONTENTIONS

INTRODUCTION

Pursuant to 10 C.F.R. § 2.714(c) and the Atomic Safety and Licensing Board's Order dated October 3, 2002,[1] the staff of the Nuclear Regulatory Commission (Staff) hereby responds to the Blue Ridge Environmental Defense League's (BREDL) Supplemental Petition to Intervene, filed October 21, 2003, and the Contentions of the Nuclear Information and Resource Service (NIRS), filed October 21, 2003. The Staff herein addresses the admissibility of BREDL and NIRS' proposed contentions. For the reasons set forth below, the Staff submits that BREDL's Contentions 1 through 6, 8 and 9, and NIRS' Contentions 1 through 5, do not meet the Commission's standards for admissible contentions. BREDL Contention 7 meets the standards and, therefore, to the extent discussed below, the Staff does not oppose its admission.

BACKGROUND

On February 27, 2003, Duke Energy Corporation (Duke) submitted a proposal to amend its operating licenses and technical specifications for McGuire Nuclear Station, Units 1 and 2 (McGuire), and Catawba Nuclear Station, Units 1 and 2 (Catawba). *See* Letter from M.S. Tuckman to NRC, "Proposed Amendments to the Facility Operating License and Technical Specifications

[1] Order (Granting Request for Extension of Time), (Oct. 3, 2002).

to Allow Insertion of Mixed Oxide Fuel (MOX) Lead Assemblies and Request for Exemption from Certain Regulations in 10 C.F.R. § Part 50" (February 27, 2003) (hereinafter License Amendment Request or LAR). Duke requested that the NRC approve the LAR and allow the insertion of a total of four Mixed Oxide (MOX) fuel lead test assemblies (LTAs) at either plant, as well as grant exemptions from certain regulations pursuant to 10 C.F.R § 50.12.[2] On September 23, 2003, Duke amended the application to limit the request to the use of MOX at Catawba Nuclear Station, Units 1 and 2. Letter from M.S. Tuckman, Duke, to the NRC, (amending license renewal application) dated Sept. 23, 2003, served on the Board and parties by letter from Anne W. Cottingham, Counsel for Duke, dated Sept. 24, 2003.

On July 25, 2003, the Staff issued a "Notice of Consideration of Issuance of Amendment to Facility Operating License and Opportunity for a Hearing." *See* 68 Fed. Reg. 44107 (2003). In that notice, the Staff stated it was considering Duke's LAR and invited interested persons to file requests for a hearing and petitions to intervene in the proceeding. *See id.* at 44,107. On August 21 and August 25, 2003, NIRS and BREDL filed separate petitions requesting a hearing and seeking to intervene in the license amendment proceeding.[3] On September 9, 2003, Duke filed its answer to the petitions to intervene, and on September 15, 2003, the Staff filed its answer.[4] The answers addressed standing to intervene and aspects. On September 23, 2003, the Atomic Safety

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[2] Duke requested exemptions from portions of 10 C.F.R. § 50.44, 50.46 and Appendix A to 10 C.F.R. Part 50. LAR, Attachment 6.

[3] *See* Blue Ridge Environment Defense League's Request and Petition to Intervene (August 25, 2003) (BREDL Petition); Nuclear Information & Resource Service's Request for Hearing and Petition to Intervene (August 25, 2003) (NIRS Petition).

[4] *See* Answer of Duke Energy Corporation to the Petitions to Intervene and Requests for Hearing of the Nuclear Information and Resource Service and Blue Ridge Environmental Defense League (September 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 Request for Hearing (September 15, 2003).

and Licensing Board (Board) issued a scheduling order.[5] In response to that order, and an additional order extending time to file, BREDL and NIRS filed separate petition supplements containing proposed contentions on October 21, 2003.[6]

DISCUSSION

1. Standing

Attached to BREDL's supplemental petition are nineteen affidavits from BREDL members, many of whom reside within 20 miles of Catawba. The BREDL members authorize BREDL to represent them in this matter and meet the standing requirements for intervention in NRC proceedings. Based on the statements in the affidavits, the staff does not object to BREDL's standing in this case.

2. Legal Standards for the Admission of Contentions

To gain admission to a proceeding as a party, a petitioner for intervention, in addition to establishing standing and raising an aspect within the scope of the proceeding, must submit at least one valid contention that meets the requirements of 10 C.F.R. § 2.714(b). *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 333 (1999); *Yankee Atomic Electric Co.* (Yankee Nuclear Power Station), CLI-96-7, 43 NRC 235, 248 (1996). For a contention to be admitted, it must consist of a specific statement of the issue of law or fact to be raised or controverted, and must be accompanied by: (1) a brief explanation of the bases for the contention; (2) a concise statement of the alleged facts or expert opinion supporting the contention, with references to specific sources and documents on which the petitioner intends to rely in establishing the facts or expert opinion; and (3) sufficient information to show that a genuine dispute exists with

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[5] *See* Order (Setting Deadlines, Schedule, and Guidance for Proceedings), (Oct. 3, 2002).

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

the applicant on a material issue of law or fact, with references to the specific portions of the application in dispute and the basis for the dispute. *See* 10 C.F.R. § 2.714(b)(2). Failure of a contention to comply with any one of these requirements is grounds for dismissing the contention. 10 C.F.R. § 2.714(d)(2)(i); *Arizona Public Service Co.* (Palo Verde Nuclear Generating Station, Units 1, 2 and 3) CLI-91-12, 24 NRC 149, 155-56 (1991). *See also* Rules of Practice for Domestic Licensing Proceedings -- Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168, 33,168-69 (1989).

"The intervenor must do more than submit 'bald or conclusory allegation(s)' of a dispute with the applicant." *Dominion Nuclear Connecticut Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 358 (2001) (citation omitted). "He or she must 'read the pertinent portions of the license application, . . . state the applicant's position and the petitioner's opposing view.'" *Id.* There must be a specific factual and legal basis for the contention. *Id.* "[P]residing officers may not admit open-ended or ill-defined contentions lacking in specificity or basis." *Id.*

A contention must be dismissed where the "contention, if proven, would be of no consequence . . . because it would not entitle [the] petitioner to relief." 10 C.F.R. § 2.714(d)(2)(ii). Moreover, contentions that are not supported by some alleged fact or facts should not be admitted nor should the full adjudicatory hearing process be triggered by contentions that lack a factual and legal foundation. *Oconee*, CLI-99-11, 549 NRC at 335 (citing Final Rule, Procedural Changes in the Hearing Process, 54 Fed. Reg. at 33, 170). The Board should not uncritically accept an assertion that a document or other factual information or an expert opinion supplies the basis for a contention, but should review the information to ensure that it does so. *See, e.g., Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), ALAB-919, 30 NRC 29, 48 (1989), *vacated in part on other grounds and remanded,* CLI-90-4, 31 NRC 333 (1990). *See also Yankee Atomic Electric Co.* (Yankee Nuclear Power Station), LBP-96-2, 43 NRC 61, 90 (1996).

Pursuant to section 2.714, a petitioner must provide a "clear statement as to the basis for the contentions and the submission of . . . supporting information and references to specific documents and sources that establish the validity of the contention." *Palo Verde*, CLI-91-12, 34 NRC at 155-56. *See also, Dominion Nuclear Connecticut, Inc.*, (Millstone Nuclear Power Station, Unit 2), CLI-03-14, 58 NRC __ (2003), sl. op. at 7 (October 23, 2003), citing *Oconee*, CLI-99-11, 49 NRC at 333. The purpose of the basis requirement of section 2.714(b)(2) is (1) to assure that, at the pleading stage, the hearing process is not invoked improperly, (2) to assure that the contention raises a matter appropriate for adjudication in a particular proceeding; and (3) to put other parties sufficiently on notice of the issues so that they will know generally what they will have to defend or oppose. *Philadelphia Electric Co.* (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-216, 8 AEC 13, 20-21 (1974). Further, the petitioner has the obligation to formulate the contention and provide the information necessary to satisfy the basis requirement of 10 C.F.R. § 2.714(b)(2). *See also Millstone*, CLI-01-24, 54 NRC at 362-63, n.10; *Statement of Policy on Conduct of Adjudicatory Proceedings*, CLI-98-12, 48 NRC 18, 22 (1998). Any deficiencies in the contentions or bases cannot be remedied by the Licensing Board. *See Millstone*, CLI-01-24, 54 NRC at 362-363, n.10. In *Millstone*, the Commission stated:

> [The] contention rule is strict by design. It thus insists upon some reasonably factual or legal basis for a petitioner's allegations. 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.

Millstone, CLI-03-14, sl. op. at 7-8 (quotations and citations omitted).

3. <u>BREDL Contentions</u>

> <u>BREDL CONTENTION 1</u>: Failure to Provide Quantitative Information in Risk Impact Analysis.
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> Duke's risk impact analysis is inadequate, because it presents the results of its analysis in qualitative terms only.

> Basis: In Section 3.8 of the LTA license amendment application, Duke presents an analysis of the risk impact of the license amendment that is nominally based on Duke's probabilistic risk assessment ("PRA"). Duke claims that "the use of four MOX lead test assemblies ... will not significantly change the risk to public health and safety that is posed by the operation of Catawba and McGuire." License Amendment Application at 3-36. However, despite the fact that the PRA is obviously a quantitative study, Duke provides only qualitative arguments for its claim that the probability of a severe accident will not significantly increase. 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. By failing to provide its quantitative calculations, Duke's risk analysis fails to provide an adequate basis for the NRC to conclude that the increases in core damage frequency or risk are "small and consistent with the intent of the Commission's Safety Goal Policy Statement," an important criterion for risk-informed decision-making. *See* Regulatory Guide ("RG") 1.174, Rev. 1, An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis at 1.174-6 (2002).

BREDL Contentions at 4.

STAFF RESPONSE TO CONTENTION 1:

This proposed contention is inadmissible. BREDL states 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, and that by failing to provide its quantitative calculations, Duke's risk analysis fails to provide an adequate basis for the NRC to conclude that the increases in core damage frequency or risk are "small and consistent with the intent of the Commission's Safety Goal Policy Statement," an important criterion for risk-informed decision-making. BREDL Contentions at 6. This license amendment request, however, is not risk -informed. Therefore, the risk analysis proposed by BREDL is not necessary. The license amendment request falls under the NRC's traditional engineering (deterministic) criteria and regulations. In order for an amendment request to be considered risk-informed it must meet certain criteria. A risk-informed licensing action is defined as:

> Any licensing action that uses quantitative or qualitative risk assessment insights or techniques to provide a key component of the bases for acceptability of the proposed action. Mere mention of qualitative or quantitative risk insights does not in itself make a licensing action risk informed.

NRR Office Instruction, License Amendment Review Procedure, LIC-101, Rev. 2, Chapt. 7.2.1 (ML023370629). *See also* NUREG-0800, Standard Review Plan (SRP), Chapter 19, Rev. 1, Use of Probabilistic Risk Assessment in Plant-Specific, Risk-Informed Decisionmaking: General Guidance, at SRP 19-4.

In the instant case, the licensee has submitted some risk information, but the information, while it may be looked at during the Staff's review, does not play a large role and is not a key component in the decision making process. *See* LIC-101, Rev. 2, Chapt. 7.2.1; NUREG-0800, Chapt. 19, Rev. 1, sect. 1. Changes in the CDF or LERF are not required to be addressed or calculated for this deterministic amendment. Because quantitative risk assessments are not required, BREDL has failed to provide a legal or factual basis for the contention and has failed to raise issues that are admissible in this proceeding. Moreover, the NRC does not require submittal of analyses for beyond design basis or severe accidents for license amendments. *See, Florida Power and Light Co.* (St. Lucie Nuclear Power Plant, Unit No. 2), ALAB-603, 12 NRC 30, 45 (finding that an accident with a conservatively calculated probability of 10(-6) per year or a realistically calculates probability of 10(-7) per year did not have to be considered in designing a plant).

Finally, BREDL cites, as authority for its basis, Regulatory Guide 1.174 (RG 1.174). This Reg. Guide provides guidance to licensees on acceptable risk-informed licensing submittals. *See* NRC Regulatory Issue Summary 2001-02: Guidance on Risk-Informed Decisionmaking in License Amendment Reviews (January 18, 2001) (ADAMS Accession No. ML003778249). In the instant case, RG 1.174 is not relevant because the LAR is not a risk-informed LAR. As discussed above, the staff employs its traditional deterministic review of the request, thus making the guidance

provided in RG 1.174 irrelevant. Additionally, like other regulatory guides, RG 1.174 merely presents guidance from the staff regarding risk-informed LARs. Therefore, although Duke supplied some risk information in Section 3.8 of its license amendment application, it was not necessary.

Since the risk information is not required for approval of the license amendment, then the information is not material to the amendment. Thus, there is no dispute as to a material fact or issue of law. Therefore, the contention does not meet the requirements of 10 C.F.R. § 2.714(b), and it should be rejected.

> BREDL CONTENTION 2: Inappropriate use of SPDEIS for Estimate of Consequence Increase
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> Duke has failed to support its claim that the increase in severe accident consequences associated with the MOX LTA loading will not be significant.

BREDL Contentions at 5. As a basis for their contention, BREDL argues that Duke made mistakes in its LAR when it described the consequences of severe accidents. *See id.* at 5-6. Further, BREDL asserts that the risk impacts of MOX fuel use cannot be evaluated because of an alleged deficiency in RG 1.174. *See id.* at 6.

STAFF RESPONSE TO CONTENTION 2

The proposed contention is inadmissible. The contention fails to address any issues material to this proceeding as required by 10 C.F.R. § 2.714 (b)(2)(iii). BREDL's arguments all relate to safety and risk issues regarding severe accident consequences of irradiating the LTAs. These issues, however, are not relevant in the instant proceeding. Prior NRC precedent states that licensees need not design against severe accidents. *St. Lucie*, 12 NRC at 45. Further, BREDL has failed to specify any accident sequences, not previously analyzed by the applicant, that, because of irradiation of MOX LTAs, must be included in the LAR.

Moreover, BREDL's argument that RG 1.174 is implicated in this proceeding is, at best, misguided. As discussed in the Staff's answer to Contention 1, RG 1.174 is used by applicants that

are filing a "risk-informed" license amendment request. In the instant case, RG1.174 is not relevant because Duke does not justify the LAR on the basis of its meeting the risk-informed guidance of RG 1.174. Therefore, the staff employs its traditional deterministic review of the request, thus making the guidance provided in RG 1.174 irrelevant. Additionally, like other regulatory guides, RG 1.174 merely presents guidance from the staff regarding risk-informed LARs. Consequently, BREDL's argument that the LAR cannot be assessed because of some perceived deficiency in RG 1.174 is unfounded, since the guide is not applicable to the instant LAR.

This contention does not meet the requirements of 10 C.F.R. § 2.714(b) in that it fails to show that there is a genuine dispute on a material issue of fact or law. It, therefore, should be rejected.

> BREDL CONTENTION 3: Failure to Evaluate Containment Sump Failure
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> The discussion of risk impacts of MOX fuel lead assemblies in Section 3.8 of the LTA application is incomplete, because it does not include an evaluation of the effect of containment sump failure on risk impacts of operating the Catawba nuclear power plant with four MOX fuel assemblies.

BREDL Contentions at 7. As a basis for this contention, BREDL relies on a handout from the Union of Concerned Scientists (UCS) and claims that the LAR is deficient because it fails to analyze issues related to sump clogging (GSI-191). BREDL Contentions at 7.

STAFF RESPONSE TO CONTENTION 3

The proposed contention is inadmissible. The contention should not be admitted because it fails to provide a technical basis for BREDL's arguments and it contains no factual support for the bald assertion that somehow the type of fuel irradiated bears any relation to the sump clogging issue. Furthermore, BREDL fails to cite any regulation or relevant case law that would require that Duke address the issue of sump clogging in its LAR. Finally, there are no material issues of fact

or law in dispute, because the contention relates to risk and this is not a risk-informed license amendment.

Central to this proposed contention is BREDL's argument that the baseline core damage frequency for Catawba could be "much higher than was assumed in the Catawba PRA, thereby driving up the total risk impact associated with the increased consequences of a severe accident involving the MOX LTA core." *Id.* at 8. BREDL, however, provides no technical basis for its argument. In making its assertion, BREDL purports to rely on a UCS report, which, in turn, references an NRC contractor report prepared by Los Alamos National Laboratory (LANL). However, none of the documents BREDL cites supports its assertion. For example, the UCS document itself states "[t]he proposal to place [LTAs] in the Catawba and McGuire reactors may not increase the probability for a loss of coolant accident." *See* UCS at 3. Further, the LANL report itself, on its face, states that its results "have a number of limitations that make them ill-suited for making a determination of whether a specific plant is vulnerable to sump failure." NUREG/CR-6762, Vol. 1, "GSI 191 Technical Assessment: Parametric Evaluations for Pressurized Water Reactor Recirculation Sump Performance" at xi (August 2001); *see also* Letter from J.E. Dyer to David Lochbaum at 4 (October 22, 2003) (ADAMS Accession No. ML032930295) (stating that the LANL report's findings do not provide an adequate basis for drawing conclusions about a specific plant). Therefore, it is clear that BREDL has failed to provide any expert opinion which would support their contention as required by 10 C.F.R. §2.714 (b)(2)(ii). Alternatively, even if one assumes that BREDL has adequately supported their claims regarding core damage frequency at Catawba as it relates to sump performance, BREDL still failed to provide any support for their bald assertion that there would be increased consequences of a severe accident if it involved a reactor using MOX LTAs. *See id.* at 8. None of the citations or materials offered to support proposed contention 3 support this claim and as such it fails to meet the requirements of 10 C.F.R. § 2.714 (b)(2)(ii).

Moreover, there is no requirement that sump clogging due to the use of MOX be considered as part of the accident analysis which supports the LAR, and BREDL cites to no authority in support of its claim that such consideration is required.

Finally, because this is not a risk-informed amendment, the contention does not raise a genuine dispute regarding a material issue of fact or law. Also, it does not provide a technical basis for its assertions. Thus, it is inadmissible under 10 C.F.R. § 2.714(b).

> BREDL CONTENTION 4: Failure to Evaluate Future Use of MOX Fuel
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> The Environmental Report for the LTA application (Attachment 5) is deficient because it completely fails to address the environmental impacts of using batch quantities of MOX fuel in the Catawba and McGuire reactors. Duke's failure to address the impacts of MOX use in its Environmental Report is inconsistent with Council on Environmental Quality ("CEQ") regulations and judicial and NRC decisions interpreting NEPA, which require consideration of connected actions, as well as cumulative impacts.

BREDL Contentions at 9. As a basis for their proposed contention, BREDL cites to regulations from the Council on Environmental Quality (CEQ) and claims that the current proposal to irradiate LTAs is "connected" to and "interdependent" with the possible use of batch quantities of MOX fuel at Catawba. *See id.* at 9-11. Therefore, BREDL concludes, Duke has impermissibly segmented their review of the environmental impacts of their proposal and, as a result, Duke's ER is deficient. *Id.*

STAFF RESPONSE TO CONTENTION 4

The proposed contention is inadmissible. As the Commission clearly held in *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-14, 55 NRC 278, 295 (2002), the possibility of a future license amendment to use batch quantities of MOX fuel is not sufficient to warrant consideration of any potential, as yet undefined, impacts in the current ER. In that case, the Commission reasoned that a Board decision admitting a contention regarding future use of MOX fuel at Catawba and McGuire must

be reversed because "Duke [had] submitted no 'proposal' (i.e., a license amendment application) to use MOX fuel." *Id.* at 294-95. It is clear that the Commission equated the "proposal" with a license amendment request.

In the instant case, BREDL presents no facts that would satisfy the Commission's requirement of a license amendment request. BREDL cites to Duke's September 15, 2003 revision to the security plan and argues that Duke's request that the Staff review certain changes to the security plan for Catawba necessarily indicates "that the proposed changes to the security plan will apply to batch MOX fuel use as well as LTA testing."[7] BREDL Contentions at 10 (citing Letter from M.S. Tuckman to NRC, "Revision 16 to Duke Energy Corporation Physical Security Plan and Request for Exemption from Certain Regulatory Requirements in 10 C.F.R. 11 and 73 to Support MOX Fuel Use" (September 15, 2003) (Revision 16)). BREDL alleges that, as a result of the submittal, Duke has, in fact, proposed the irradiation of batch quantities of MOX fuel. *See id.* at 10-11. Further, BREDL alleges that "[b]y seeking to put important measures in place for batch MOX fuel use, Duke has demonstrated that its plans to use MOX fuel are 'concrete.'" *Id.* at 11. BREDL, however, never addresses the Commission's language, cited above, which equates a "proposal" with a license amendment request. In light of the Commission's clear language in its prior decision, BREDL would need to show that an actual request (in the form of a license amendment request) to use batch quantities of MOX fuel at Catawba has been filed with the Commission. Therefore, as a result of the Commission's clear precedent and the lack of a license amendment request to irradiate batch quantities of MOX fuel, the contention must be dismissed.

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[7] Notably, the staff has already communicated to Duke that it will only review its security related submittal in relation to the LTAs and that any review covering use of batch quantities of MOX must be deferred until Duke makes a proposal for such use (*i.e.*, a license amendment request). *See* Letter from Robert E. Martin to Michael S. Tuckman, Re. Mixed Oxide Fuel Assemblies (October 31, 2003) (ADAMS Accession No. ML033040017) (Attachment 1).

> BREDL CONTENTION 5: Failure to Consider New Information Showing Viability of Alternatives.
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> The Environmental Report is deficient because it fails to consider alternative nuclear power plants for testing and batch MOX fuel use, other than Catawba and McGuire.
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> Basis : In Sections 5.2.2 and 5.7, Duke states that no alternatives other than the proposed action or no-action alternatives are viable. Duke does not explain the reason for this assertion. In any event, it is incorrect. New information, not considered in the SPDEIS, demonstrates that McGuire and Catawba are not appropriate choices for MOX fuel batch use, because of two significant previously unidentified design flaws that make them particularly vulnerable to accidents, including containment breach. This new information compels a re-evaluation of conclusions previously reached in the SPDEIS. . . .
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> * * *
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> The new information . . . , regarding the heightened vulnerability of the Catawba and McGuire containments to breach or rupture, and the heightened vulnerability of plant cooling systems to clogging, could significantly increase the overall risk of an accident over other nuclear power plants if MOX fuel were used. Therefore, before LTA testing is allowed, the new information should be considered in a supplemental EIS.

BREDL Contentions at 10-16.

STAFF RESPONSE TO CONTENTION 5

BREDL asserts that Duke's ER is inadequate because it fails to consider nuclear power plants besides Catawba for testing and batch MOX fuel use.[8] BREDL Contentions at 12. This proposed contention is inadmissible. BREDL fails to provide an adequate basis for requiring Duke to consider alternatives, such as reactors with non-ice condenser containment, that are outside the scope of its application. BREDL also does not provide any authority requiring Duke to explain why

[8] Duke's application is for four MOX LTAs. As discussed above, in response to BREDL contention 4, batch quantities are outside the scope of this proceeding.

alternatives other than the proposed action and the no action alternative were not viable. In sum, the proposed contention lacks legal support.

BREDL states that Duke must consider non-ice condenser containments as an alternative because ice condenser containments, like Catawba, have a heightened vulnerability to sump clogging and containment breach in the event of hydrogen ignition. BREDL Contentions at 12-13. However, BREDL fails to establish a relationship between the ice condenser containment's alleged increased vulnerability and the irradiation of MOX.[9] As discussed in the staff's response to BREDL contention 2, generic safety issues that are not related to the use of MOX are not within the scope of this proceeding; therefore, this contention must be rejected because BREDL failed to provide any basis that requires Duke to explore irradiating MOX LTAs at non-ice condensers as an alternative.

Moreover, this contention is inadmissible because it does not limit the alternatives analysis to the reactors owned or operated by Duke.[10] The purpose and need of Duke's proposed action is to provide for the irradiation of four MOX LTAs at a reactor owned or operated by Duke, and thereby evaluate the performance of MOX fuel in that reactor. *Allison v. Department of Transp.*, 908 F.2d 1024, 1031 (D.C. Cir. 1990) (holding that based on purpose and need of action, "rule of reason" is followed in deciding which alternatives are "reasonable" or feasible," as well as to what extent they must be discussed). Duke's goals, which are company specific and economically

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[9] BREDL states that DOE's SPDEIS must be re-evaluated due to new information regarding the general heightened vulnerability of ice-condenser containment to breaching and sump clogging accidents. BREDL Contentions at 12, 13. Because the NRC staff does not have the jurisdiction to issue a supplemental EIS to the SPDEIS or the authority to require DOE to do so, BREDL's contention is outside the scope of this proceeding.

[10] In addition, exploring the alternative of irradiating MOX at other plants is not feasible, because neither Duke nor the NRC can initiate the application process to amend licenses of other reactors to allow the use of MOX. *Hydro Resources, Inc.*, 53 NRC at 55 ("Nor does the initiative to build a nuclear facility or undertake ISL uranium mining belong to the NRC.")

based, cannot be achieved by another power company; therefore, Duke was not required to evaluate in depth in its ER the irradiation of MOX at reactors owned by other companies.[11] *Hydro Resources, Inc.*, CLI-01-04, 53 NRC 31, 55 (2001) ("Agencies need only discuss those alternatives that are reasonable and 'will bring about the ends' of the proposed action. . . . When the purpose is to accomplish one thing, it makes no sense to consider the alternative ways by which another thing might be achieved. . . . The agency . . . may take into account the 'economic goals of the project's sponsor."); *Citizens Against Burlington v. Busey*, 938 F.2d 190, 198 (D.C. Cir. 1991), *cert. denied*, 502 U.S. 994 (1991) (holding that consideration of alternative sites was unnecessary where those alternatives would not accomplish purpose defined by agency). It is not Duke's goal for MOX to be used at a reactor not owned or operated by Duke or for any other power company in the United States to provide services to DOE; BREDL cannot redefine the goals of Duke's proposed action to broaden the scope of the alternatives to be examined to include reactors owned by other power companies.[12] *Busey*, 938 F.2d at 199 ("An agency cannot redefine the goals of the proposal that arouses the call for action; it must evaluate alternative ways of achieving its goals, shaped by the application at issue and by the function that the agency plays in the decisional process."). BREDL, therefore, failed to provide any legal basis that requires Duke to consider reactors it does not own or operate in its alternatives analysis.

Finally, BREDL asserts that Duke's ER is inadequate because it fails to explain why no alternatives other than the proposed action and no-action alternative were viable, but fails to cite to any statutes, regulations or case law that require the report to contain a detailed explanation of

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[11] Although the use of MOX fuel at other reactors was not discussed in depth, it was considered. LAR at 5-1.

[12] Although the use of MOX at other sites is an alternative that will achieve DOE's goal of disposing of the weapon-grade plutonium, irradiating MOX at other sites will not achieve Duke's goals of burning MOX at one of its own reactors and providing irradiation services to DOE.

why alternatives were deemed not appropriate. *Id.* at 12. The regulations do not compel a discussion of inappropriate alternatives. 10 C.F.R. § 51.45; 10 C.F.R. Part 51, App. A, § 5. *See also* 40 C.F.R. § 1502.14(a) (Council on Environmental Quality regulations requiring only a brief discussion in EISs, and not a comprehensive evaluation, why reasonable, but not viable, alternatives were eliminated from detailed study). Regardless, Duke supplemented its application with a letter that stated that the timing of the availability of the LTAs supported the operational schedule at Catawba, thus explaining why McGuire was not a viable alternative. *See* September 23, 2003 letter from M. S. Tuckman, Duke, to NRC.

Based on the discussion above, the contention should be rejected because it fails to meet the requirements of 10 C.F.R. § 2.714(b).

> BREDL CONTENTION 6: Failure to Provide Quantitative Information in Support of Assertions re Environmental Impacts.
>
> Duke fails to provide quantitative support for its assertion that the consequences of a severe accident involving use of LTA MOX fuel assemblies will increase 0.3% at most.
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> Basis: In Section 5.6.3.2 of the Environmental Report, Duke asserts that use of MOX LTAs will have no significant impacts. As in Section 3.8, while Duke's assertions are obviously based on probabilistic risk calculations, Duke provides only qualitative arguments in support of this claim. 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. By describing environmental impacts in purely qualitative terms, when it also has the information in quantitative terms, Duke violates the requirement of 52.45(c)(sic) that the analysis in an Environmental Report must quantify the various factors considered "to the extent possible." In order to document the risk analysis on which Duke relies for its conclusions regarding environmental impacts, Duke must provide all the details of its consequence assessment, including a full description of core inventory, release fractions, consequence modeling, techniques used, and a full accounting of uncertainties.

BREDL Contentions at 13.

STAFF RESPONSE TO CONTENTION 6

This proposed contention is inadmissible. BREDL alleges that Duke provides only qualitative arguments in support of this claim. Duke does not attempt to calculate the changes in

CDF and LERF associated with the proposed license amendment. BREDL then claims that Duke must provide all the details of its consequence assessment, including a full description of core inventory, release fractions, consequence modeling, techniques used, and a full accounting of uncertainties. BREDL provides little, if any, basis for its contention that the ER is deficient in this respect. BREDL does not state why Duke must provide all the details of its consequence assessment, including a full description of core inventory, release fractions, consequence modeling, techniques used, and a full accounting of uncertainties, other than to cite 10 C.F.R. § 51.45(c). Mere citation of the regulation, without more, is insufficient to support the contention. The regulation does not require unnecessary details, nor does it require the preparation of a PRA, which is essentially what BREDL is demanding in this contention. No Commission regulation requires Duke to prepare a PRA in support of its application. *See, e.g., Duke Cogema, Stone and Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-01-35, 54 NRC 403, 447 (2001).

Regarding BREDL's claim that Duke did not attempt to calculate the changes in CDF and LERF associated with the proposed license amendment, BREDL does not provide any facts or expert opinion that would indicate that there would be changes to CDF or LERF. *See supra* Staff Response to Contention 2. Therefore, the contention does not meet the requirements of 10 C.F.R. § 2.714(b), in that it is not supported by fact or expert opinion, and should be rejected.

The Staff notes that BREDL also fails to acknowledge the quantitative data that is in the application or related documents. Although the conclusions regarding the impact of MOX on risk are presented in qualitative terms, these conclusions are supported by quantitative assessments. For example, the qualitative statements comparing the decay heat levels and offsite consequences for MOX and LEU fuel, which are central to Duke's risk arguments, are supported by results of quantitative assessments. A quantitative comparison of MOX and LEU decay heat levels is provided in Section 3.7.2.5 and Figure 3-12 of the LAR. A quantitative description of MOX and

LEU source terms and frequencies, site population and evacuation assumptions, and calculated offsite consequences for the most risk-significant beyond-design-basis accidents and release categories is presented in Appendix K of Volume 2 of the SP DEIS. *See* LAR, Attachment 5, 5-8 to 5-13. The quantitative assessment of accident impacts documented in Appendix K of Volume 2 of the SP DEIS provides a basis for comparing the risks associated with MOX and LEU fuel. Furthermore, even assuming that BREDL is correct that the increase in consequences would be between (-)0.2% and (+)0.7%, the increase is still under 1%. The petitioner fails to acknowledge the information contained in the LAR, and to justify why a more detailed risk assessment is needed.

As stated above, the contention is not supported by relevant facts or expert opinion. In addition, BREDL ignores quantitative information that is in the LAR and referenced documents. In addition, BREDL has not demonstrated that there is a genuine dispute regarding a material issue of law or fact. The contention does not meet the requirements of 10 C.F.R. § 2.714(b) and should be rejected.

> BREDL CONTENTION 7: Inappropriate use of SPDEIS for Conclusion that Impacts are Insignificant.
>
> Duke has failed to support its claim that the increase in severe accident consequences associated with the MOX LTA loading will not be significant.

BREDL Contentions at 14.

STAFF RESPONSE TO CONTENTION 7

The proposed contention meets the requirements of 10 C.F.R. §2.714; therefore, it should be admitted. Unlike contention 6 (which, as stated above, without basis merely demands more quantitative analysis), contention 7 challenges the technical merit of Duke's conclusions relating to severe accident environmental impacts. However, to the extent that the proposed contention seeks to require a PRA from Duke, the contention is inadmissible. BREDL fails to identify any requirement that would force Duke to generate a PRA. Further, the regulations are clear that

quantitative analyses in support of an ER are not required and are to be done only if "practicable." *See* 10 C.F.R. § 51.45(c).

> BREDL CONTENTION 8: Failure to address environmental impacts of plutonium shipments
>
> The Environmental Report is deficient because it fails to address the environmental impacts of shipping plutonium oxide to France, and the impacts of shipping the LTAs from France back to the United States.

BREDL Contentions at 15. As a basis for their proposed contention, BREDL argues that the shipment of plutonium to France is a connected action and, as such, its impacts should be considered in Duke's ER. *Id.* at 15-16.

STAFF RESPONSE TO CONTENTION 8

The proposed contention is a contention of omission. It challenges the adequacy of Duke's ER based on the lack of information about the transportation related impacts associated with the fabrication of the LTAs. Given that the licensee has submitted such an analysis,[13] the alleged omission has been cured and the contention is *a priori* inadmissible.

> BREDL CONTENTION 9: Failure to identify the quantity of plutonium to be shipped to France.
>
> The LTA license amendment application fails to identify the quantity of plutonium that will be shipped to France for processing. This is a significant omission, in light of the significant discrepancy (40 kg) between the amount of plutonium oxide that the DOE seeks to ship to France and the amount of plutonium needed to make four lead test assemblies. This discrepancy and its environmental impacts should be addressed before the LTA use permit is issued.

BREDL Contentions at 16. In support of their proposed contention BREDL argues that the DOE must explain an alleged discrepancy between the SPDEIS and DOE's application for an export license from the NRC.

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[13] *See* Letter from Anne Cottingham to ASLB (November 10, 2003).

STAFF RESPONSE TO CONTENTION 9

The proposed contention is inadmissible. BREDL fails to provide sufficient information to show that a genuine dispute exists on a material issue of law or fact within the scope of this proceeding. BREDL provides no support for their argument that Duke's request is incomplete because of an alleged discrepancy in DOE's statements regarding the quantity of plutonium it is intending to export for fabrication of the LTAs. Moreover, BREDL fails to provide any basis for considering this issue in the context of Duke's LAR. In fact, BREDL never explains how the alleged discrepancy is relevant to this proceeding. In sum, the proposed contention is outside the scope of this proceeding.

4. NIRS Contentions

NIRS CONTENTION 1: Duke's proposed plan is lacking key benchmarks

> Weapons-grade plutonium has not been used widely as a reactor fuel. Further, the factory on which the proposed MOX Fuel Fabrication Facility (MFFF) is based, is not now, and has not ever been licensed to handle weapons-grade plutonium. Uncertainties remain about the differences between reactor grade and weapons-grade fuel behavior and reactor control. In order to show in the future that the present tests are representative, or bounding of future large-scale 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.

NIRS Contentions at 2.

As bases for the Contention, NIRS alleges that because the plutonium that will be used in the US plutonium disposition program will come from multiple processes and will have to be treated to remove impurities and other materials in order to make the fuel, "it is important to document or benchmark the specific quantity of plutonium oxide that is used for the test fuel, including how it was previously treated." In addition, NIRS asserts that it is important to know whether the plutonium oxide that would be used to make the test fuel comes from "pits" (an alloy of plutonium and other elements and materials, including gallium). Also, NIRS alleges that independent validation of the post "polishing" product is necessary in order to maintain a record for future

production. NIRS is concerned about the removal of gallium from the plutonium because it can attack the zirconium in the fuel cladding. NIRS wants documentation of the level of gallium, "and other contaminants remaining in the plutonium oxide in order to be able to use the data from this test fuel when considering any future loading of MOX fuel in the Duke reactors." NIRS Contentions at 2-4.

The second basis raised by NIRS concerns quality assurance for and certification of the MOX fuel. NIRS complains that the LAR does not state that there will be quality certification of the test fuel pellets or the rods, in addition to the assemblies. NIRS further notes that the Cadarache plant, where the fuel rods will be manufactured, was closed in July 2003 (for reasons related to seismic issues) and the equipment may not be able to meet QA standards. *Id.* at 4.

NIRS specifically declines to challenge the fabrication process, suggesting only that the product be "thoroughly documented." NIRS then goes on to cite QA problems with BNFL MOX fuel. NIRS states that "in order for LTA testing at Catawba to provide a credible basis for future batch use of MOX, fuel pellet and fuel rod characteristics, prior to irradiation, must be documented." *Id.* at 5-6.

STAFF RESPONSE TO NIRS CONTENTION 1

For the reasons set forth below, this proposed contention should be rejected. The contention lacks specificity and does not address all the information contained in the LAR and answers to Staff requests for additional information (RAI), filed October 1, 2003.[14] The crux of this contention appears to be that each step in the fabrication of the LTAs, including the source of the plutonium oxide used in the processing, must be documented in order to ensure that the data from the LTA will be useful for future loading of batch quantities of MOX fuel at Duke reactors. In addition, quality certification of the test fuel pellets, rods and assemblies is necessary. This

[14] On October 1, 2003, Duke filed its answers to Staff RAIs relating to Quality Assurance. (ADAMS Accession No. ML 032890405).

proceeding is limited to lead test assemblies and batch use of MOX is beyond the scope of this proceeding. Nonetheless, the Staff submits that the elements enumerated by NIRS are already a part of the MOX fuel design and certification program. *See* LAR, Attachment 3 at 3-2, 3-3, 3-17, 3-38, referencing, MOX Fuel Design Report, BAW-10238(NP) (Fuel Design Report), Rev. 1, sec. 3.2, Framatome ANP (May 2003)[15] (Attachment 2), referencing, Framatome MOX Fuel Qualification Plan (Fuel Qualification Plan) (April 2001)[16] (Attachment 3).

The source of the plutonium oxide is a programmatic decision that is within the control of the Department of Energy, not the NRC. The specification for the isotopic and impurity range is addressed on page 14 of the Fuel Qualification Plan, and the design of the MOX fuel is described in the Fuel Design Report.

The NRC does not control the amount of material in each LTA, instead the applicant provides the pertinent information needed to authorize use of the fuel. The amount of material is determined by the pellet dimensions, fuel stack length, enrichment, pellet density, and material isotopic composition. The Standard Review Plan, NUREG-0800, Section 4.2, states that applicants should provide all of these parameters to the Staff except for the material composition. Duke provided the material specification on page 14 of the Fuel Qualification Plan. *See also* Fuel Design Report, § 3.2. Gallium is considered to be an impurity material and a range of acceptability specific to gallium was included in the material specification. *See* Fuel Design Report, § 3.2.

The physical form of the original material (*i.e.* pit) and where it came from is not relevant to the Staff's assessment of the fuel. Only the composition of the fuel provided for use in the reactor is important. Because the gallium is an impurity that needs to be limited, the material undergoes a chemical process called aqueous polishing before it is processed; but, as stated

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[15] ADAMS Accession No. ML 031550349

[16] ADAMS Accession No. ML 013390597

above, it is not relevant here because the process used for getting the material into the composition needed to meet the material specification will not impact how the fuel behaves. *See* Fuel Design Report, §§ 3.2.1, 3.2.2, 3.2.3.

In section 1.02 of Contention 1, NIRS raises several quality assurance (QA) issues, stating that information is missing from the application. Duke described the QA program for Duke and its fuel vendor, Framatome, in section 3.5.6 of the LAR. On October 1, 2003, Duke replied to Staff RAIs[17] and Duke supplied information that relates directly to the issues raised by NIRS in this contention and demonstrates that there is no genuine dispute as to material facts. NIRS does not address the information contained in Duke's October 1, 2003 responses to RAIs.

NIRS alleges that "[t]he amendment request does not specifically state that there will be quality certification of the test fuel pellets and rods in addition to the fuel assemblies." In fact, the application states that the supplier, Framatone ANP (FANP) has responsibility for the oversight of the **entire** (emphasis added) fuel assembly fabrication process. This process includes the fabrication of the fuel pellets and rods in addition to the finished fuel assemblies. Duke's RAI responses provided further clarification with respect to the breadth of the quality assurance program as it related to the fabrication process. Specifically, FANP will apply the same quality assurance program to the fabrication of components within FANP as items purchased from their sub-suppliers. *See* Response to RAI, Attachment 1 at 1, response A. For the MOX fuel lead assemblies, all hardware and materials will be purchased from qualified suppliers. *Id.* As qualified suppliers they will be performing their activities affecting quality in accordance with a quality assurance program that has been reviewed and approved to meet the stringent requirements of 10 C.F.R. Part 50, Appendix B. *Id.* at 2, response A; 3-4. The QA plan will address the method for surveillance of the pellet, rod and assembly fabrication and visual and dimensional inspection

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[17] Letter from M.S. Tuckman to NRC, Re: Response to Requests for Additional Information (October 1, 2003) (ADAMS Accession No. ML032890405) (hereinafter Response to RAI).

of those items. *Id.* at pg.1, response B. Therefore the contention that the planned activities of Duke Power and its supplier, FANP, does not ensure certification of the quality of the fuel pellets and rods is without basis and should be rejected.

NIRS states that fuel pellet and fuel rod characteristics must be documented and that the Duke plan does not provide for such certification. According to Duke's application, it is purchasing the MOX fuel lead assemblies from FANP in accordance with the Duke Power quality assurance program (QAP). Duke's QAP is required to meet the requirements of 10 C.F.R. Part 50, Appendix B and as such procurement of materials, equipment, and services, must be accomplished in accordance with those stringent requirements. *See generally* Response to RAI, Attachment 1. 10 C.F.R. Part 50, Appendix B, Quality Assurance, comprises all those planned and systematic actions necessary to provide adequate confidence that a structure, system, or component will perform satisfactorily in service. *See* 10 C.F.R. Part 50, Appendix B, Introduction. The eighteen elements described in Appendix B specifically describe those planned and systematic actions. In several of these elements the explicit requirement for documenting of test activities affecting quality are enumerated. *See* 10 C.F.R. Part 50, Appendix B, Criteria III (Design Control), VII (Control of Purchased Material, Equipment, and Services), VIII (Identification and Control of Materials, Parts, and Components), X (Inspection), XI (Test Control), and XVII (Quality Assurance Records).

The fuel supplier's (FANP) QA program must also meet these requirements. Response to RAI at 2. According to Duke, the FANP quality assurance program has been reviewed and approved by the licensee, Duke Power, in accordance with Duke Power's NRC-approved Appendix B quality assurance program, and as a result, FANP has been qualified as a supplier of nuclear fuel to Duke Power. *Id.* at 1. Additionally, the FANP Fuel Sector Quality Management Manual, FQM Revision 1, July 2003, relating to the requirements of various codes, standards, and regulations, including 10 C.F.R. 50, Appendix B, defines the quality program that applies to the fabrication of components within FANP and items purchased from suppliers. Response to RAI,

Attachment 2. As described above, the quality assurance program ensures that a series of actions necessary and sufficient to identify and document information important to activities affecting quality are required. NIRS has not challenged the adequacy of Duke's QA plan or the FANP QA plan.

NIRS also alleges that the current proposal gives Framatome, the producer of the fuel, sole responsibility for fuel certification. It implies that there is no independence attributed to the process. Several of the eighteen elements in 10 C.F.R. Part 50, Appendix B contain explicit requirements for independent assessment of activities affecting quality. *See* 10 C.F.R. Part 50, Appendix B, Criteria III, VII, and XVII. The fuel supplier, FANP, must meet these requirements. *See* Response to RAI, Attachment 1 at 1, Response A. Additionally, the FANP Fuel Sector Quality Management Manual, defines the quality program that applies to the fabrication of components within FANP and items purchased from suppliers. Response to RAI, Attachment 2. As described above, the quality assurance program ensures that a series of independent actions and evaluations are undertaken for all activities affecting quality. NIRS has not challenged the any of the details of the QA programs. Therefore, the contention, that there is not independence attributed to the process by which FANP will produce and certify the fuel is without basis.

Based on the foregoing, the contention is inadmissible in that it does not meet the requirements of 10 C.F.R. § 2.714(b). The information, record keeping and certifications sought by NIRS are part of the MOX Fuel Certification Plan and the Fuel Design Report, which are incorporated in Duke's license amendment request. Therefore, there is no genuine dispute regarding a material issue of law or fact and the contention should be rejected.

<u>NIRS CONTENTION 2:</u> Provisions for Irradiated MOX Test Assemblies

> Irradiated MOX fuel has a higher thermal power, decaying more slowly than irradiated LEU fuel, and irradiated MOX waste will also bear more fissile plutonium than LEU waste. Duke's application states that the irradiated assemblies will be stored in the fuel pool. Given uncertainties about the impact of burnup on the fuel rods, the greater thermal power of this waste as well as any complications from

> inhomogeneities and possible residues from other nuclear bomb ingredients, the cladding of this test fuel may, or may not, be durable. A plan is needed for the ongoing assessment of this waste while Duke Energy waits for eventual disposition of high-level waste. Additionally, there is no mention made of the need to provide for lower density packaging for transport in the event that a repository becomes available.

NIRS Contentions at 6.

STAFF RESPONSE TO CONTENTION 2

This contention does not meet the requirements of 10 C.F.R. § 2.714. It is a series of statements and suppositions without supporting facts or expert opinion. NIRS has provided no facts or expert opinion and no nexus between the alleged higher thermal power, slower decay time and increased fissile plutonium in MOX waste, and possible cladding degradation.

The staff previously approved the M5 cladding material that will be used for the MOX LTAs. The M5 material was submitted for review via topical report BAW-10227P, "Evaluation of Advanced Cladding and Structural Material (M5) in PWR Reactor Fuel," and was approved by the staff in an SE dated December 14, 1999, and a revised SE dated February 4, 2000.[18] The Staff found that the material is acceptable and in accordance with SRP Section 4.2, 10 C.F.R. § 50.46, and 10 C.F.R. Part 50, Appendix K. M5 cladding has been used in European reactors with MOX fuel and there is no fact or expert opinion offered by NIRS that the cladding material will behave differently here. *See* BAW-10238(NP), Revision 1, "MOX Fuel Design Report." [19] NIRS has not offered any facts or expert opinions in support of this contention. Therefore, the contention does not meet the requirements of 10 C.F.R. § 2.714(b) and should be rejected.

> NIRS CONTENTION 3: Duke's License Amendment Underscores Regulatory Gap Between NRC and DOE: Duke's License Amendment Precedes The Department of Energy's Fulfillment of It's [sic] Responsibility Under the National Environmental Policy Act.

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[18] ADAMS Accession No. ML003686365.

[19] ADAMS Accession No. ML031550349.

> Basis: Duke Energy makes clear in the application for license amendment that some aspects of the Lead Test Assembly program, notably the transport of US weapons-grade plutonium to France for fuel fabrication is outside the scope of this proceeding. Nonetheless, the irradiation of this fabricated fuel in the Catawba ice condenser reactors depend upon the shipment of the weapons-grade plutonium to France. There is also currently an application before the NRC from the Department of Energy for an export license from NRC to accomplish this plutonium transfer. There has been, to date, no supplemental environmental review or environmental impact statement (in the public record) by the Department of Energy, under which auspice Duke indicates this part of the program will be conducted. The proposed action to transport 300 pounds – enough plutonium for dozens of nuclear weapons – by land and water is not a trivial action. Clearly this regulatory gap, and its potential for independent litigation should be addressed by the Nuclear Regulatory Commission as part of resolving the decision about this license amendment.

NIRS Contentions at 7.

STAFF RESPONSE TO CONTENTION 3

This contention does not satisfy the requirements of 10 C.F.R. § 2.714(b). It lacks specificity and does not clearly state the relief being sought. Any alleged regulatory gap between NRC and DOE is outside the scope of this proceeding. As NIRS acknowledges, the import/export license proceeding is also outside the scope of this proceeding. Any alleged deficiencies in the documents supporting that application must be addressed within that proceeding and the regulations applicable to that application. Finally, to the extent that NIRS is requesting that DOE be required to prepare a supplemental EIS, such action is outside this Board's jurisdiction. However, on November 7, 2003, DOE issued a supplemental analysis pertaining to the fabrication of MOX in Europe. Supplemental Analysis, Fabrication of Mixed Oxide Fuel Lead Assemblies in Europe, DOE/EIS-0229-SA3, November 2003, which was submitted to the Board and served on the parties by letter from Anne W. Cottingham, dated November 10, 2003. The Supplemental Analysis addresses, *inter alia*, the overland truck transport of 150kg of plutonium oxide to each of three east coast ports and shipment of the LTAs to Catawba. *See* Supplemental Analysis at 8-9, 10-13, 16-24. Therefore, the contention inadmissible because it does not demonstrate a genuine dispute with regard to a material issue of fact or law. In addition, the contention also does not meet

the requirements of 10 C.F.R. § 2.714 because it lacks specificity and is outside the scope of this proceeding. The contention should be rejected.

> NIRS CONTENTION 4: Only the No Action Alternative is Consistent with the Overall Goal for Plutonium
>
> Duke's license amendment application includes the No Action Alternative which is stated as "...to deny the license amendment." Page 2 of Mr. Tuckman' s cover letter to the license amendment application sums up the stated overall goal of this program:
>
> > This license amendment request is being made as part of the ongoing United States – Russian Federation plutonium disposition program. The goal of this nuclear nonproliferation program is to dispose of surplus plutonium from nuclear weapons by converting the material into MOX fuel and using that fuel in nuclear reactors.
> >
> > * * *

NIRS Contention at 7.

STAFF RESPONSE TO CONTENTION 4:

This contention is inadmissible because the bases offered by NIRS are outside the scope of this proceeding. Moreover, the contention is not litigable because the relief NIRS seeks cannot be granted by the Board at this stage of the amendment review process.

NIRS argues that the no action alternative must be selected because the MOX program is not a credible means of non-proliferation or of increasing the security of the plutonium located in Russia. NIRS Contentions at 8-9. Since the goals and effectiveness of the United States – Russian Federation plutonium disposition program are outside the scope of this adjudication, this contention must be rejected as inadmissible. *Philadelphia Electric Co.* (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-216, 8 AEC 13, 20-21 (1974); *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-316, 3 NRC 167, 170-71 (1976); *Private Fuel Storage L.L.C.* (Independent Spent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 179 (1998).

Furthermore, NIRS' contention that the NRC must deny Duke's application by selecting the no action alternative must be dismissed as not litigable because the Board cannot, at this juncture,

instruct the NRC staff to deny the application or to select the no action alternative. *Peach Bottom*, 8 AEC at 20-21; *Arizona Public Service Co.* (Palo Verde Nuclear Generating Station, Units 2 and 3), LBP-83-36, 18 NRC 45, 48-49 (1983), *citing New England Power Co.* (NEP Units 1 and 2), LBP-78-9, 7 NRC 271, 279 (1978) ("The studies and analyses which result in [the draft and final EISs] are made independently by the Staff, and licensing boards have no rule or authority in their preparation. . . . [T]he Board does not have any supervisory authority over that part of the application review process that has been entrusted to the Staff."). *See also Offshore Power Sys.* (Floating Nuclear Power Plants), ALAB-489, 8 NRC 194, 206-7 (1978). Because the Staff has not yet completed its environmental review or issued any environmental documents relating to the LAR, any direction by the Board regarding the content of any future staff documents would be beyond the authority of the Board. Therefore, the contention is inadmissible because the Board cannot grant NIRS relief even if this contention were admitted and NIRS was able to prove that the no action alternative must be selected. *See Private Fuel Storage*, 47 NRC at 178; 10 C.F.R. § 2.714 (d).

> NIRS CONTENTION 5: An Environmental Impact Statement is Needed to Inform This Decision
>
> The current decision on this license amendment application is part and parcel of a larger action plan, detailed in the license application, that Duke and the Nuclear Regulatory Commission have been involved with for some time. The overall decision to use weapons-grade plutonium fuel from nuclear weapons sources is a major federal action significantly affecting the quality of the Human environment. Under 10 C.F.R. 51.20(a)(1) the NRC regulations direct NRC staff to prepare a full environmental impact statement.
>
> Since taking the No Action Alternative of denying the license amendment will either redirect, or end the federal plutonium disposition program, this alone demonstrates that the NRC's decision on Duke's license amendment to test weapons MOX plutonium fuel is a major federal action and that it cannot be separated from the intention to use "batch" quantities of weapons-grade MOX plutonium fuel in US Light Water Reactors.

NIRS Contentions at 10.

STAFF RESPONSE TO CONTENTION 5:

This proposed contention is inadmissible. NIRS asserts that inserting four MOX LTAs into a reactor is a major federal action significantly affecting the human environment, and that the NRC Staff must complete an EIS. NIRS Contentions at 10. NIRS's contention is premature, however, because the NRC has not determined whether the proposed action is a major federal action or or determined whether to prepare an EIS or an Environmental Assessment (EA). *See Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plant), LPB-99-25, 50 NRC 25, 39 (1999) (holding that contention arguing that Board should require EIS was premature and superseded by the Staff's representation that it would issue an EA). Because NIRS's contention may become moot once the staff makes its determination, NIRS's contention should be dismissed without prejudice as premature. *See Pacific Gas & Elec. Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), LBP-93-1, 37 NRC 5, 36 (1993) (rejecting contention seeking EIS as premature because might become moot by virtue of staff action). *But see Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Nuclear Power Station), ALAB-869, 26 NRC 13, 30-31 (1987) (finding that where staff has already indicated it is preparing EA and not EIS, contention that action is major federal action and EIS is necessary is not premature).

NIRS's discussion raises eleven bases, none of which establish that the proposed action is a major federal action or an action that significantly affects the human environment. Each of the bases, like the contention itself, is premature, since they all are bases for claiming that an EIS must be prepared. In addition, they lack specificity or evidentiary support. Because they are premature, they will not be individually addressed in this pleading. In general, they: seek litigation of issues relating to batch quantities of MOX, which is beyond the scope of this proceeding; lack basis or evidentiary support; lack specificity; lack factual support or expert opinion; challenge the structure of the Commission's regulatory process; or are vague. To the extent that the contention seeks to litigate issues relating to the irradiation of batch quantities of MOX or "the overall decision to use

weapons-grade plutonium fuel from nuclear weapons sources," the contention is beyond the scope of this proceeding. The contention as a whole is premature because the Staff has not yet reached a decision as to whether it will issue an EIS or an EA. If the Staff does decide to issue an EA instead of an EIS, NIRS would have an opportunity to request admission of late-filed contention challenging the EA and the decision to prepare an EA. Therefore, the contention should be rejected.

CONCLUSION

Based on the forgoing, the Staff submits that BREDL Contentions 1, 2, 3, 4, 5, 6, 8, and 9, and NIRS Contentions 1, 2, 3, 4 and 5 do not meet the requirements of 10 C.F.R. § 2.714(b) and should not be admitted for hearing. BREDL Contention 7 is admissible, but not to the extent that it seeks to require Duke to submit a PRA.

Respectfully submitted,

Susan L. Uttal
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Counsel for the NRC staff

Dated at Rockville, Maryland
this 10th day of November, 2003

Attachment 1

October 31, 2003

Mr. Michael S. Tuckman
Executive Vice President
Duke Energy Corporation
526 South Church St
Charlotte, NC 28201-1006

SUBJECT: WILLIAM B. MCGUIRE NUCLEAR STATION, UNITS 1 AND 2 AND CATAWBA NUCLEAR STATION, UNITS 1 AND 2 RE: MIXED OXIDE LEAD FUEL ASSEMBLIES (TAC NOS. MB7863, MB7864, MB7865, MB7866, MC0824 AND MC0825)

Dear Mr. Tuckman:

By letter dated February 27, 2003, you submitted applications for amendment to the operating licenses for the McGuire Nuclear Station, Units 1 and 2 (McGuire) and the Catawba Nuclear Station, Units 1 and 2 (Catawba). The proposed amendments would revise the Technical Specifications to allow the use of four mixed oxide (MOX) fuel assemblies at either Catawba or McGuire. By letter dated September 23, 2003, you amended the February 27, 2003, application so that it now applies only to Catawba. Accordingly, we are treating this as a withdrawal by Duke Power of the application as it applies to McGuire. We will publish a Notice of Withdrawal in the *Federal Register* and will close the associated work tracking TAC numbers for the McGuire Nuclear Station.

By letter dated September 15, 2003, you submitted a proposed revision to the physical security plan and associated requests for exemptions from certain regulations for the Catawba and McGuire stations. The Nuclear Regulatory Commission (NRC) staff does not plan to review the physical security plan revisions for McGuire, since, as noted above, Duke has withdrawn McGuire from the MOX Lead Test Assembly program. The NRC staff review and findings regarding your physical security plan submittal dated September 15, 2003, will be applicable only to the Lead Test assembly program at Catawba. Any physical security plan revisions associated with the potential use of batch quantities of MOX fuel will be reviewed if and when the NRC staff receives such proposals.

Sincerely,

/RA/

Robert E. Martin, Senior Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-369, 50-370, 50-413, and 50-414

cc: See next page

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Attachment 2

- The ability to predict the behavior of cores loaded initially with LEU fuel requires the capability to model plutonium fuel behavior.
- RG MOX fuel, with more plutonium and a more complicated mixture of plutonium isotopes, presents a greater challenge to neutronic modeling methods than does WG MOX fuel.
- Nuclear analysis methods that are demonstrated to model both all-LEU fuel cores and mixed LEU - RG MOX fuel cores with an acceptable accuracy will also be capable of modeling mixed LEU - WG MOX fuel cores with a similar level of accuracy.

Comparison to operating reactor core measurements in both all-LEU fuel cores and mixed LEU – RG MOX fuel cores is the approach that has been used by Duke Power to qualify the CASMO-4 and SIMULATE-3 MOX computer codes for application to WG MOX fuel analyses (Reference 3).

3.2 *Impurities*

Plutonium derived from weapons material will contain small amounts of gallium, but the manufacturing process is designed to reduce the gallium concentration in MOX to trace levels. The design impurity level for gallium for the WG MOX fuel is similar to current trace levels of gallium in LEU fuel. Gallium is a low-melting-point element and is liquid at slightly above room temperature. At high concentrations, it can cause embrittlement in metals and alloys (Reference 10) and is considered undesirable in both the processing and use of MOX fuel. In weapons material, however, gallium serves the purpose of stabilizing the δ phase of plutonium. Less than 1% by weight of gallium is sufficient to stabilize δ-plutonium at room temperature (Reference 11). Larger gallium concentrations are not expected since they would result in unnecessary dilution of the plutonium for weapons, but for the purposes of this report, the maximum gallium concentration in the source of WG plutonium is assumed to be 1.2%.

A concern has been expressed that gallium could cause degradation of the cladding (Reference 10). Also, the gallium could migrate to the cooler regions of the fuel rod, particularly the susceptible heat-affected weld zone, and cause embrittlement and subsequent fuel rod failure.

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.

3.2.1 Effectiveness of Polishing Process

The effectiveness of the polishing process for removing gallium has been evaluated through a series of laboratory tests conducted by Oak Ridge National Laboratory (ORNL) (Reference 12). The ORNL tests introduced gallium in known quantities prior to subjecting the material to the same chemical process planned for the production facility. To allow the measurement of the very small amounts of gallium remaining after the polishing process, the gallium was first activated in ORNL's High Flux Isotope Reactor (HFIR). The decontamination factor (DF) is used to characterize the effectiveness of the polishing operation. Specifically, DF is the ratio of the gallium concentration to plutonium concentration before polishing divided by the ratio after polishing (Reference 12). The ORNL tests confirmed that the DF for the process is greater than 10^5. The initial gallium concentration is at most 1.2%, so polishing with a DF of greater than 10^5 yields a final gallium concentration less than 120 ppb. The specification for the powder to be processed at the MFFF is expected to impose a 120-ppb gallium limit on the finished PuO_2.

A WG PuO_2 powder specification has been developed from the existing European RG PuO_2 specification, and, with one exception, the list of impurity elements is the same in both documents. The sole difference between the two lists of impurities is the addition of a gallium limit to the WG PuO_2 powder specification because of the known presence of gallium in the starting materials.

When polished feed PuO_2 powder with a gallium concentration less than 120 ppb is diluted with depleted UO_2 powder, the final gallium concentration in the finished MOX pellet is comparable to the concentration in current LEU fuel. The concentration of gallium in current LEU is described in Section 3.2.2.

3.2.2 Gallium Content of Current LEU Fuels and Components

Trace levels of gallium can be found in current LEU fuel and components. These fuels have operated successfully for decades, with no indication of gallium-related fuel failures. Furthermore, gallium is produced during operation from the direct activation of zinc that is typically present as an impurity in cladding material and LEU pellets. Gallium is also present as an impurity in LEU fuel rod components (e.g., cladding and plenum springs).

Archive samples of fuel pellets and components have been analyzed at ORNL to determine the levels of gallium in LEU fuels that have operated successfully. The pellet samples analyzed at ORNL represent four batches of FANP (US) fuel fabricated over a five-year period from 1990 through 1994. Both Mark-B (15 × 15) and Mark-BW (17 × 17) fuel types were included, as were pellets from two pellet vendors. The results of these analyses are shown in Table 3.4.

As shown, the gallium level in the archive LEU fuel pellets is approximately 10 ppb. The batches of fuel represented by these archive samples operated successfully, with no indication of cladding degradation or failure. The remaining archive fuel components (the spring and cladding) were found to contain higher levels of gallium. The average gallium content of the fuel rod plenum spring samples was 38 parts per million (ppm), or 38,000 ppb. The presence of gallium in the plenum spring material is significant in that it illustrates the levels of gallium that have been present in fuel components for many years, but the presence of gallium was never known because measurements have not been performed previously at these extremely low levels.

The archive Zircaloy-4 cladding samples contained an average of 275 ppb gallium. This measured gallium level corresponds to the same total mass of gallium in the cladding as would be present in fuel pellets if those pellets had a 50 ppb concentration. (The different concentrations for equivalent gallium mass reflect the different masses of cladding and fuel.) The results of this evaluation are significant in that the mass of gallium introduced in the rod from the WG plutonium is much less than the mass of gallium already present in cladding and fuel pellets that have operated successfully.

The polishing process will reduce the gallium content in the feed plutonium to less than 120 ppb. The concentration of PuO_2 in WG MOX is only about 5%, so, when it is diluted with depleted UO_2, the polished plutonium contributes approximately 6 ppb or less to the gallium content of

the finished MOX pellets. Thus, the finished MOX pellets are expected to contain gallium at approximately 10 to 20 ppb. This level of gallium is consistent with the levels of gallium in MOX fuels that have operated successfully. Thus, the presence of gallium from the WG plutonium presents no additional risk of cladding failure from gallium.

3.2.3 Fuel Performance with Gallium

Testing to determine the effects of gallium on fuel performance, at significantly higher levels than expected in the mission reactor fuel, is currently underway in the Advanced Test Reactor (ATR) (Reference 13). The Average Power Test (APT) began irradiation in January 1998 with two types of MOX fuel:

1. The first fuel type was untreated relative to impurities and contained a gallium concentration of 3.0 ppm.
2. The second fuel type was thermally treated to reduce the impurities and contained gallium at the 1.3 ppm level.

Test rods have been examined after burnups of 8,000, 21,000, and 30,000 MWd/MThm, operating at heat rates of 5 to 10 kW/ft. The burnups are projected to reach 50,000 MWd/MThm during future irradiation cycles. The post-irradiation examinations (PIEs) are aimed at determining the effects of gallium on fuel rod performance, including the potential embrittlement of the Zircaloy-4 cladding. Results from the PIE at 30,000 MWd/MThm are summarized below:

- SEM/microprobe examination of the fuel and cladding revealed no abnormal behavior (Reference 13).
- Gas release does not exceed that in early European MOX (Reference 14).
- No gallium migration to the cladding has been detected. Analyses of unirradiated archive samples and irradiated cladding indicate no transfer of gallium to the cladding within the measurement uncertainty limit (Reference 13).

These tests will be followed and are expected to provide additional assurance that operation of MOX pellets with gallium concentrations as great as 3.0 ppm offers no concern for fuel rod performance.

3.3 *Pellet Microstructure*

The use of WG plutonium for MOX fuel in place of RG plutonium has the potential to affect fuel performance with respect to:

- Thermal conductivity

Attachment 3

Control of the process is verified through metallographic examination and autoradiography of a representative number of samples from each batch of pellets. These examinations provide measurements of the effective particle size, the grain size and the plutonium content. Alternatively, these parameters can be measured using Electron Probe Micro Analysis (EPMA) during qualification, with the process monitored during fabrication using metallography and autoradiography. One of the primary criterion for acceptance of MOX fuel batches is the microstructure.

5.3 Specification

5.3.1 FRA-ANP (US) UO_2 Specification

The FRA-ANP (US) UO_2 pellet specification has been developed over an extended period of time to define the requirements for a pellet that essentially guarantees zero probability of failure under irradiation. Of the very few fuel rod failures experienced by FRA-ANP (US), none have been attributed to pellet problems over the last 20+ years. The early failures experienced by other nuclear fuel suppliers due to hydriding and fuel densification are all adequately controlled by design and/or pellet processing. The essential requirements of the specification cover the O/U ratio, or stoichiometry, the impurity content including Equivalent Boron Content (EBC) and hydrogen values, the resinter densification characteristics, the grain size, the uranium and isotopic content, the density and the dimensions. Additional control is imposed on the fissile content per linear inch to address specific reactor criteria. Certain specification criteria are required on a batch basis while others may be addressed on a qualification basis only. Acceptance of qualification data is based on a thorough understanding of the production process and the fact that the manufacturer does not deviate from qualified production parameters.

5.3.2 FRA-ANP (Fr) MOX Specification

The FRA-ANP (Fr) MOX pellet specification is quite similar to the FRA-ANP (US) UO_2 pellet specification where such requirements are common since MOX fuel is 95% UO_2. For example, the O/U (oxygen/uranium) requirement of 1.99 to 2.02 for the FRA-ANP (US) UO_2 specification is essentially the same as the O/M (oxygen/heavy metal) requirement of 1.98 to 2.01 for the FRA-ANP (Fr) MOX specification recognizing that the PuO_2 addition tends to decrease the O/M ratio. The impurity lists are also similar; however, limits on some additional elements such as gallium will be addressed for the WG specification.

In some areas the MOX specification covers additional limits, primarily the size of the plutonium rich particle and the concentration of the

plutonium content. Additional analyses are also required for the plutonium isotopes and other transuranic elements associated with RG PuO_2.

5.3.3 Mark-BW/MOX1 Pellet Specification

The Mark-BW fuel assembly (UO_2) using the FRA-ANP (US) pellet specification has been loaded in eight Westinghouse-designed 17x17 reactors, including all four of the mission reactors, and has operated successfully. The fuel specification for the Mark-BW/MOX1 will be based on the FRA-ANP (US) UO_2 pellet specification with integration of the FRA-ANP (Fr) MOX specification for all aspects specific to MOX. Use of the existing FRA-ANP (US) specification as the basis provides consistency with existing FRA-ANP (US) performance, ordering practice and supporting analyses, e.g. hot channel factor criteria are addressed and controlled.

This specification conveys all of the MOX requirements from the European experience while adding limits necessary to address WG plutonium. Criteria derived from the MOX pellet requirements include plutonium homogeneity, plutonium rich particle size, and derivation of the equivalent fissile content. The specification also defines the criteria for three MOX pellet types associated with plutonium concentration zones within an assembly. The specific plutonium concentrations for each of the zones vary with the plutonium isotopic content and with the design burnup of the assembly. These concentrations will not be defined in the specification since they may vary with each reload.

A limit on gallium is added to the specification since this limit does not currently appear in the FRA-ANP specifications. The value is based on ORNL studies that have confirmed that a Decontamination Factor (DF) of 10^5 will be achievable for the aqueous polishing process. The maximum gallium content will be imposed on the PuO_2 powder specification at the 120 ppb level, based on a maximum gallium level of 1.2% prior to polishing. (Detection limits of 10-20 ppb on the PuO_2 powder are achievable with high-resolution mass spectrometry, even after dilution.) With the MOX pellet containing less than 5% PuO_2, the resulting gallium contribution from the WG plutonium in the finished pellets will be on the order of 6 ppb or less. As discussed in Section 7.5.1, comparable trace levels of gallium are found in UO_2 fuels; limiting the gallium contribution from the polished PuO_2 to approximately 6 ppb or less will ensure that the final gallium content of the finished MOX pellet remains in the range of current operating LEU fuels. Thus, there will be no detrimental effects on fuel performance, and the applicability of the European RG plutonium database is ensured.

The MOX pellet specification and drawing will place tolerances on the allowable variation in specific Pu and U isotopes for a given fuel batch. Some deviation from the normal isotopic distribution is expected from batch to batch and can be accommodated by making appropriate adjustments in the specification. The range of acceptable isotopics is provided in Table 5-3.

A summary of the specification is given in Appendix D.

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 "NRC STAFF'S RESPONSE TO (1) BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE'S SUPPLEMENTAL PETITION TO INTERVENE AND (2) NUCLEAR INFORMATION AND RESOURCE SERVICE'S CONTENTIONS" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class; or as indicated by an asterisk (*), by deposit in the Nuclear Regulatory Commission's internal mail system; and by e-mail as indicated by a double asterisk (**), this 10th day of November, 2003.

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