

RAS 5241

January 6, 2003

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE PRESIDING OFFICER

DOCKETED
USNRC

January 10, 2003 (10:18AM)

In the matter of)	OFFICE OF SECRETARY
)	RULEMAKINGS AND
)	ADJUDICATIONS STAFF
Nuclear Fuel Services, Inc.)	Docket No. 70-143
)	
(Materials License SNM-124))	
)	

**PETITIONERS' REPLY TO APPLICANT'S OPPOSITION
TO THEIR MOTION TO HOLD PROCEEDING IN ABEYANCE**

As provided by the Presiding Officer's Memorandum and Order of December 17, 2002, Friends of the Nolichucky River Valley ("FNRV"), the State of Franklin Group of the Sierra Club, Oak Ridge Environmental Peace Alliance ("OREPA"), and Tennessee Environmental Council ("TEC") (hereinafter "Petitioners"), hereby reply to Nuclear Fuel Service's ("NFS's") answer to their November 27, 2002, request to hold this proceeding hearing in abeyance pending submission of all three license amendment applications for the proposed BLEU Project. *See* Applicant's Answer to Request by the Friends of the Nolichucky River Valley, the State of Franklin Group of the Sierra Club, the Oak Ridge Environmental Peace Alliance, and the Tennessee Environmental Council to Hold Proceeding in Abeyance (December 13, 2002) (hereinafter "Applicant's Response").

NFS has failed to provide a single persuasive reason that this proceeding should go forward before all three applications have been submitted. In fact, NFS's response merely confirms the absurdity of holding three separate hearings on the proposed BLEU project.

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First, NFS has not provided any information to indicate that the NRC Staff's Environmental Assessment ("EA") is anything more than a provisional document. Nor has NFS given any practical reason why the parties should be forced to go through the process of litigating the contents of an EA that, as both NFS and the Staff concede, may be changed after the hearing is over. NFS's repeated incantation that the Finding of No Significant Impact is "final" is self-serving and empty. Applicant's Response at 8. The purpose of a FONSI is to declare, conclusively, that a proposed project will have no significant impacts and therefore may go ahead. There is nothing "final" about a document that (a) fails to authorize any action, and (b) is subject to change at some time in the future.

Second, NFS fails to controvert Petitioners' argument that to hold three separate hearings on the EA would unlawfully bifurcate the decisionmaking process under the National Environmental Policy Act ("NEPA"). Just as the NRC Staff has concluded that the BLEU Project must be considered as a whole in its own review process, so the hearing process should allow consideration of the BLEU Project's impacts as a whole. NFS argues that in three separate hearings, there will be "no possibility that Petitioners will be unable to challenge some impact associated with NFS's activities in connection with the BLEU project." Applicant's Response at 8. Under those circumstances, however, the impacts of the BLEU Project are likely to be reviewed in piecemeal fashion, without the benefit of an overall evaluation of the cumulative impacts of the entire project.

Third, NFS fails to make a persuasive argument that the NEPA review process may be divorced from the safety review process. As the NRC Staff's own actions demonstrate, much louder than any words could show, it cannot claim to have taken a "hard look" at the environmental impacts of a proposed nuclear operation unless and until it has the information it needs to conclude that the facility will operate in compliance with NRC safety regulations. This is precisely why the NRC has held the door open to revise the EA after it completes its safety review of the second and third license amendment applications.

Moreover, NFS incorrectly NFS cites 10 C.F.R. § 2.1205(m) for the proposition that "the holding of a hearing, including consideration of environmental issues, is not tied to the Staff's action on the license amendment, *i.e.*, completion of its safety review." Applicant's Response at 6. Section 1205(m) provides that the Staff may issue a license notwithstanding the pendency of a hearing request. It does *not* provide that the Presiding Officer may conduct a hearing on environmental issues, notwithstanding the Staff's failure to complete its safety or environmental reviews. NFS points to no case, nor petitioners aware of any, in which the NRC has conducted a hearing on the adequacy of a license application, without the benefit of the Staff's safety review. Nor are petitioners aware of any case in which the NRC has made a final determination of no significant impact, or issued an Environmental Impact Statement, before it has completed its safety review of the proposed operation.

Fourth, NFS does not respond at all to Petitioners' arguments that because of significant overlap between the three license amendment applications, to hold three

separate hearings on a single operation would be inefficient and extremely wasteful of the parties' resources. NFS merely argues that because bifurcating the proceeding can be done, it should be done. Thus, NFS completely fails to show that holding three separate hearings would be efficient, effective, or fair.

Fifth, NFS has not provided any new information to suggest that its plan to submit all three applications within the space of a single year has changed. As the Staff noted in its letter to the Presiding Officer today, a notice of the second license amendment application has gone to the Federal Register. Neither the Staff nor NFS has suggested that the third license amendment application will be delayed past the planned submission date of January of 2003. Given the close spacing of the license amendment applications, it makes no practical sense to proceed with three separate hearings. Indeed, the only conceivable purpose of holding three separate hearings on such closely spaced and closely related applications would be to exhaust the intervenors and waste their limited resources.

Finally, NFS argues that Petitioners' motion is not "ripe," because they have not been admitted as parties to the litigation. Applicant's Response at 4, citing *Texas Utilities Electric Co.* (Comanche Peak Steam Electric Station, Units 1 and 2), CLI-89-6, 29 NRC 348, 354 (1989) (refusing to consider a motion for reconsideration where, *inter alia*, the movant was not a party.) Petitioners submit that the Presiding Officer may postpone acting on their motion until after they have been admitted as parties, or he may decide, on his own motion, to hold the proceeding in abeyance. Since the inception of this proceeding, the Presiding Officer has the discretion to manage this proceeding in a

manner that is reasonable and efficient. That discretion exists regardless of whether any petitioners have been formally admitted as parties. Petitioners continue to urge the Presiding Officer to consolidate the three proceedings into one because bifurcation of the licensing of the BLEU Project into three separate proceedings makes no legal or practical sense.

Accordingly, Petitioners request that the Presiding Officer hold this proceeding in abeyance pending the submission of all three license amendment applications for the proposed BLEU Project.

Respectfully submitted,



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RULEMAKINGS AND
ADJUDICATIONS STAFF

Docket No. 70-143

**REPLY BY FRIENDS OF THE NOLICHUCKY RIVER VALLEY,
STATE OF FRANKLIN GROUP OF THE SIERRA CLUB,
OAK RIDGE ENVIRONMENTAL PEACE ALLIANCE, AND
TENNESSEE ENVIRONMENTAL COUNCIL TO APPLICANT'S
ANSWER TO THEIR HEARING REQUEST**

I. INTRODUCTION

As provided by the Presiding Officer's Memorandum and Order of December 17, 2002, Friends of the Nolichucky River Valley ("FNRV"), the State of Franklin Group of the Sierra Club, Oak Ridge Environmental Peace Alliance ("OREPA"), and Tennessee Environmental Council ("TEC") (hereinafter "Petitioners"), hereby reply to Nuclear Fuel Service's ("NFS's") answer to their hearing request of November 27, 2002. *See* Applicant's Answer to Request for Hearing of the Friends of the Nolichucky River Valley, the State of Franklin Group of the Sierra Club, the Oak Ridge Environmental Peace Alliance, and the Tennessee Environmental Counsel (December 13, 2002 (hereinafter "Applicant's Answer")). *See also* Applicant's Supplement to Applicant's Answers to Petitioners' Request for Hearing (December 19, 2002). As demonstrated below, NFS's arguments that Petitioners lack standing have no merit. With respect to the

admissibility of Petitioners' concerns, only one of NFS's arguments has any merit. Based on recent decisions by the Commission, it now appears that the Commission intends to refuse to admit any contentions or concerns seeking preparation of an Environmental Impact Statement ("EIS") with respect to the environmental impacts of a terrorist attack on a nuclear facility or related transportation of nuclear material. *See* discussion below in Section III.

This Reply is supported by the attached Declaration of January 6, 2003 by Dr. Arjun Makhijani.

II. STANDING

As discussed in their hearing request, Petitioners seek representational standing to participate in this proceeding, by demonstrating that members of the petitioner organizations who have standing as individuals have authorized the petitioner organizations to represent them. NFS agrees that each of the petitioner organizations has identified at least one member who has authorized the organization to represent it in the proceeding. Applicant's Answer at 7. However, NFS opposes granting Petitioners standing on numerous other grounds.

First, NFS argues that the injury claimed by the Petitioners, *i.e.*, increased radiological effluent discharges to the Nolichucky River, do not confer standing because these discharges are not directly traceable to the proposed license amendment. NFS points out that this particular license amendment applications relates only to the storage of uranyl nitrate at the Uranyl Nitrate Building ("UNB"), and will not result in discharges of contaminants to the river. Applicant's Answer at 11. According to NFS, Petitioners

may not assert their standing on the basis of project actions that will not be licensed until later license amendment requests. *Id.* at 12. However, as pointed out in Petitioners' hearing request, standing may be predicated on injury from an activity that is not the direct subject of a proposed licensing action, if the licensing action would allow the injurious activity to occur. *Duke Cogema Stone and Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-01-35, 54 NRC at 403, 417 (2001).

NFS attempts to distinguish *Duke* by arguing that in that case, "the project actions that provided Petitioners with standing . . . did not need to be licensed in a subsequent NRC licensing proceeding the way and second and third phases of the BLEU Project will be licensed here." Applicant's Answer at 12, footnote 5. This argument misses the point of *Duke*, *i.e.*, that regardless of whether the asserted injury falls within the scope of the hearing that is being offered, if the construction and operation of a proposed facility would allow the injury to occur, then the injury is considered to support standing because it is "fairly traceable" to the proposed action.¹

NFS next argues that Petitioners' concern regarding the potential that NFS will continue its past practice of contaminating the environment is insufficient to confer standing, because in NRC licensing proceedings, the Commission will not assume that license applicants will violate applicable regulations. Applicant's Answer at 13, *citing*

¹ See 54 NRC at 417:

Nor is there any doubt that the injury alleged by the Petitioners' members is fairly traceable to the construction and subsequent manufacture and shipping of MOX fuel. Because the transport of MOX fuel to the mission reactors over the public highways on which Petitioners' members travel cannot take place without the construction of the MFFF, it cannot be fairly argued that the threatened injury to the Petitioners' members is not caused by the challenged licensing action.

GPU Nuclear, Inc. (Oyster Creek Nuclear Generating Station), CLI-00-6, 51 NRC 193, 207 (2000). *GPU* does not support NFS's argument. In that case, the Commission found that the petitioner had failed to provide "documentary support" for its assertion that the applicant was likely to violate safety regulations in the future. *Id.* Here, in contrast, the Petitioners have offered statements in the EA acknowledging that over a period of years, NFS has contaminated soil and groundwater on the NFS site. *See* Hearing Request at 5. In addition, a neighbor of the NFS-Erwin plant has charged that NFS has contaminated offsite areas. *Id.*, footnote 3. These concrete assertions regarding environmental contamination by NFS can hardly be characterized as "unfounded conjecture." *See* Applicant's Answer at 13, citing *International Uranium (USA) Corporation* (White Mesa Uranium Mill), CLI-01-21, 54 NRC 247, 253 (2001). In fact, this case stands in sharp contrast to *White Mesa*, where the petitioner had failed to show that currently licensed activities "had caused seepage into the groundwater in the past or that activities to be authorized by the instant license amendment would create a greater likelihood of such contamination in the future." 54 NRC at 252. Here, Petitioners have demonstrated that operation of the NFS-Erwin plant has already caused environmental contamination. If NFS is allowed to process even greater quantities of radioactive material, and if it continues the practices that led to the now-existing environmental contamination, then it is reasonable to infer that levels of environmental contamination will increase.²

² NFS's argument that the Petitioners must present some "scenario" in which illegal releases could occur in the future is absurd. Applicant's Answer at 13. Where a nuclear licensee has demonstrated a longstanding practice of disregarding environmental

In their Hearing Request, Petitioners asserted that declarants Frances Lamberts and Ruth Gutierrez, who draw their drinking water from the Jonesborough water treatment facility, would be adversely affected by increased levels of radiological contamination in the Jonesborough municipal water supply. Hearing Request at 6. These increased contaminant levels are reported in the Environmental Assessment ("EA"). *Id.* NFS does not deny that the liquid radiological effluent discharges to the Nolichucky River will increase significantly as a result of the proposed BLEU Project. Applicant's Answer at 14. However, NFS argues that even so, these discharges are insufficient to confer standing because they are only a "small fraction of what is permissible under applicable regulations and NFS's permits."³ *Id.* at 13. Thus, NFS argues, this "miniscule increase above background that will result from BLEU Project discharges to the river is insufficient to confer standing, "even for the maximally exposed individual."⁴ *Id.*

standards and polluting the environment, it should not be necessary to point out "how" the contamination escaped the facility. The fact that it did escape should be sufficient.

In this context, it is notable that NFS does not argue that the environmental contamination it has caused is permitted by its NRC license or any other permit it may hold. Moreover, NFS has not provided any information to demonstrate that the ownership and/or management of the NFS-Erwin facility have changed such that NFS's past practice of contaminating the environment will not recur.

³ According to NFS, the total dose from water effluent to the maximally exposed individual is conservatively estimated to be only 2.06 mrem per year, which is only two percent of the annual public dose limit of 100 mrem per year in 10 C.F.R. Part 20. It is also only "roughly half a percent of the annual average individual whole body dose from natural radiation in the United States." *Id.*

⁴ Without actually making an argument, NFS also implies that a person drinking from the Jonesborough water supply would not qualify as a "maximally exposed individual." Applicant's Answer at 14. However, NFS does not suggest any mechanism by which contaminated water that is taken from the Jonesborough water treatment facility and

In support of its argument, NFS cites *Babcock & Wilcox* (Appollo, Pennsylvania Fuel Fabrication Facility), LBP-93-4, 37 NRC 72, 87 (1993). In that case, the Licensing Board denied standing where offsite airborne or effluent releases were “only a fraction of regulatory limits.” *Babcock & Wilcox*, however, is inconsistent with the Commission’s decision in *Yankee Atomic Electric Co* (Yankee Nuclear Power Station), CLI-96-7, 43 NRC 235 (1996). In that case, the Commission found that even “minor” radiological doses could be sufficient to confer standing. *Id.* at 247-48. *See also Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-01-35, 54 NRC 403, 417 (2001).⁵

In any event, NFS’s argument ignores the concern expressed in the declarations of Frances Lamberts, Ruth Gutierrez, Trudy Wallack, and Park Overall, that NFS’s history of causing radiological and nonradiological environmental contamination indicates that it may not have sufficient control over the BLEU Project to prevent accident releases of contaminants in the future. Obviously, accident discharges may be significantly higher than the normal discharges estimated in the EA.

pipled directly to people’s homes would become more diluted in the process. It is reasonable to presume that that concentration of contaminants in the water at the water treatment facility remains the same when the water arrives at the faucet.

⁵ Moreover, NFS incorrectly suggests that in evaluating standing, the Presiding Officer may only consider the dose from the proposed BLEU project. Applicant’s Answer at 13. This is not a logical argument. Petitioners’ members are already exposed to radiological impacts from the existing NFS facility. The additional effects of the proposed BLEU project on their health will be cumulative, *i.e.*, in addition to the existing effects. It would not be at all reasonable or logical to ignore the fact that the radiological effluent from the proposed BLEU Project will add to an existing burden on Petitioners’ members’ health.

Moreover, in the course of evaluating NFS's claim that the EA shows the BLEU Project's radiological discharges to the Nolichucky River are vanishingly small, Petitioners have discovered significant discrepancies in the data underlying the EA, which undermine the credibility of NFS's claim. As demonstrated in the attached Declaration of January 6, 2003 by Dr. Arjun Makhijani (hereinafter "Makhijani Declaration"), the EA makes incorrect and misleading assertions regarding NFS's estimates of radiological discharges to the environment.

In Section 5.1.1.2, the EA claims that Tables 5.1 and 5.2 present estimates of liquid and airborne radiological releases from the proposed BLEU Project. The EA cites two source documents submitted by NFS: a letter from B.M. Moore, NFS, to NRC, regarding "NFS Responses to NRC's Request for Additional Information to Support an Environmental Review for BLEU Project" (March 15, 2002) (hereinafter "RAI Response"); and a letter from B.M. Moore, NFS, to NRC, regarding "Additional Information to Support an Environmental Review for BLEU Project" (January 15, 2002) (hereinafter "Additional Information Letter"). *See* EA at 5-4 – 5-5; Makhijani Declaration, pars. 3 and 4. In fact, however, the EA reports radiological discharge estimates from only one of those sources, the Additional Information Letter. *Id.*, par. 5. Significantly higher estimates in the RAI Response are not reported in the tables or anywhere else in the EA; nor is the discrepancy explained.

For instance, the EA does not provide data from the RAI Response which estimates liquid plutonium discharge estimates that are six times higher than reported in the EA. Makhijani Declaration, pars. 6-8. As discussed in paragraph 8 of Dr.

Makhijani's Declaration, he considers this discrepancy to be significant for two important reasons. First, assuming that the dose is proportional to the release, the higher figure of plutonium releases would cause the estimated plutonium dose to increase from 0.436 mrem to about 2.7 mrem. By itself, this plutonium dose is higher than the entire dose estimate from all radionuclides via that water pathway in the EA. A 2.7 mrem dose from plutonium is also far higher than that typically expected from atmospheric testing fallout, which is the basic point of comparison for plutonium doses when that comparison is to "background" dose from plutonium. Second, the discrepancy raises a significant concern that NFS and the NRC do not have an adequate basis for estimating plutonium releases. If plutonium release estimates can increase by a factor of six in the two months that elapsed between the January 15, 2002, Additional Information Letter and the March 15, 2002, RAI Response, Dr. Makhijani questions what is to guarantee that they will not increase again by a factor of six, ten or even fifty in the next two years? Makhijani Declaration, pars. 8, 13.

Similarly, the EA fails to disclose discrepancies in NFS's estimates of airborne radiological releases. Table 5.2 fails to report higher estimates of plutonium and americium discharges that are contained in the RAI Response. The plutonium discharge estimates in the RAI Response are between six and almost 39 times higher than the levels estimated in the EA and the Additional Information Letter. The americium discharge estimates reported in the RAI Response are between nine and almost 60 times higher than the estimates reported in the EA and the Additional Information Letter. Makhijani Declaration, paragraphs 10-12.

Also disturbing is NFS's acknowledgement that its estimates of radiological discharges to the environment may increase again in the future. Makhijani Declaration, par. 13.

As Dr. Makhijani concludes, the discrepancies cited above are significant for two important reasons. First, they indicate that releases from the proposed BLEU Project may be significantly higher than estimated by the NRC or NFS. Second, they also demonstrate an unacceptably low level of scientific care and rigor by the NRC in preparing the EA, which undermines the credibility of the NRC's low estimates for liquid and airborne releases from the proposed BLEU Project. Makhijani Declaration, par. 14.

NFS also asserts that Trudy Wallack and Park Overall lack standing because they live farther down the river than Ms. Lamberts or Ms. Gutierrez. Applicant's Answer at 17, 19. According to NFS, the very small levels of contaminants that are found in the effluent at the Jonesborough water treatment plant will be even further diluted by the time they get to where Ms. Wallack and Ms. Overall live. *Id.* However, given the significant questions raised by Dr. Makhijani about the reliability of the NRC Staff's estimates of radiological discharges to the environment, the Presiding Officer lacks an adequate basis for ruling that discharges from the BLEU Project would have no effect on the health and welfare of these individuals. Moreover, Ms. Wallack's and Ms. Overall's standing is not based on normal discharges alone, but also on their concern about accidental discharges. Wallack Declaration, par. 6; Overall Declaration, par. 5. Their concern is well-founded on NFS's acknowledged history of contaminating the environment. *Id.* Finally, NFS completely ignores Ms. Wallack's statement that she eats fruits and vegetables that are

irrigated in Nolichucky River water, consumes shrimp that are raised in Nolichucky River water, and drinks milk from cows that drink from the Nolichucky River. Declaration of Trudy L. Wallack, par. 9 (November 25, 2002). As her declaration demonstrates, the quality of the Nolichucky River has a direct impact on her health, through the ingestion of food that is raised on Nolichucky River water.

In summary, given NFS's history of environmental contamination, the questionable nature of the radiological discharge estimates provided in the EA, and the fact that Nolichucky River water is used to irrigate crops and raise animals for food in the area, the Presiding Officer is not "in a position at this threshold stage to rule out as a matter of certainty the existence of a reasonable possibility" that that radiological impacts of the proposed BLEU Project may have an adverse impact on the health of any of the petitioners, including Ms. Wallack and Ms. Overall. *Yankee Atomic, supra*, CLI-96-7, 43 NRC at 247, quoting *Yankee Atomic Electric Co. (Yankee Nuclear Power Station)*, LBP-96-2, 43 NRC 61, 70 (1996).

NFS also argues that Petitioners may not rely on an assertion by Ms. Gutierrez that she is concerned that the value of her property will potentially decline as a result of public perception that increased contaminant levels in the Jonesborough drinking water supply pose a health risk. According to NFS, allegations that public fears of health risks will depress property values have been held not to confer standing in NRC licensing cases.⁶ Applicant's Answer at 15. However, the Commission has explicitly recognized

⁶ The principal case cited by NFS for this proposition, *Sequoyah Fuels Corporation (Gore, Oklahoma Site Decommissioning)*, CLI-01-2, 53 NRC 9, 13 (2001) does not contain any holding that relates to standing based on a decline in property values.

that the impact of nuclear facilities on property values is covered by the National Environmental Policy Act. *Louisiana Energy Services* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 108 (1998). In that case, the Commission affirmed a Licensing Board decision that recognized the “adverse impact” to already-depressed communities of “having a heavy industrial facility nearby making them even more undesirable.” *Louisiana Energy Services* (Claiborne Enrichment Center), LBP-97-8, 45 NRC 367, 409 (1997). As was the case in *Louisiana Energy Services*, the potential for a depression in real estate values along the Nolichucky River arises from human perceptions that are grounded in real-life conditions. In reality, waterborne and airborne releases of plutonium, and other radiological contaminants will increase as a result of the operation of the proposed BLEU Project. In reality, NFS is a company with a history and a reputation for contaminating the environment. Nevertheless, as Ms. Gutierrez implicitly recognized in her declaration, these factors do not, by themselves, cause property values to decline. Property values decline when there is human perception of and response to new conditions, such that people are no longer willing to pay the same price for property because they consider it less desirable. The fact that Ms. Gutierrez noted the relationship between public perception and declining property values does not put her concern within the realm of purely psychological harms that are outside the scope of injuries protected by the Atomic Energy Act and the National Environmental Policy Act.⁷

⁷ For the same reasons, the Presiding Officer should also reject NFS’s similar argument with respect to those aspects of Ms. Wallack’s standing that are related to declining property values. See Applicant’s Answer at 17-18.

NFS also disputes the adequacy of Ms. Wallack's claim that she does not canoe or raft in the waters directly below the NFS-Erwin facility because of NFS's discharges into the river, and would be further discouraged from canoeing or rafting there by the operation of the proposed BLEU Project. According to NFS, "if she does not canoe or raft there now, then she will not canoe or raft there regardless of whether the first amendment is granted." Applicant's Answer at 18. However, NFS misses Ms. Wallacks's point that if NFS should cease its other operations, she still would not go back to the waters directly below the NFS plant because of the BLEU Project.

In addition, NFS inappropriately compares Ms. Wallack's declaration to a standing affidavit rejected by the Supreme Court in *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 564 (1992). In that case, the Court held that an affidavit expressing a generalized intent to visit the site of the alleged injury, *i.e.*, to travel from the United States to Sri Lanka at some unstated time in the future, was not sufficient to confer standing. *Id.* Here, in contrast, Ms. Wallack has stated that she is an "avid canoeist and rafter," who "frequently" canoes and rafts on "various parts of the Nolichucky River." Wallack Declaration, par. 8. Her contact with the Nolichucky is steady, indeed enthusiastic. Thus, she is more like the standing declarant in *Private Fuel Storage* (Independent Fuel Storage Installation), LBP-99-3, 49 NRC 40, 49-52 (1999), *affirmed*, CLI-99-10, 49 NRC 318, 323-24 (1999), who alleged that he that he had "frequently visited" the mountain range that was the location of a proposed rail spur and would "do so frequently in the future," but would be "personally harmed" by a decision to allow construction of the rail spur. *Id.* at 50. Clearly, Ms. Wallack's hope of returning to a

favorite boating spot on the Nolichucky River, *i.e.*, just below the NFS-Erwin facility, is dimmed by the prospect of the operation of the proposed BLEU Project.⁸

III. PETITIONERS' AREAS OF CONCERN

NFS objects to the admission of all of the areas of concern raised by Petitioners. With the exception of Petitioners' concern regarding the environmental impacts of terrorist attacks, these arguments are without merit and must be rejected.

A. Concerns Regarding Compliance With NEPA

In their first area of concern, Petitioners seek preparation of an EIS for the proposed BLEU project. In support of this argument, they raise three areas in which the EA fails to address significant environmental impacts of the proposed project. NFS takes issue with each of these assertions regarding the project's environmental impacts.

The first assertion of significant environmental impact reads as follows:

- a. The proposed license amendment involves the shipping, storage, handling, and processing of HEU. It also involves the shipping, storage, handling and processing of hazardous chemicals. As the EA concedes:

The conversion of HEU materials to low-enriched uranium dioxide at the BLEU Project will require the handling, processing, and storage of radioactive material and hazardous chemicals. An uncontrolled release of these materials from accidents could pose a risk to the environment as well as to workers and public health and safety.

67 Fed. Reg. at 66,175. In preparing the EA, the NRC Staff apparently assumes that accidents involving HEU and/or hazardous chemicals are not credible, and therefore that no EIS is needed. *See, e.g.*, October 30, 2002, Federal Register Notice, 67 Fed. Reg. at 66,175 ("Accidental releases of contaminants to groundwater appear unlikely due to design and control measures implemented by NFS"; "safety controls to be employed in the processes for the BLEU Project

⁸ For the same reasons discussed above, the Presiding Officer should reject NFS's argument that Chris Erwin, who has similar contacts with the Nolichucky River, lacks standing. Applicant's Answer at 20-21.

appear to be sufficient to ensure planned processing will be safe.”) However, the EA lacks a reasonable factual basis for making such a determination. As the NRC concedes in the October 30, 2002, Federal Register notice, the NRC has not even received, let alone reviewed, two of the three license amendment applications needed to complete the BLEU Project. *Id.* Given that radiological accidents constitute the principal means by which the NFS Erwin facility could have an adverse impact on the environment, and given that the NRC’s chief area of expertise lies in assessing compliance with its safety regulations for the control of radiological releases, the NRC cannot be considered to have taken the proverbial “hard look” at the environmental impacts of the expansion of the NFS-Erwin facility if it has not reviewed any license amendment application regarding the safety of the proposed operation. *See Natural Resources Defense Council v. Morton*, 458 F.2d 827, 838 (D.C. Cir. 1972).

NFS first argues that this concern is invalid because the instant proceeding concerns the first license amendment request and not the second and third. However, Petitioners do not believe they were precluded from raising this concern by the Presiding Officer’s November 19, 2002, Memorandum and Order (Ruling on Motion for Clarification of Scope of Hearing). In that order, the Presiding Officer held that:

the scope of this proceeding is limited to those safety and environmental areas of concern that directly relate to the February 2002 license amendment application. Any areas of concern pertaining to portions of the EA relating to the actions that will be the subject of the yet unsubmitted second and third amendment applications need not be now advanced.

Id., slip op. at 3 (emphasis added). Petitioners interpreted this order to permit, but not require, them to raise environmental issues that relate to all three license amendment applications. As discussed in Petitioners’ Hearing Request, Petitioners presented their concerns in general form because they found it difficult to separate their environmental concerns with respect to the three separate license amendment applications. Hearing Request at 3.

Second, NFS argues that Petitioners have overlooked the fact that in preparing the EA, the NRC Staff did indeed have documents on which to base its finding that accidents are unlikely. Applicant's Answer at 23. These documents consist of correspondence from NFS regarding the Staff's environmental review. NFS misses the point of Petitioners' concern, which is that, aside from the application to build the Uranyl Nitrate Storage Building, NFS has not submitted any application showing how the BLEU Project will comply with NRC safety regulations. Nor has the NRC Staff itself issued any evaluation of whether and how NFS will comply with NRC safety regulations. Under the circumstances, NFS's generalized environmental correspondence with the NRC provides the NRC with insufficient information to fully evaluate NFS's compliance with NRC safety requirements, and therefore its capability to avoid accidents. This conclusion is borne out by the fact that the NRC Staff has reserved judgment on whether to prepare a full-scale EIS until it receives the second and third license amendment applications.

Petitioners' second assertion of significant environmental impact reads as follows:

b. As discussed above in subsection (a), the NRC Staff's apparent rationale for its Finding of No Significant Impact is that NFS will comply with its permit. However, over the course of its operating history, NFS has had a long history of exceeding permit limitations with respect to the emission of effluent to the environment, with the result that soil and groundwater on the Erwin site are contaminated. *See* Section 3.9 of the EA. [Footnote: As discussed in note 3, *supra*, NFS has also been sued for offsite contamination.] In addition, NFS has reported and/or been cited on numerous occasions for violations of its permit, some of which resulted in spills and/or exposure of workers to contamination. These incidents demonstrate a serious risk that NFS will continue to pollute the environment, causing significant adverse impacts to the health and welfare of workers, the public, and the general environment.

NFS does not deny that it has contaminated the environment, or has been cited on numerous occasions for violations of its permits, including spills and worker contamination. Instead, NFS argues that this claim must be rejected because it is “completely unparticularized.” Applicant’s Answer at 25. The case cited by NFS for this standard, *Shieldalloy Metallurgical Corp.* (Cambridge, Ohio Facility), CLI-99-12, 49 NRC 347, 354 (1999), concerned the Commission’s standard for the raising of concerns in a Subpart L proceedings by interested governments and Indian tribes: “reasonable specificity.” See 10 C.F.R. § 2.1211(b). As pointed out in Petitioners’ Hearing Request at page 9, the standard for admissibility of concerns by private citizens and organizations is found in 10 C.F.R. § 2.1205(e), which requires a petitioner must describe its areas of concern “in detail.” NFS does not dispute Petitioners’ assertion that the Commission has interpreted this provision to require the petition to provide the presiding officer with “the minimal information needed to ensure the intervenor desires to litigate issues germane to the licensing proceeding.” *Id.*, citing Statement of Considerations to 10 C.F.R. Part 2, Subpart L, 54 Fed. Reg. 8,269, 8,272 (February 28, 1989); *Sequoyah Fuels Corporation* (Source Materials License No. Sub-1010), LBP-94, 40 NRC 314, 316, *affirmed* 40 NRC 64 (1994). See also *Babcock & Wilcox Company* (Pennsylvania Nuclear Services Operations, Parks Township, Pennsylvania), LBP-94-12, 39 NRC 215, 217 (1994).

The question raised here is whether Petitioners have submitted the minimal amount of information needed to ensure that they desire to litigate issues germane to this licensing proceeding. The concern raised by Petitioners is that the NRC Staff does not

have reasonable grounds for its apparent assumption that the proposed BLEU Project will not adversely impact the environment because NFS will comply with its permit. In support of this concern, Petitioners cite NFS's history of violating its permit. This is a straightforward, clear and documented concern. Moreover, contrary to NFS's argument, it relates to NFS's future operations, not to the past.

The third significant impact of concern to Petitioners consists of the impacts of acts of malice or insanity against the proposed BLEU Project, or against radioactive material that is being transported to or away from the BLEU Project. NFS has correctly pointed out that in a series of decisions issued on December 18, 2002, the Commission ruled that such considerations are not litigable in NRC licensing proceedings. *See Private Fuel Storage* (Independent Spent Fuel Storage Installation), CLI- 02-24 56 NRC __ (December 18, 2002), and cases cited therein in footnote 4. Petitioners believe the Commission's decision in *Private Fuel Storage* is in error, and request that the Presiding Officer issue a ruling for purposes of preserving their right to appeal.

Petitioners also raised the concern that the geographic zone of impact of the BLEU Project, as depicted in the EA in Figure 3.1 and evaluated throughout the EA, does not include Greene County, which is contiguous with Unicoi County and lies downstream of the NFS-Erwin facility. Hearing Request at 13. NFS argues that the zone described by Petitioners actually constitutes a "Region of Influence," which was used to evaluate demography, socioeconomics, and environmental justice. Applicant's Answer at 26-27. Whether the zone is called the geographic zone of impact or the region of influence, Petitioners have raised a legitimate concern that NFS has drawn a circle around the NFS-

Erwin facility that excludes a significant area that is impacted by the proposed BLEU Facility, and should be included. The merits question of whether the impacts do in fact extend to Greene County should not be evaluated at this threshold phase of the proceeding.

B. Safety Concerns Regarding the February 28, 2002 Application

NFS opposes the admission of all of Petitioners' safety-related concerns regarding the proposed BLEU Project.

First, NFS opposes the admission of Petitioners' concern that NFS has not publicly demonstrated that it has made adequate arrangements to fund the decommissioning of the Uranyl Nitrate Storage Building at the end of the facility's life, and thus has not demonstrated compliance with 10 C.F.R. § 70.23(a)(5) or § 70.25. Hearing Request at 13-14. NFS responds that Petitioners have not made any "particularized" complaints about the inadequacy of decommissioning funding. Applicant's Answer at 27-28. Setting aside the question of whether Petitioners were required to submit a "particularized" set of concerns regarding financial assurance for decommissioning, it is correct that Petitioners were unable to provide any details regarding inadequacies in financial assurances because the information was withheld as proprietary. Petitioners seek access to this information through the issuance of a Protective Order from the Presiding Officer, so that they can evaluate the adequacy of decommissioning funding. Petitioners also wish to note their belief that it would be most reasonable and efficient to evaluate the question of the adequacy of decommissioning funding with respect to the entire BLEU project, rather than one piece at a time.

NFS also opposes the admission of Petitioners' concern that NFS has not demonstrated that it can and will comply with 10 C.F.R. §§ 70.23(a)(2), (3), or (4).⁹ In essence, Petitioners are concerned that NFS will continue its past history of violating its permit and contaminating the environment. NFS argues that the concern must be rejected because Petitioners "do not describe in any respect the ways in which the Petitioners believe that the NFS license amendment applications(s) do not meet the Commission's requirements." Applicant's Answer at 28 (emphasis in original). This argument is absurd. It is hard to envision any case in which a license applicant would admit, in a license amendment application or any other document, that it is likely to be unable or unwilling to control its chemical and radiological releases, and expects to contaminate the environment in the future. Yet, time and again, illegal and environmentally harmful releases from these operations occur after the license is issued. The problems usually lie in poor management and oversight, and failure to maintain the plant in an adequate condition. By pointing out that NFS, which previously committed to the NRC that it would comply with its permits, did not in fact comply, Petitioners have raised an admissible concern that NFS may not be able to comply with its permit for the proposed BLEU Project either.

⁹ These provisions require that the application must show that:

- (2) The applicant is qualified by reason of training and experience to use the material for the purpose requested in accordance with the regulations in this chapter;
- (3) The applicant's proposed equipment and facilities are adequate to protect health and minimize danger to life or property;
- (4) The applicant's proposed procedures to protect health and to minimize danger to life or property are adequate.

IV. CONCLUSION

For the foregoing reasons, NFS's objections to Petitioners' standing and the admissibility of their concerns, are generally without merit. Only one of NFS's arguments has merit, i.e., that Petitioners' concern regarding the environmental impacts of a terrorist attack on the proposed BLEU Project or associated transportation must be dismissed under recent Commission decisions. Petitioners seek an explicit ruling on this issue, in order to preserve their right of appeal.

Respectfully submitted,



Diane Curran

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202/328-3500

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Dated: January 6, 2003

CERTIFICATE OF SERVICE

I certify that on January 6, 2003, copies of REPLY BY FRIENDS OF THE NOLICHUCKY RIVER VALLEY, STATE OF FRANKLIN GROUP/SIERRA CLUB, OAK RIDGE ENVIRONMENTAL PEACE ALLIANCE, AND TENNESSEE ENVIRONMENTAL COUNCIL and REQUEST BY FRIENDS OF THE NOLICHUCKY RIVER VALLEY, STATE OF FRANKLIN GROUP/SIERRA CLUB, OAK RIDGE ENVIRONMENTAL PEACE ALLIANCE, AND TENNESSEE ENVIRONMENTAL COUNCIL TO APPLICANT'S ANSWER TO THEIR REQUEST FOR A HEARING AND PETITIONERS' REPLY TO APPLICANT'S RESPONSE TO THEIR MOTION HOLD PROCEEDING IN ABEYANCE were served on the following by first-class mail, and by e-mail and fax (Exhibits 2-9 to Declaration of January 6, 2003 by Dr. Arjun Makhijani) if so designated:

Alan S. Rosenthal, Presiding Officer Atomic Safety and Licensing Board Mail Stop T-3 F23 U.S. Nuclear Regulatory Commission Washington, D.C. 20555 By e-mail to: rosnthl@aol.com Sam4@nrc.gov FAX: 301/415-5599	Office of Appellate Adjudication U.S. Nuclear Regulatory Commission Washington, D.C. 20555
Richard F. Cole, Administrative Judge Atomic Safety and Licensing Board Mail Stop T-3 F23 U.S. Nuclear Regulatory Commission Washington, D.C. 20555 By e-mail to: rfcl@nrc.gov FAX: 301/415-5599	Daryl Shapiro Shaw Pittman, LLP 2300 N Street N.W. Washington, D.C. 20037 By e-mail to: Daryl.Shapiro@shawpittman.com FAX: 202/663-8007
Rules and Adjudications Branch Office of the Secretary U.S. Nuclear Regulatory Commission Washington, D.C. 20555 By e-mail to: hearingdocket@nrc.gov	C. Todd Chapman, Esq. King, King and Chapman, PLLC 125 South Main Street Greeneville, TN 37743 By e-mail to: chapman@xtn.net FAX: 423/639-3629

Neil J. Newman, Esq. Nuclear Fuel Services 1205 Banner Hill Road Erwin, TN 37650-9718	
Jennifer Euchner, Esq. David Cummings, Esq. Office of General Counsel U.S. Nuclear Regulatory Commission Washington, D.C. 20555 By e-mail to: jme@nrc.gov , dac3@nrc.gov FAX: 301/415-3275	Louis Zeller Blue Ridge Environmental Defense League P.O. Box 88 Glendale Springs, NC 28629 By e-mail to: BREDL@skybest.com FAX: 336/982-2954



Diane Curran

January 6, 2003

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE PRESIDING OFFICER

In the matter of

Nuclear Fuel Services, Inc.

(Materials License SNM-124)

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Docket No. 70-143

DECLARATION OF JANUARY 6, 2003 BY DR. ARJUN MAKHIJANI

Under penalty of perjury, I, Dr. Arjun Makhijani, declare as follows:

1. I am President of the Institute for Energy and Environmental Research. IEER has been doing nuclear-related studies for more than fifteen years and is an independent non-profit organization located in Takoma Park, Maryland. Under my direction, IEER produces technical studies on a wide range of environmental issues to provide advocacy groups and policymakers with sound scientific information and analyses as applied to environmental and health protection and for the purpose of promoting the understanding and the democratization of science.

2. I have a Ph.D. (Engineering), granted by the Department of Electrical Engineering of the University of California, Berkeley, where I specialized in the application of plasma physics to controlled nuclear fusion. I also have a master's degree in electrical engineering from Washington State University, and a bachelor's degree in electrical engineering from the University of Bombay. I am qualified by training and experience as an expert in the fields of plasma physics, electrical engineering, nuclear engineering, and energy-related technology and policy issues. I have served as a nuclear engineering expert witness in lawsuits and testified as such. A copy of my curriculum vita is attached as Exhibit 1 to this declaration. Over the past 30 years, I have developed extensive experience with nuclear fuel cycle-related issues, including standards and strategies for radioactive waste storage and disposal, accountability with respect to measurement of radioactive effluent from nuclear facilities, health and environmental effects of nuclear testing, strategies for disposition of fissile materials, energy efficiency, and other energy-related issues. As reflected in my curriculum vita, which is attached, I have authored or co-authored many publications on these subjects. I have testified before Congress on several occasions regarding issues related to nuclear waste, reprocessing, environmental releases of radioactivity, and regulation of nuclear weapons plants. Since 1997, I have been on the expert team monitoring independent audits of the compliance of Los Alamos National Laboratory with the radiation release portion of the Clean Air Act (40 CFR 61 Subpart H), conducted under a Consent Decree, which was the result of a federal court finding that Los Alamos was out of compliance with Subpart H. In that capacity I have reviewed extensive records, models, facilities, procedures, measurements, and other

aspects of the Los Alamos National Laboratory air emissions control and measurement program in order to determine whether the audits were being properly conducted and whether they were thoroughly done. I have also served as a member of the Radiation Advisory Committee of the U.S. Environmental Protection Agency's (EPA's) Science Advisory Board from 1992 to 1994 and on the EPA's Advisory Subcommittee on Radiation Standards, which is part of the National Advisory Committee on Environmental Policy and Technology. In addition, I have served as a consultant to numerous organizations, as mentioned in my CV.

3. I have reviewed the estimates of radiological releases for the proposed BLEU Project at the NFS-Erwin plant, which are contained in Tables 5.1 and 5.2 of the U.S. Nuclear Regulatory Commission's (NRC's) Environmental Assessment for Proposed License Amendments to Special Nuclear Material License No. SNM-124 Regarding Downblending and Oxide Conversion of Surplus High-Enriched Uranium, Nuclear Fuel Services, Inc., Erwin, Tennessee Plant, Docket 70-143 (June 2002). I have also reviewed related information in two NFS documents that are cited by the NRC as the documentation of the calculations and the Environmental Assessment's (EA's) estimates of radioactive and chemical effluent releases for the proposed BLEU Project. These documents consist of a letter from B.M. Moore, NFS, to NRC, regarding "NFS Responses to NRC's Request for Additional Information to Support an Environmental Review for the BLEU Project" (March 15, 2002) (hereinafter "RAI Response"); and a letter from B.M. Moore, NFS, to NRC, regarding "Additional Information to Support an Environmental Review for BLEU Project" (January 15, 2002) (hereinafter "Additional Information Letter"). The Additional Information Letter and RAI Response are cited in Section 5 of the EA as References 5 and 8, respectively. I have been assisted in this review by Annie Makhijani, Project Scientist at Institute for Energy and Environmental Research (M.S., Chemistry, University of Maryland, 1994).

4. In Section 5.1.1.2 of the EA, the NRC addresses radiological impacts of the proposed BLEU Project operations. According to the EA:

Based on source material properties and processing information, NFS has estimated the quantities of airborne and liquid effluents and used this information to estimate doses to the maximally exposed individual. The documentation of these calculations are [sic] provided in the additional information letter (Ref. 5) and RAI response (Ref. 8). Effluent and dose calculation results by release point are provided in Tables 5.1 and 5.2.

5. As discussed above in paragraph 4, the text of the EA cites both the Additional Information Letter and the RAI Response as sources of the information contained in Tables 5.1 and 5.2 of the EA. Nevertheless, my review of these documents show that the EA ignores data in the RAI Response that is substantially different from the data provided in the Additional Information Letter. The RAI Response contains estimates for liquid and airborne releases of plutonium and uranium that are significantly higher than the estimates provided in the EA and Additional Information Letter. For ease of reference, copies of the relevant tables from the EA, the Additional Information Letter, and the RAI Response are attached as exhibits to this Declaration. The exhibits are as follows:

Exhibit 2: EA Table 5.1;
 Exhibit 3: EA Table 5.2;
 Exhibit 4: Additional Information Letter, Attachment 23, Table 1;
 Exhibit 5: Additional Information Letter, Attachment 23, Table 2;
 Exhibit 6: Additional Information Letter, Attachment 22, Table 1;
 Exhibit 7: RAI Response, Attachment IV, Table 3-1;
 Exhibit 8: RAI Response, Attachment IV, Table 3-3
 Exhibit 9: RAI Response, Attachment IV, page 3

Liquid Effluent Estimates

6. Table 5.1 of the EA is entitled "Comparison of current liquid effluent releases with estimated effluents and doses from the proposed action." Despite the fact that the text of the EA cites the RAI Response as part of the "documentation of these calculations" (pp. 5-4 and 5-5), the table itself does not use or cite data from the RAI Response. Instead, the EA relies solely on the Additional Information Letter, as indicated in the note below Table 5.1. However, the RAI Response contains an estimate of plutonium discharged into the liquid stream that is about six times higher than the estimate reported in the EA and the Additional Information Letter. It also contains an estimate of americium discharged to the liquid stream that is more than nine times higher than reported in the EA and the additional information letter. This is demonstrated below in Table 1:

Table 1: Discrepancies in Estimates of Liquid Effluent between the EA/Additional Information Letter and the RAI Response

Radionuclide	EA Table 5.1 Ci/yr	Additional Information Letter (Attachment 23, Table 1) Ci/yr	RAI Response (Attachment IV, Table 3-3) Ci/yr	Absolute difference between RAI resp and EA	Ratio of estimates (RAI Resp/EA)
Uranium (232, 233, 234, 235, 236, 238)	1.05E-04	1.10E-04	1.30E-04	2.50E-05	1.24
Thorium (228, 230, 231, 232, 234)	9.10E-03	9.10E-03	9.10E-03	0.00E+00	1
Plutonium (238, 239/240, 241)	3.09E-02	3.10E-02	1.90E-01	1.59E-01	6.15
Americium	5.56E-04	5.56E-04 (from Attachment 23 Table 2)	5.3E-03 (Attachment G)	4.74E+03	9.53
Technetium	1.75E-04	1.80E-04	1.80E-04	(rounding difference only)	(rounding difference only)

7. In Table 5.1 of the EA, the NRC used the lower plutonium discharge figure from the Additional Information Letter, without providing any explanation as to why it ignored the higher figure in the RAI Response. Nor did the EA explain what caused the liquid plutonium discharge estimate to increase by a factor of six in the short space of the two months that passed between the submittal of the Additional Information Letter and the RAI Response.

8. I consider the EA's failure to report the estimate in the RAI Response significant, for two important reasons. First, assuming that the dose is proportional to the release, the higher figure of plutonium releases would cause the plutonium dose to increase from 0.436 (last column of table 5.1 on page 5-5 of the EA) to about 2.7 mrem. The latter figure for plutonium dose alone is higher than the entire dose estimate from all radionuclides via that water pathway in the EA. The 2.7 mrem dose from plutonium is far higher than that typically expected from plutonium in atmospheric testing fallout, which is the basic point of comparison for plutonium doses when that comparison is to "background" dose from plutonium. Second, the discrepancy raises a significant concern that NFS and the NRC do not have an adequate basis for estimating plutonium releases. If plutonium release estimates can increase by a factor of more than six in two months, what is to guarantee that they will not increase again (see below).

Airborne Effluent Estimates

9. Table 5.2 of the EA is entitled "Comparison of current airborne effluents with estimated effluents from the proposed action (including the combined dose estimates.)" Despite the fact that the text of the EA cites the March 15, 2002, RAI Response as part of the "documentation of these calculations" (pp. 5-4, 5-5), Table 5.2 itself does not use or cite data from the RAI Response. Instead, it relies solely on the January 15, 2002, Additional Information Letter, as stated at the note at the bottom of Table 5.2. Once again, the omission is significant, because various estimates of airborne plutonium releases to the air from different facilities are from six to almost 39 times higher in the RAI Response than in the EA or the Additional Information Letter. Similarly, estimates of americium releases are nine to almost 59 times higher in the RAI Response than in the EA and Additional Information Letter.

10. Tables 2, 3, and 4 below illustrate the fact that for each sector for which airborne radiological estimates are provided (BLEU Production Facility, BLEU Complex, Waste Water Treatment Facility), Table 5.2 of the EA ignores some significantly higher discharge estimates in the RAI Response for certain radionuclides, including plutonium and americium.

Table 2: BLEU Preparation Facility Air Effluent Discrepancies

Radionuclide	EA Table 5.2 , and Additional Information Letter, Attachment 22, Table 1 Ci/yr	RAI Response, Attachment IV, Table 3-1 Ci/yr	Absolute Difference	Ratio of estimates
Uranium	1.10E-03	1.10E-03	0.00E+00	no change
Thorium	1.70E-05	1.70E-05	0.00E+00	no change
Plutonium	1.40E-07	8.50E-07	7.10E-07	6 07
Americium	2.50E-09	2.30E-08	2.05E-08	9 20

Table 3: BLEU Complex Air Effluent Estimate Discrepancies

Radionuclide	EA Table 5.2 , and Additional Information Letter, Attachment 22, Table 1 Ci/yr	RAI Response, Attachment IV, Table 3-1 Ci/yr	Absolute Difference	Ratio of estimates
Uranium	2.30E-05	2.30E-05	0.00E+00	no change
Thorium	3.40E-07	3.40E-07	0.00E+00	no change
Plutonium	2.80E-09	1.80E-08	1.52E-08	6.43
Americium	5.00E-11	4.80E-10	4 30E-10	9.6

Table 4: Waste Water Treatment Facility Air Effluent Estimate Discrepancies

Radionuclide	EA Table 5.2 , and Additional Information Letter, Attachment 22, Table 1 Ci/yr	RAI Response, Attachment IV, Table 3-1 Ci/yr	Absolute Difference	Ratio of estimates
Uranium	4.70E-05	4.80E-05	1E-06	1.02
Thorium	2.00E-05	1.20E-04	1.00E-04	6
Plutonium	1.60E-07	6.20E-06	6 04E-06	38 8
Americium	2.90E-09	1.70E-07	1 67E-07	58 6

11. Just as it did with respect to liquid plutonium discharge estimates in Table 5.1 of the EA, in Table 5.2 the NRC used the Additional Information Letter's lower airborne plutonium and americium discharge estimates for the BLEU Preparation Facility (BPF), without providing any explanation as to why it ignored the higher figures in the RAI Response. Nor did the EA explain what caused the plutonium and americium airborne discharge estimates to increase by factors ranging from 6 to nearly 59 respectively, in the short space of the two months that passed between the submittal of the Additional Information Letter and the RAI Response.

Other Problems

12. The EA has not been prepared with due diligence on other grounds as well. Specifically, the source terms for liquid effluents listed in Table 5.1 of the EA do not correspond to the doses listed for those releases. Rather, a detailed examination of the Additional Information Letter and the RAI Response against the estimates in Table 5.1 led me to conclude that the dose estimate in Table 5.1 includes many more radionuclides than are listed there. The lumping together of decay products should have been specified in the table. It is misleading not to have done so.

Conclusions

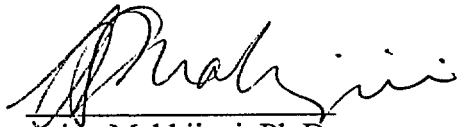
13. I consider the six-fold increase of plutonium in liquid discharges and the six to almost 59 fold increases in airborne discharges of transuranic radionuclide estimates that is reflected in a comparison of the EA, NFS's Additional Information Letter, and RAI Response to be significant. As discussed above, if plutonium release estimates can increase by a factor of six in two months, what is to guarantee that they will not increase again by a factor of six, ten, or even fifty in the next two years? If it increases again by about a factor of four, it would exceed the claimed ALARA limit of 10 millirem.

NFS itself has stated on page 3 of Attachment IV of the RAI Response that its discharge estimates may go up in the future by unspecified amounts, raising questions about the validity of the analysis and the assurances provided to the public in the EA:

The concentrations for the caustic discharge stream were calculated assuming that the percentages of uranium and the radioactive impurities going with the caustic discharge stream remain unchanged. The BFP process will use centrifuges to separate the uranium from the caustic discharge stream. These centrifuges may change the radionuclides ratios, causing some of the impurities to be concentrated in the caustic discharge stream. If the radioactive impurities are concentrated to a significant degree, the consequences analyzed using the data in Table 2-2 may be biased low. When a consequence has been evaluated as being just below the next higher consequence level, more accurate source term data may be needed to ensure that the consequence level is not any higher than what was already indicated.

14. In summary, I find that the discrepancies cited above, between the EA/Additional Information Letter and the RAI Response, are significant, for two important reasons. First, they indicate that releases from the proposed BLEU Project may be significantly higher than estimated by the NRC or NFS. Second, they also demonstrate an unacceptably low level of scientific care and rigor by the NRC in preparing the EA, which undermines the credibility of the NRC's low estimates for liquid and airborne releases from the proposed BLEU Project.

I certify that the factual information presented above is true and correct to the best of my knowledge, and that the opinions expressed herein are based on my best professional judgment.



Arjun Makhijani, Ph.D

Dated: January 6, 2002

**Curriculum Vita of
Arjun Makhijani**

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Education:

Ph.D. University of California, Berkeley, 1972, from the Department of Electrical Engineering.
Area of specialization: plasma physics as applied to controlled nuclear fusion.
Dissertation topic: multiple mirror confinement of plasmas.
M.S. (Electrical Engineering) Washington State University, Pullman, Washington, 1967.
Thesis topic: electromagnetic wave propagation in the ionosphere.
Bachelor of Engineering (Electrical), University of Bombay, Bombay, India, 1965.

Current Employment:

1987-present: President and Senior Engineer, Institute for Energy and Environmental Research,
Takoma Park, Maryland. (part-time in 1987).

Other Long-term Employment

1984-88: Associate Professor, Capitol College, Laurel, Maryland (part-time in 1988).
1983-84: Assistant Professor, Capitol College, Laurel, Maryland.
1977-79: Visiting Professor, National Institute of Bank Management, Bombay, India. Principal
responsibility: evaluation of the Institute's extensive pilot rural development program.
1975-87: independent consultant (see page 2 for details)
1972-74: Project Specialist, Ford Foundation Energy Policy Project. Responsibilities included
research and writing on the technical and economic aspects of energy conservation and
supply in the U.S.; analysis of Third World rural energy problems; preparation of requests
for proposals; evaluation of proposals; and the management of grants made by the Project
to other institutions.
1969-70: Assistant Electrical Engineer, Kaiser Engineers, Oakland California. Responsibilities
included the design and checking of the electrical aspects of mineral industries such as
cement plants, and plants for processing mineral ores such as lead and uranium ores.
Pioneered the use of the desk-top computer at Kaiser Engineers for performing electrical
design calculations.

Professional Societies:

Institute of Electrical and Electronics Engineers and its Power Engineering Society
American Physical Society
Health Physics Society
American Association for the Advancement of Science

Awards:

The John Bartlow Martin Award for Public Interest Magazine Journalism of the Medill School of Journalism, Northwestern University, 1989, with Robert Alvarez.

Consulting Experience, 1975-1987

Consultant on a wide variety of issues relating to technical and economic analyses of alternative energy sources; electric utility rates and investment planning; energy conservation; analysis of energy use in agriculture; US energy policy; energy policy for the Third World; evaluations of portions of the nuclear fuel cycle.

Partial list of institutions to which I was a consultant in the 1975-87 period:

Tennessee Valley Authority
Lower Colorado River Authority
Federation of Rocky Mountain States
Environmental Policy Institute
Lawrence Berkeley Laboratory
Food and Agriculture Organization of the United Nations
International Labour Office of the United Nations
United Nations Environment Programme
United Nations Center on Transnational Corporations
The Ford Foundation
Economic and Social Commission for Asia and the Pacific
United Nations Development Programme

Languages: English, French, Hindi, Sindhi, and Marathi.

Reports, Books, and Articles (Partial list)

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Exhibit 2: Environmental Assessment, Table 5.1 (June 2002)

calculations are provided in the additional information letter (Ref. 5) and RAI response (Ref. 8). Effluent and dose calculation results by release point are provided in Tables 5.1 and 5.2. While some effluents for the proposed action are increasing in relation to current releases, the total annual dose estimate for the maximally exposed individual from all planned effluents is 0.022 mSv (2.2 mrem). This result is well below the annual public dose limit of 1 mSv (100 mrem) in 10 CFR Part 20 and the 0.1 mSv (10 mrem) ALARA constraint. The estimated dose is conservative because no pollution control was assumed for a number of radionuclides (Ref. 5, Attachment 23, Table 2). For the proposed action effluents, BPF liquid effluents are discharged to the WWTF, and BLEU Complex liquid effluents are discharged to the sanitary sewer. Sanitary sewer releases are not included in the dose calculations because the dose receptor used for the calculations (maximally exposed individual) would not be exposed to the sewer effluent exposure pathways.

The documentation of effluent estimates includes detailed radionuclide data for feed material, mass balance and process flow diagrams, bases for release fractions for various processing steps, pollution control removal efficiencies, and tabulation of results. For dose assessment, the effluent estimates were multiplied by unit dose coefficients calculated using pathway dose assessment software for each type of release scenario (i.e., airborne, liquid).

Table 5.1 Comparison of current liquid effluent releases with estimated effluents and dose from the proposed action

Element	Removal Factor ^a	Proposed Action WWTF Effluent (Ci/yr) ^b	Current WWTF Effluent (Ci/yr)	As Percentage of Current WWTF Effluent (%)	Proposed Action Effluent Dose (mrem/yr) ^c
Uranium	0.0024	1.05E-4	6.3E-4	16.6	2.93E-3
Thorium	0.0024	9.10E-3	4.4E-6	2.1E+5	1.01E+0
Plutonium	1.0000	3.09E-2	5.3E-7	5.8E+6	4.36E-1
Americium	1.0000	5.56E-4	— ^d	— ^d	2.72E-2
Neptunium	1.0000	7.67E-3	— ^d	— ^d	4.45E-1
Actinium	1.0000	1.39E-4	— ^d	— ^d	1.16E-1
Cesium	1.0000	6.75E-4	— ^d	— ^d	1.82E-2
Technetium	1.0000	1.75E-4	1.6E-2	1.1	2.98E-4
Strontium	1.0000	3.45E-04	— ^d	— ^d	3.45E-3
Total					2.06E+0

^a The removal factor represents the assumed fraction of material remaining in effluent following treatment at the WWTF. A factor of one assumes no treatment and this is conservative since treatment is planned.

^b To convert Ci to Bq, multiply by 3.7E+10.

^c To convert mrem to mSv, multiply by 0.01.

^d Not estimated for current releases.

Source: B.M. Moore, Nuclear Fuel Services, Inc., Letter to U.S. Nuclear Regulatory Commission, "Additional Information to Support an Environmental Review for BLEU Project," January 15, 2002. (Ref. 5), Attachment 23.

Exhibit 3: Environmental Assessment, Table 5.2 (June 2002)

Table 5.2 Comparison of current airborne effluents with estimated effluents from the proposed action (including the combined dose estimate)

Element	Current Main Stack Average (Ci/yr) ^a	Current Remaining Stack Average (Ci/yr) ^a	Proposed BLEU Prep Facility (Ci/yr) ^a	Proposed BLEU Complex (Ci/yr) ^a	Proposed WWTF (Ci/yr) ^a	Totals
Uranium	2.84E-4	3.1E-5	1.1E-3	2.3E-5	4.7E-5	1.5E-3
Thorium	5.7E-7	7.2E-6	1.7E-5	3.4E-7	2.0E-5	4.5E-5
Plutonium	0.0E+0	4.7E-5	1.4E-7	2.8E-9	1.6E-7	4.7E-5
Americium	0.0E+0	9.4E-7	2.5E-9	5.0E-11	2.9E-9	9.4E-7
Dose (mrem/yr) ^b	2.60E-2	1.50E-2	7.37E-2	8.00E-3	7.90E-2	2.02E-1

^a To convert Ci to Bq, multiply by 3.7E+10.

^b To convert mrem to mSv, multiply by 0.01

Source: B.M. Moore, Nuclear Fuel Services, Inc., Letter to U.S. Nuclear Regulatory Commission, "Additional Information to Support an Environmental Review for BLEU Project," January 15, 2002. (Ref. 5), Attachment 22.

Airborne release unit dose factors were calculated using the CAP-88 PC V2.0 code (Ref. 9). The CAP-88 PC V2.0 code was developed by EPA to demonstrate compliance with National Emissions Standards for Hazardous Air Pollutants. A modified Gaussian plume equation in CAP-88 PC V2.0 estimates the average dispersion of radionuclides released from various sources. Calculations were done using a circular grid to distances up to 80 km (50 mi). Effective dose equivalent calculations (i.e., organs and weighting factors) are consistent with the methods in International Commission on Radiological Protection ICRP 26 (Ref. 10) and 30 (Ref. 11). NFS used the EPA rural food source agricultural data for an agricultural exposure scenario that includes consumption of meat, milk, and crops raised in the plume transport/deposition path (Ref. 8). Meteorological data from the NFS license renewal ER (Ref. 12) were used for plume transport calculations (Ref. 8).

Documentation for the liquid release unit dose factors is provided in Ref. 13. Details of the methods used to calculate these dose factors were clarified in a discussion with NFS technical staff (Ref. 14). Calculations were based on the national Council on Radiation Protection 123 screening methodology (Parts 1 and 2) (Ref. 15). The receptor was located at the nearest point of water use (the Jonesborough Water Plant located 13 km (8 mi) downstream from the WWTF outfall (Ref. 14)). A few irrigation uses exist closer to the plant; however, NFS has found the doses calculated for the Jonesborough location bound the dose estimates for the irrigation locations.

The dose to the workers at the NFS site has been analyzed in the Renewal EA (Ref. 3). The potential for increase in dose to workers at NFS due to the BLEU project was evaluated. Operation of the BPF, OCB and UNB is not expected to increase the dose to workers at the NFS facility because the types and quantity of material, and the processing, will be similar to what is already licensed at the site. NFS is committed to keeping doses as low as reasonable

Attachment 23

Additional Information to update Table 5.4 of the NRC EA – 1999
Radiological impacts to the maximally exposed individual from liquid releases

Table 1: Radioactive Liquid Effluents - Radioactivity Released¹

Effluent Stream	Element	Current Averages (Ci/yr)	Estimated BLEU Project Effluents		Effluent Totals (Ci/yr)
			BPF ² (Ci/yr)	BLEU Complex ³ (Ci/yr)	
WWTF	Uranium	6.3E-04	1.1E-04		7.3E-04
	Radium	1.3E-04	3.7E-01		3.7E-01
	Thorium	4.4E-06	9.1E-03		9.1E-03
	Plutonium	5.3E-07	3.1E-02		3.1E-02
	Technetium	1.6E-02	1.8E-04		1.6E-02
Banner Spring Branch	Uranium	1.4E-02			1.4E-02
	Radium	NM			NM
	Thorium	3.4E-04			3.4E-04
	Plutonium	1.7E-04			1.7E-04
	Technetium	2.6E-03			2.6E-03
Sanitary Sewer	Uranium	2.8E-03		2.0E-04	3.0E-03
	Radium	NM			NM
	Thorium	1.4E-05		1.3E-08	1.4E-05
	Plutonium	1.3E-06		4.3E-09	1.3E-06
	Technetium	2.5E-03		1.1E-03	3.6E-03

Notes:

- 1 - Current averages are based on release data from 1996 through 2000, which were obtained from the Safety Department's Semiannual Reports. "NM" - not measured.
- 2 - BPF liquid effluents are only discharged through the WWTF.
- 3 - BLEU Complex effluents are only discharged to the sanitary sewer.

Table 2: Summary of Estimated BPF Liquid Effluents

Constituent	WWTF's Minimum Removal Factor	NCRP-123 Unit Dose Factors (mrem/Ci)	Summary of Estimated BPF Liquid Effluents				
			Untreated Effluents (Ci/yr)	Treated Effluents (Ci/yr) (%)		Estimated TEDE (mrem/yr) (%)	
U-232	0.0024	58	1.85E-04	4.44E-07	0.0000%	2.58E-05	0.0012%
U-233	0.0024	21	1.76E-04	4.22E-07	0.0000%	8.86E-07	0.0000%
U-234	0.0024	2	3.50E-02	8.41E-05	0.0032%	1.68E-04	0.0081%
U-235	0.0024	9.5	5.28E-04	1.27E-06	0.0000%	1.20E-05	0.0006%
U-236	0.0024	1.9	7.95E-03	1.91E-05	0.0007%	3.62E-05	0.0018%
U-238	0.0024	4.4	2.37E-05	5.69E-08	0.0000%	2.50E-07	0.0000%
U Subtotal			4.39E-02	1.05E-04	0.0040%	2.43E-04	0.0118%
Th-228	0.0024	14	9.34E-01	2.24E-03	0.0850%	3.14E-02	1.5202%
Th-230	0.0024	9	2.19E-02	5.26E-05	0.0020%	4.74E-04	0.0230%
Th-231	0.0024	1.0E-02	2.79E+00	6.70E-03	0.2542%	6.70E-05	0.0032%
Th-232	0.0024	220	9.20E-04	2.21E-06	0.0001%	4.86E-04	0.0235%
Th-234	0.0024	3.2E-01	4.53E-02	1.09E-04	0.0041%	3.48E-05	0.0017%
Th Subtotal			3.79E+00	9.10E-03	0.3454%	3.24E-02	1.5716%
Pu-238	1.0000	36	1.08E-02	1.08E-02	0.4102%	3.89E-01	18.8657%
Pu-239/240	1.0000	41	6.94E-04	6.94E-04	0.0263%	2.85E-02	1.3796%
Pu-241	1.0000	0.92	1.94E-02	1.94E-02	0.7368%	1.79E-02	0.8659%
Pu Subtotal			3.09E-02	3.09E-02	1.1734%	4.36E-01	21.1112%
Am-241	1.0000	49	5.56E-04	5.56E-04	0.0211%	2.72E-02	1.3201%
Np-237	1.0000	58	7.67E-03	7.67E-03	0.2910%	4.45E-01	21.5598%
Thorium Series							
Ra-228	0.4000	95	7.27E-04	2.91E-04	0.0110%	2.76E-02	1.3391%
Ac-228	1.0000	2.2E-02	7.27E-04	7.27E-04	0.0276%	1.60E-05	0.0008%
Ra-224	0.4000	2.1	9.34E-01	3.73E-01	14.1670%	7.84E-01	38.0042%
Pb-212	1.0000	1.8E-01	9.24E-01	9.24E-01	35.0615%	1.66E-01	8.0619%
Bi-212	1.0000	7.1E-03	5.26E-01	5.26E-01	19.9334%	3.73E-03	0.1808%
Po-212	1.0000	0	3.38E-01	3.38E-01	12.8144%	0.00E+00	0.0000%
Tl-208	1.0000	3.4E-05	2.98E-01	2.98E-01	11.3016%	1.01E-05	0.0005%
Uranium Series							
Pa-234	1.0000	1.8E-02	3.31E-04	3.31E-04	0.0125%	5.95E-06	0.0003%
Pa-234m	1.0000	1.0E-07	1.25E-01	1.25E-01	4.7520%	1.25E-08	0.0000%
Ra-226	0.4000	110	6.10E-05	2.44E-05	0.0009%	2.68E-03	0.1300%
Actinium Series							
Pa-231	1.0000	120	7.70E-04	7.70E-04	0.0292%	9.23E-02	4.4743%
Ac-227	1.0000	170	1.39E-04	1.39E-04	0.0053%	2.37E-02	1.1479%
Th-227	0.0024	2	1.36E-04	3.27E-07	0.0000%	6.53E-07	0.0000%
Ra-223	0.4000	5.4	1.37E-04	5.48E-05	0.0021%	2.96E-04	0.0143%
Fission Products							
Sr/Y-90	1.0000	10	3.45E-04	3.45E-04	0.0131%	3.45E-03	0.1671%
Tc-99	1.0000	1.7	1.75E-04	1.75E-04	0.0066%	2.98E-04	0.0144%
Cs-134	1.0000	27	1.89E-04	1.89E-04	0.0072%	5.10E-03	0.2471%
Cs-137	1.0000	27	4.86E-04	4.86E-04	0.0184%	1.31E-02	0.6353%
Pm-147	1.0000	2.4E-02	2.01E-05	2.01E-05	0.0008%	4.81E-07	0.0000%
Eu-154	1.0000	10	1.53E-05	1.53E-05	0.0006%	1.53E-04	0.0074%
Grand Totals				2.64E+00	100.0000%	2.06E+00	100.0000%

Note: The DOE/EIS-0240 reports the estimated dose from liquid effluents resulting from the BLEU Project to be zero. The estimated dose of 2.06 mrem/yr is conservative because removal factors of many of the isotopes were considered to be zero (1.0000 in column 2). The 2.06 mrem/yr is less than the ALARA constraint of 10 mrem/yr.

Attachment 22
Additional Information to update Table 2.3 of the NRC EA – 1999
Estimated annual releases of radiological constituents from process stacks

Table 1:
Radioactive Gaseous Effluents - Radioactivity Released

Element	Current Averages ¹		Estimated BLEU Project Effluents			Effluent Totals	
	Main Stack (Ci/yr)	Remaining Stacks (Ci/yr)	BPF ² (Ci/yr)	BLEU Complex (Ci/yr)	NFS WWTF (Ci/yr)	(Ci/yr)	(uCi/yr)
Uranium	2.8E-04	3.1E-05	1.1E-03	2.3E-05	4.7E-05	1.5E-03	1,492.23
Thorium	5.7E-07	7.2E-06	1.7E-05	3.4E-07	2.0E-05	4.5E-05	44.55
Plutonium	0.0E+00	4.7E-05	1.4E-07	2.8E-09	1.6E-07	4.7E-05	47.13
Americium	0.0E+00	9.4E-07	2.5E-09	5.0E-11	2.9E-09	9.4E-07	0.94

Notes:

- 1 - Current averages are based on release data from 1996 through 2000, which were obtained from the Safety Department's Semiannual Reports.
- 2 - The BPF's gaseous effluents will be released through the Main Stack.

Additional Information to update Table 5.2 of the NRC EA – 1999
Radiological impacts to the maximally exposed individual
from releases to the atmosphere

Table 2:
Radioactive Gaseous Effluents –TEDE

Current Averages ¹		Estimated BLEU Project Effluents			Totals ³
Main Stack (mrem/yr)	Remaining Stacks (mrem/yr)	BPF ² (mrem/yr)	BLEU Complex (mrem/yr)	NFS WWTF (mrem/yr)	
0.0260	0.0150	0.0737	0.0080	0.0790	0.2016

Notes:

- 1 - Current averages are based on release data from 1996 through 2000, which were obtained from the Safety Department's Semiannual Reports. The portion attributable to the Main Stack was determined from the ECV – fractions in the EDMS' Radioactivity in Effluent Air" report for the period of 1996 through 2000.
- 2 - The BPF's gaseous effluents will be released through the Main Stack.
- 3 - The DOE/EIS-0240 estimates the dose to the maximally exposed individual from the atmospheric pathway at 0.17 mrem/yr. The 0.03 mrem/yr difference between the estimates is negligible relative to the ALARA constraint of 10 mrem/yr.

3.0 RADIOACTIVE EFFLUENT ESTIMATES

This section provides a summary of the effluent estimates for gaseous effluents, liquid effluents, and fugitive emissions.

3.1 Gaseous Effluents

Comparisons of NFS' average annual radioactive gaseous effluents and the estimated radioactive gaseous effluents associated with the TVA Project are provided in Table 3-1. A similar comparison of the radioactive gaseous effluents, in terms of total effective dose equivalents (TEDE), is provided in Table 3-2

Table 3-1

Radioactive Gaseous Effluents – Radioactivity Releases							
Elements	Current Averages ¹		Estimated TVA Project Effluents			Total Effluents	
	Main Stack (Ci/yr)	Remaining Stacks (Ci/yr)	BPF ² (Ci/yr)	BLEU Complex (Ci/yr)	WWTF (Ci/yr)	(Ci/yr)	(μCi/yr)
Uranium	2.8E-04	3.1E-05	1.1E-03	2.3E-05	4.8E-05	1.5E-03	1,498.32
Thorium	6.3E-07	7.2E-06	1.7E-05	3.4E-07	1.2E-04	1.5E-04	147.05
Plutonium	0.0E+00	4.7E-05	8.5E-07	1.8E-08	6.2E-06	5.4E-05	53.95
Americium	0.0E+00	9.4E-07	2.3E-08	4.8E-10	1.7E-07	1.1E-06	1.13

Notes

- 1 - Current averages are based on release data from 1996 through 2000, which were obtained from the Safety Department's semiannual reports.
- 2 - The BLEU Preparation Facility's (BPF's) gaseous effluents will be released through the Main Stack.

Table 3-3

Radioactive Liquid Effluents – Radioactivity Released ¹					
Effluent Stream	Element	Current Averages (Ci/yr)	Estimated TVA Project Effluents		Effluent Totals (Ci/yr)
			BPF ² (Ci/yr)	BLEU Complex ³ (Ci/yr)	
WWTF	Uranium	6.3E-04	1.3E-04	No Effluents Expected	7.6E-04
	Radium	1.3E-04	3.7E-01		3.7E-01
	Thorium	4.4E-06	9.1E-03		9.1E-03
	Plutonium	5.3E-07	1.9E-01		1.9E-01
	Technetium	1.6E-02	1.8E-04		1.6E-02
Banner Spring Branch	Uranium	1.4E-02	No Effluents Expected	No Effluents Expected	1.4E-02
	Radium	NM			NM
	Thorium	3.4E-04			3.4E-04
	Plutonium	1.7E-04			1.7E-04
	Technetium	2.6E-03			2.6E-03
Sanitary Sewer	Uranium	2.8E-03	No Effluents Expected	2.0E-04	3.0E-03
	Radium	NM			NM
	Thorium	1.4E-05		1.3E-08	1.4E-05
	Plutonium	1.3E-06		4.3E-09	1.3E-06
	Technetium	2.5E-03		1.1E-03	3.6E-03

Notes:

- 1 - Current averages are based on release data from 1996 through 2000, which were obtained from the Safety Department's semiannual reports. "NM" – not measured.
- 2 - The BPF's liquid effluents will only be discharged through the WWTF.
- 3 - The BLEU Complex's effluents will only be discharged to the sanitary sewer.

3.3 Fugitive Emissions

Radioactive fugitive emissions are only anticipated during construction of the BLEU Complex. The TEDE attributable to the construction of the BLEU Complex was estimated as 0.0112 mrem.

2.0 ISA SOURCE TERM DATA

The average uranium concentrations for the product stream and the calculated concentrations for the discard streams are provided in Table 2-1. The annual quantity of uranium in the discharge stream was divided by the annual volume discharged, to yield the uranium concentration of the discard stream. All the values used for this calculation are provided in Attachment B. The remaining uranium concentrations will need to be obtained from the process specifications.

Table 2-1

Average Uranium Concentrations in BPF Product & Discard Streams				
LE UN Product (g U/L)	Caustic Discharge (g U/L)	Condensate from SX (g U/L)	Raffinate from SX (g U/L)	Scrubber Solution (g U/L)
1.85E+02	1.27E-03	7.65E-04	8.30E-04	3.15E-04

A summary of the radionuclide concentrations for the various process streams is provided in Table 2-2. The radionuclide concentrations in the discard streams were calculated by dividing the annual quantity of untreated radionuclide processed at the WWTF by the annual average mass of uranium processed in each discard stream.

The concentrations for the caustic discharge stream were calculated assuming that the percentages of uranium and the radioactive impurities going with the caustic discharge stream remain unchanged. The BPF process will use centrifuges to separate the uranium from the caustic discharge stream. These centrifuges may change the radionuclide ratios, causing some of the impurities to be concentrated in the caustic discharge stream. If the radioactive impurities are concentrated to a significant degree, the consequences analyzed using the data in Table 2-2 may be biased low. When a consequence has been evaluated as being just below the next higher consequence level, more accurate source term data may be needed to ensure that the consequence level is not any higher than what was already indicated.