UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judge
Peter B. Bloch

In the Matter of	Docket Nos. 70-00270 30-02278-MLA
THE CURATORS OF THE UNIVERSITY OF MISSOURI	RE: TRUMP-S Project
(Byproduct License No. 24-00513-32; Special Nuclear Materials License No. SNM-247)	ASLBP No. 90-613-02-MLA

LICENSEE'S WRITTEN PRESENTATION

November 14, 1990

LICENSEE'S WRITTEN PRESENTATION

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13	Affidavit of Dr. J. Steven Morris Regarding Renewed Stay Request */
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*/ Submitted with Licensee's Response To Intervenors' Renewed Stay Request.

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LICENSEE'S WRITTEN PRESENTATION

A. Introduction

On October 15, 1990, Intervenors filed the "Written Presentation of Arguments of Intervenors and Individual Intervenors" ("Intervenors' Written Presentation" or "Int. Pres."), consisting of a 61-page narrative and 19 Exhibits ("Intervenors' Exhibits" or "Int. Exh."). They also filed a companion Intervenors' Renewed Request for Stay Pending Hearing ("Renewed Stay Request").

In this document ("Licensee's Written Presentation" or "Lic. Pres."), Licensee will respond to the Intervenors' Written Presentation, including Intervenors' Exhibits. Attached to Licensee's Written Presentation are 12 exhibits ("Licensee's Exhibits" or "Lic. Exh."). A companion document, Licensee's Response to Renewed Stay Request, contains two Exhibits, which

for ease of reference are numbered as Licensee's Exhibits 13 and 14.

Finally, Licensee is also filing the related Licensee's Response to "Intervenors' Motion for Summary Disposition and Other Relief." Since the exhibit attached thereto deals with a peripheral matter, it is not numbered.

The organization of Licensee's Written Presentation generally follows that of Intervenors' Written Presentation. Thus:

- Section B responds to "The Facts" (Int. Pres. at 1-7)
- Section C responds to "The Issue" (Id. at 7-14)
- Section D responds to "Argument I" (Id. at 14-27)
- Section E responds to "Argument II" (Id. at 27-30)
- Section F responds to "Argument III" (Id. at 30-55)
- Section G responds to "Areas of Information and Further Questions to be Explored" (Id. at 55-59)
- Section H responds to "Request for Hearing" (Id. at 59-60)
- Section I responds to "Conclusion" (Id. at 60-61)

Since some of Intervenors' arguments are repetitious, Licensee has attempted to avoid duplication by responding only once at the location where the argument seemed to appear more logically. Licensee has attempted to cross reference such a response where the argument appears again, but may not have uniformly been successful.

Licensee has attempted to respond to such portions of Intervenors' Exhibits as appeared to be relevant to Intervenors' arguments based primarily upon whether they were cited in Intervenors' Written Presentation.

In view of the bulk of the material presented by Intervenors, it may be that Licensee has not recognized the need to respond to some aspect of Intervenors' filing that is of interest to the Presiding Officer. In such instances, Licensee will respond promptly to any written questions propounded by the Presiding Officer.

B. Statement of Facts

The University of Missouri ("University" or "Licensee") filed an application for an amendment to its Special Nuclear Materials License (SNM-247) on February 21, 1990 and an application for an amendment to its Broadscope Byproduct Materials License (BPM-24-00513-32) on March 12, 1990. See Letter to NRC, Region III from T. Lew Pitchford (University of Missouri) (Feb. 21, 1990); Letter to NRC, Region III from T. Lew Pitchford (University of Missouri) (Mar. 12, 1990). The amendment to the University's Special Nuclear Materials License (No. 12) was issued by the NRC on March 19, 1990 and the amendment to the University's Broadscope Byproduct Materials License (No. 74) was issued by the NRC on April 5, 1990. Letter to T. Lew Pitchford (University of Missouri) from William J. Adam

(NRC) (Mar. 20, 1990); Letter to T. Lew Pitchford (University of Missouri) from William J. Adam (NRC) (Apr. 5, 1990).

These amendments were obtained in order that the University could conduct a limited portion of the Transuranic Management by Pyropartitioning Separation ("TRUMP-S") research project at the University of Missouri Research Reactor ("MURR") facility. The ultimate objective of the overall TRUMP-S project is the safe and efficient removal (partitioning) of long-lived radioactive materials from spent nuclear fuel or weapons waste. The activities to be conducted by the University under the subject amendments, however, are limited to pure elements (99% or better). The objective of the University's component of the TRUMP-S project is to conduct basic scientific research on the thermodynamic, nuclear, analytical and health physics aspects that are associated with such a project. The University will develop fundamental chemical and electrochemical data for rare earths and actinides in molten salt/cadmium systems. The University's research is expected to be accomplished with minimal inventories of the elements of interest, i.e., less than 75 grams of depleted uranium and less than 10 grams each of neptunium, plutonium and americium. 2/ These elements will only be examined in their pure form and no spent nuclear fuel will be

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2/ The possession limits requested in Licensee's applications and authorized in the subject license amendments are larger than the amounts expected to be used in order to provide some flexibility as to inventory.

studied or used in the research. Affidavit of J. Steven Morris at ¶ 6 (May 24, 1990) ("May 24 Morris Affidavit").

The research will be performed in the Alpha Laboratory installed in the basement of the MURR laboratory building, which was specially constructed for the purposes of working with small quantities of alpha emitters. Id. at ¶ 8. The elements used in the research will be stored in the fuel vault at the MURR facility. The mass of the uranium, neptunium, plutonium or americium used in any single experiment will not exceed 1 gram. Id. at ¶ 6.

Other facts that are relevant to this proceeding will be discussed below and in the attached Exhibits. Licensee will not attempt at this point to discuss each of its disagreements with the Intervenors' allegations under their statement of "The Facts" at pages 1-7 of Intervenors' Written Presentation, but will state the correct facts when the subject matter is discussed below. However, Licensee will respond to a few allegations made by Intervenors that are peripheral to the substance of this proceeding and are thus not discussed in the following portions of Licensee's Direct Presentation.

The University did not maintain a veil of secrecy surrounding the TRUMP-S program as alleged by the Intervenors. Intervenors' Written Presentation at 2. To the contrary, because of the unique importance of the TRUMP-S program to the University and the State and local community, the University contacted and received the support of the Governor of Missouri; both United

States Senators from Missouri; the local Congressman; members of the Missouri Senate and the Missouri House of Representatives; the Mayor of Columbia; the Columbia Chamber of Commerce; and Regional Economic Development, Inc. May 24 Morris Affidavit at ¶ 4 (the letters of support are attached to the applications and to the May 24 Morris Affidavit).

Intervenors also claim that the amount of radioactive materials allowed by the license amendments are greater than that allowed by all but "one-tenth of one percent of materials licenses" and that the radioactive hazards created by the amendment places the MURR facility in the top "17 of over 20,000 licenses." Intervenors' Written Presentation at 5. The NRC does not consider that any of the country's material licenses are dangerous to the public. Lic. Exh. 2 at ¶ 29.

Intervenors also appear to complain that there is inadequate information in the hearing file from which to present their Written Presentation. Intervenors' Written Presentation at 5. Although Subpart L does not allow for formal discovery (see § 2.1231(d)), extensive information has been provided to the Intervenors -- far in excess of that which is contemplated by the portion of the NRC regulations (§ 2.1231(b)) that relates to the establishment of a hearing file.

On August 16, 1990, the NRC Staff supplemented the hearing file by providing what it described as:

- All documents, with the exception of pleadings etc. in this proceeding, contained in the Region III docket files for the 10

C.F.R. Parts 30 and 70 licenses held by the University of Missouri (for the last 10 years);

- Documents contained in the Office of Nuclear Reactor Regulation docket file relating to admitted "areas of concern" 1 (risks related to fire or explosions) and 4 (the adequacy of emergency plans) for the 10 C.F.R. Part 50 license held by the University (for the past 10 years) 3/

Letter to Peter B. Bloch from Bernard M. Bordenick (counsel for NRC Staff) (Aug. 16, 1990).

In addition to the materials provided by the NRC Staff, the following materials 4/ have been made available by Licensee to the Intervenors 5/ on the specified dates:

1. The two applications and the two license amendments were provided to Intervenors on June 6, 1990.

2. On June 26, 1990, the additional materials listed in Attachment A of Licensee's letter of June 22, 1990 were made available to Intervenors.

3/ Thus, contrary to the assertions in Intervenors' Written Presentation (at 6-7), the hearing file does contain the MURR Facility Emergency Plan and clearly indicates that the Plan has been reviewed and approved by the NRC Staff. The NRC Staff supplemented the hearing file to include all the documents contained in the Part 50 docket for the past ten years relating to the adequacy of the emergency plan for the MURR Facility. See Letter to Peter B. Bloch from Bernard M. Bordenick (counsel for NRC Staff) (Aug. 16, 1990).

4/ By making these documents available to Intervenors and referring to them in this written presentation, Licensee does not concede that specific information contained therein is relevant to this proceeding.

5/ These materials were also made available to the Individual Intervenors at the Office of the General Counsel of Licensee.

3. On June 28 and June 29, 1990, a number of documents that had been provided to the Board of Curators were made available to the Intervenors.

4. On August 1, 1990, extensive additional materials requested by Intervenors were made available by the Licensee. 6/

5. On September 13, 1990, a copy of the contract between the University and Rockwell was provided to the Intervenors.

6. By letter dated October 11, 1990, the University transmitted to Intervenors a few additional documents requested by their attorney after his review of previously provided documents.

C. The Regulatory Framework

Intervenors' discussion under the heading of "The Issue" begins with a brief listing of and quotations from several sections of the Atomic Energy Act of 1954, as amended (42 U.S.C. §§ 2011, et seq.), several NRC regulations in Parts 30 and 70, and one Regulatory Guide. Int. Pres. at 7-11. Although Intervenors apparently believe that such discussion reviews briefly "the statutory and regulatory framework on which

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6/ The documents made available to the Intervenors are identified on the list at pp. a-r of Intervenors' Exhibit 19, with the exception of the underlined numbered documents which were withheld as falling within one of the exceptions contained in the University's proposal to compromise and settle the Sunshine Law litigation.

[Subpart L] is superimposed" (id. at 7), it does not come close. However, Licensee does not see any need to describe such framework to the Presiding Officer. Instead, the Licensee will simply discuss each relevant statutory provision, regulation and Regulatory Guide where it is pertinent to a specific subject matter.

Intervenors then proceed to discuss Subpart L. Id. at 11-14. They first argue, in essence, that Subpart L must be read as imposing upon an applicant "the burden of proving, in its application, that the governing criteria have been met," and thus precludes an applicant from providing, during the course of the proceeding, additional information that demonstrates that applicable requirements have been satisfied. Id. at 11-12. They then propose an entirely unsupported three-part test for determining the adequacy of the application. Id. at 12-14. Both arguments are without merit.

The Intervenors' first argument is based primarily upon the provisions of § 2.1233(c), which requires, inter alia, that an intervenor's initial written presentation "must describe in detail any deficiency or omission in the license application, with references to any particular section or portion of the application considered deficient" and must "give a detailed statement of reasons why any particular section or portion is deficient or why an omission is material . . . ." Id. at 11-12.

Somehow, Intervenors translate those requirements into limiting the permitted evidence to the four corners of the

application and as preventing Licensee from rebutting Intervenors' presentation with any information not contained on the face of the application. But no such limitations are found in § 2.1233(c) or its legislative history. As explained in the statement of considerations when Subpart L was proposed, the purpose of § 2.1233(c) was to assure that "intervenors challenging an application for licensing action must describe in detail any deficiency or omission in the application." See 52 Fed. Reg. 20,089, 20,091 (May 29, 1987). In light of previous difficulties in defining specific contentions in adjudicatory proceedings, it is apparent that in informal proceedings under Subpart L the Commission wished to avoid having intervenors litigate vague, generalized concerns that have no nexus to any specific regulatory problems, i.e., deficiencies or omissions in the application. However, that regulation expresses no limit on the type of information that can be provided by intervenors to demonstrate that the alleged deficiencies or omissions exist and are regulatorily significant or by the applicant/licensee to demonstrate that the deficiencies or omissions do not exist or are not regulatorily significant or to remedy any such deficiencies or omissions.

The basic task of the Presiding Officer is to resolve the areas of concern which have been admitted in the proceeding. See 10 C.F.R. § 2.1251(d) (1990). In litigating these concerns the record is not confined to the bare application, but includes any relevant and material information submitted in the

proceeding. See 52 Fed. Reg. at 20,091 (the Presiding Officer should make his decision on "the basis of the hearing file, any information presented under oath in written or oral presentations, and any facts that might be officially noticed . . . ."); see also 10 C.F.R. § 2.1251(c) (1990). Subpart L explicitly states that the Presiding Officer may permit any party to submit "additional documentary data, informational material, or other written evidence . . . ." See 10 C.F.R. § 2.1233(d) (1990).

Whether or not information presented in the course of a proceeding explains, supplements or modifies the application, it is all subject to evaluation by the Presiding Officer who must then decide, based upon consideration of the admitted areas of concern, whether an issued license amendment should be upheld, amended or revoked. But nothing in Subpart L limits the scope of the record or the basis of the Presiding Officer's decision to the face of the application. 7/

Intervenors also argue that the consideration of such additional information is precluded by the Atomic Energy Act, which requires that a license be granted only after an

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7/ As the Presiding Officer has stated:

> It is general practice at the NRC to permit Applicant to amend its application papers to remedy defects that may be disclosed during the pendency of a proceeding, thus creating a dynamic licensing environment.

Memorandum and Order (Licensee's Partial Response Concerning Temporary Stay), LBP-90-38, slip op. at 8 (Nov. 1, 1990).

application is filed, notice of the application is given, and there is full opportunity for public review. Intervenors' Written Presentation at 12. There are two simple answers to that argument. First, the Atomic Energy Act requires public notice with respect to licenses for production facilities and some amendments thereto, but does not require public notice for materials licenses or amendments thereto. See § 189(a) of Atomic Energy Act. 8/ Second, the public does receive notice when a public hearing is held on a materials license and therefore has the opportunity to participate in the development of the record upon which a decision will be made as to whether a license will be upheld, amended or revoked. 9/

Turning now to Intervenors' proposed three-step process, Intervenors would have the Presiding Officer determine

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8/ The lack of a notice requirement in the Atomic Energy Act and NRC regulations for materials licenses is explained at pages 31-33 of Response of Licensee to Request for Hearing and Stay Pending Hearing (May 25, 1990). As there discussed, the Commission explicitly rejected a suggestion that Federal Register notice be given for each materials license application. See 54 Fed. Reg. 8269, 8270-71 (Feb. 28, 1989).

9/ As the Presiding Officer noted (see supra n.7), it has been consistent NRC practice to admit into a hearing record additional evidence in support of an application. Although Licensee has not been able to identify an instance in which anyone asserted that this practice conflicted with the Atomic Energy Act, the Commission and the courts have addressed and rejected the analogous argument that a draft environmental impact statement ("EIS") must be recirculated for public comment if the Licensing Board considers an alternative not disclosed in the draft EIS. Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), CLI-78-1, 7 NRC 1, 29 n.43 (1978); Citizens for Safe Power v. NRC, 524 F.2d 1291, 1294 n.5 (D.C. Cir. 1975).

sequentially whether the application is sufficient on its face (Step 1), whether the NRC Staff review was adequate (Step 2) and whether, in light of the arguments and facts brought out by the Intervenors, the application is still sufficient to carry the applicants' burden of proof (Step 3). Intervenors' Written Presentation at 12-14. Intervenors cite nothing in Subpart L or its legislative history, or in possibly relevant precedents in NRC adjudicatory proceedings, that would provide support for this convoluted process.

As discussed above, Step 1 is inconsistent with Subpart L since it would call for a determination by the Presiding Officer based solely upon review of the application "on its face" without consideration of the information that Intervenors and the Licensee are entitled to make part of the record. Licensee's Direct Presentation demonstrates that its applications satisfied all applicable requirements. However, particularly considering the detailed questions that may be raised by an intervenor, it is preposterous to believe that the Commission would have expected that the answers would always be found within a materials license application and intended to deprive the applicant/licensee of the opportunity to furnish the information that would provide the detailed answers.

Intervenors are basically mistaken in suggesting that the Presiding Officer should determine the adequacy of the NRC Staff's review of the application (Step 2). NRC precedents hold that the adequacy of the NRC Staff's review is not the subject of

a licensing proceeding. As recently stated in a reactor operating license amendment proceeding in which, just like the instant case, the amendment had been granted by the NRC Staff prior to the hearing:

> With minor exceptions not relevant here, it is the applicant that bears the ultimate burden of proof in NRC operating license amendment proceedings and not the staff. Thus, contrary to the intervenor's apparent belief, the adequacy of the staff's review is not the proper focus for such proceedings.

Florida Power & Light Co. (St. Lucie Nuclear Power Plant, Unit 1) ALAB-921, 30 NRC 177, 186 (1989). See also Louisiana Power & Light Co. (Waterford Steam Electric Station, Unit 3), ALAB-812, 22 NRC 5, 55-56 (1985); Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-728, 17 NRC 777, 807, review denied, CLI-83-32, 18 NRC 1309 (1983). The NRC Staff is not on trial in a licensing proceeding. Consequently, the Presiding Officer should reject Step 2 of Intervenors' proposed process. See also infra Section E.

Finally, Intervenors' Step 3 comes a little closer to the true process under Subpart L, but is still mistaken. It is the Presiding Officer's responsibility to determine, within the scope of the admitted concerns, whether Licensee's TRUMP-S activities under the subject amendments comply with applicable regulatory requirements. However, for the reasons discussed above, such determination is not limited to a review of the bare bones of the application and is properly made on the basis of all of the information that will be admitted into the record.

D. Alleged Deficiencies In The Application

Under the heading of "Argument," Intervenors' introductory remarks indicate that they will "describe in detail" the various alleged deficiencies or omissions in the license application, with a statement of reasons of why the deficiency or omission is material. Intervenors' Written Presentation at 14-15. To the extent such discussion is subsequently presented by Intervenors, Licensee responds to each such allegation below.

Intervenors assert that, with respect to each alleged deficiency or omission, the relief sought should be to set aside the amendment. Id. at 14. Licensee will show that there is no deficiency or omission. However, even if there were, each deficiency or omission should be reviewed on a case-by-case basis. If allegedly missing information has been provided in the record, no further action should be necessary. In limited instances a presiding officer might find it appropriate to impose additional conditions to assure compliance with commitments made during the proceeding. However, a drastic remedy such as setting aside an amendment should only be used if a licensee has failed to carry its burden of proving that, within the admitted areas of concern, the licensed activities will be conducted in accordance with applicable NRC requirements. The Licensee is confident that it will demonstrate that it has met its burden of proof.

In the introductory paragraph under the heading of "I. Each of the Two Applications Is Deficient on Its Face," Intervenors recite a number of regulations that they apparently

claim are violated by each of the deficiencies discussed under Intervenors' items I.1 to I.10. Id. at 15. Licensee does not admit that each of the cited regulations is relevant. In any event, Licensee will discuss relevant regulations under each of Intervenors' items below.

D.1. No Safety Analysis

Intervenors allege that there is a "material omission" in each of the applications because they do not contain a "safety analysis report or accident analysis." Intervenors' Written Presentation at 15. They are simply wrong in asserting that such a report or analysis is regulatorily required.

They cite nothing in the regulations defining the necessary content of an application for a materials license (i.e., § 30.32, § 70.22) that would require an applicant to provide a "safety analysis report or accident analysis." The reason for the lack of a citation is that no such requirement exists.

Instead, Intervenors attempt to conjure up such a requirement by quoting an isolated sentence from the first paragraph of Section 3, "Filing an Application" of Reg. Guide 10.3. 10/ Id. at 15. Intervenors seek to transform a simple

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10/ Intervenors discuss only Reg. Guide 10.3, which deals with applications for a license for special nuclear materials. Licensee's response would be similarly applicable if Intervenors were to discuss Reg. Guide 10.5, which provides further guidance for applications for broad-scope materials licenses, such as the license held by Licensee.

instruction that items in the application should be completed in sufficient detail into a directive that "a worst-case analysis" must be prepared. Reg. Guide 10.3 does no such thing.

With respect to the items mentioned in the sentence quoted by Intervenors (equipment, facilities and radiation protection programs), Reg. Guide 10.3 prescribes the type of information needed by the NRC under § 4.5, Description of Equipment, Facilities and Instrumentation, and Under § 4.6, Proposed Procedures to Protect Health and Minimize Danger. As discussed elsewhere in this Licensee's Written Presentation, Licensee has provided such information in its applications. Nowhere in those sections, or any other section, does Reg. Guide 10.3 require a "safety analysis report or accident analysis," let alone a "worst-case analysis." 11/

Although the applications for the subject license amendments and the information contained in this Licensee's Written Presentation demonstrate that Licensee has taken numerous actions to protect the MURR staff and the public from the risks associated with the TRUMP-S experiments, there is no regulatory requirement that Licensee submit a safety analysis report or accident analysis in an application for a materials license.

11/ If Intervenors' fabricated interpretation of Reg. Guide 10.3 had any merit, surely the NRC would have required a safety analysis report or accident analysis in connection with previous amendments. Yet, as evidenced by the supplemented hearing file, no such report or analysis was required of the Licensee for any amendment during the past 10 years.

D.2. 25 Curies Of Americium

Intervenors argue that since Licensee's application requested authorization for up to 25 curies of americium-241 in any form, it should have complied with the provisions of § 30.32(i) and failed to do so. They are mistaken, since § 30.32(i) did not apply to Licensee's application and does not apply to the Licensee's activities under the issued license amendment.

Section 30.32(i)(1) is a carefully crafted regulation which explicitly states:

> Each application to possess radioactive materials in unsealed form, on foils or plated sources, or sealed in glass in excess of the quantities in § 30.72, "Schedule C - Quantities of Radioactive Materials Requiring Consideration of the Need for an Emergency Plan for Responding to a Release," must contain either:
>
> (i) An evaluation showing that the maximum dose to a person offsite due to a release of radioactive materials would not exceed 1 rem effective dose equivalent or 5 rems to the thyroid; or
>
> (ii) An emergency plan for responding to a release of radioactive material.

10 C.F.R. § 30.32(i)(1) (1990) (emphasis added). This regulation did not become effective until April 7, 1990. 54 Fed. Reg. 14,051 (Apr. 7, 1989).

Thus, as explicitly adopted by the Commission, this regulation did not apply to anyone or to any "application" before April 7, 1990. Since Licensee's application relating to americium was filed on March 12, 1990, and the amendment was

issued by the NRC on April 5, 1990, the requirements of § 30.32(i) were not yet applicable and the application could not have been deficient.

The Presiding Officer has acknowledged that "the application did not need to show compliance with [§ 30.32(i)] prior to the time it was granted." Memorandum and Order (Licensee's Partial Response Concerning Temporary Stay), LBP-90-38, slip op. at 8 (Nov. 1, 1990). However, he suggested that briefs were required on the question of whether Licensee should show compliance to new regulations that become effective during the pendency of the proceeding. Id. at 8-9.

The answer to the Presiding Officer's question can also be readily found by reading the specific language of the regulation. As of April 7, 1990, § 30.32(i) does not impose any direct obligations on licensees; it explicitly affects only the required contents of pending and future "applications." If the Commission had intended to impose any immediate obligations upon holders of licenses as of April 7, 1990, it could have done so explicitly. In fact, it has done so in other instances in the past when it wished to impose obligations on licensees. See, e.g., 10 C.F.R. §§ 70.25(c)(2), (c)(3) (1990) (requiring holders of specific licenses issued before July 27, 1990, to submit certifications of financial assurance or a decommissioning funding plan on or before July 27, 1990).

This does not mean that holders of licenses as of April 7, 1990 will never have to comply with § 30.32(i) (i.e.,

will never have to submit either an emergency plan or an evaluation demonstrating low potential offsite exposures). Such licensees will, at some point, have to submit "applications" for renewals of their licenses and will have to comply with § 30.32(i) in such "applications." That this was the Commission's intent was explained when the regulation was adopted in the discussion of the applicability of the rule to existing licensees who had previously developed emergency plans under separate orders. If § 30.32(i) had been intended to apply to all licensees -- rather than to "applications" -- obviously such licensees would have had to comply on or before April 7, 1990. However, as the Commission pointed out, such licensees were not required to submit a new plan until their "regular five-year license renewal application was due." See 54 Fed. Reg. at 14,058. Then, and only then, would there be an "application" which would trigger the applicability of § 30.32(i). 12/

12/ That § 30.32(i) is only applicable to "applications" and not to licensees is also evidenced by the following discussion of the applicability of the certification requirements of § 30.32(i)(3)(xiii):

> The NRC staff, accordingly, believes that any obligation of NRC to ensure adequate emergency planning and response for releases offsite of hazardous chemicals can be met by requiring that applicants for licenses and for license renewals who are subject to the radiological emergency planning requirements certify that they are in compliance with the Emergency Planning and Community Right-To-Know Act of 1986.

54 Fed. Reg. at 14,053 (emphasis added).

Intervenors try to avoid the plain meaning of the regulation by claiming that "fundamental hornbook law" requires the application of the "regulations in effect at the time of the hearing, or the determination, not at the time of filing the petition, or the initial issuance of an amendment which is the subject of a pending hearing." Letter to Peter B. Bloch from Lewis C. Green at 2 (Oct. 31, 1990); see also Intervenors' Exhibit 1 at 11-12, ¶¶ 35-38. Whether or not this claim represents "hornbook law," it neglects one basic fact: the current regulation (§ 30.32(i)) does not apply to licensees, it applies to "applications." Thus § 30.32(i) does not define requirements that are applicable to the subject amendments. 13/

Even if § 30.32(i) were to be used as a guideline for evaluating the acceptability of Licensee's emergency preparedness, Licensee's written presentation demonstrates that there would be no concern. No formal emergency plan would be required because (as contemplated by § 30.32(i)(1)(ii)) the evaluations by Licensee have demonstrated that the maximum dose to a member of the public off-site due to a release of radioactive material would not exceed 1 rem effective dose equivalent. See infra Section F.1. Moreover, although it is not

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13/ Even if § 30.32(i) were currently applicable to licensees, any alleged lack of Licensee's compliance therewith would be an appropriate subject for an enforcement or compliance action that could be requested under § 2.206. It could not provide the basis for reviewing the validity of an amendment issued on April 5, 1990, when § 30.32(i) was not effective.

necessary to satisfy the requirements of both subparagraph (i) and subparagraph (ii) of § 30.32(i)(1), Licensee has demonstrated that the MURR Facility Emergency Plan, together with implementing and augmenting procedures, constitute a fully adequate emergency plan for the TRUMP-S experiments and satisfy the intent of relevant provisions of § 30.32(i)(3). See the Affidavit of Walter A. Meyer regarding Emergency Planning filed with Licensee's October 30 Submittal. Thus, by installing the Alpha Laboratory at a facility with an existing applicable emergency plan, Licensee has provided emergency planning well beyond any that might have been regulatory required at another location.

D.3. 5.3 Curies And 21.4 Curies Of Plutonium

Intervenors argue that the plutonium furnished to the Licensee "almost certainly contains some number of curies ranging from 5.3 curies to 21.4 curies of plutonium." Int. Pres. at 16-17. They refer to Intervenors' Exhibit 1, which states that Licensee's authorized 10 grams of plutonium would contain 5-120 curies of plutonium. Int. Exh. 1 at 6-11. These allegations have been fully responded to in Licensee's Submittal in Accordance with "Memorandum (Memorandum of Conference Call of October 19, 1990)" at 4-8 (Oct. 30, 1990) ("Licensee's October 30 Submittal"), including the Affidavit of Dr. J. Steven Morris Regarding Plutonium Content (Oct. 29, 1990). The issue has been decided by the Presiding Officer in the Memorandum and Order (Licensee's Partial Response Concerning Temporary Stay), LBP-90-38 (Nov. 1, 1990), for the purpose of ruling on a

temporary stay and subject to the filing of any motions for reconsideration. 14/

Intervenors argue that Licensee violated § 70.22(i), presumably on the basis of Intervenors' allegation that the plutonium furnished to Licensee exceeded 2 curies. Int. Pres. at 17. Intervenors' argument is mistaken both because Licensee's plutonium does not exceed 2 curies and because § 70.22(i), just like § 30.32(i), did not become effective before April 7, 1990. See supra Section D.2.

Intervenors also argue that because of the "substantial" amount of plutonium furnished to Licensee, its activities must be considered a "plutonium processing and fuel fabrication plant" as defined in § 70.4(r) and are thus not exempt from the preparation of an environmental impact statement ("EIS") under the categorical exclusion in § 51.22(c)(14)(v). Int. Pres. at 18-19. Licensee responds to this argument in Section F.5 infra, where it responds to Intervenors' Concern No. 5. Licensee's response shows that Licensee is not operating a plutonium processing or fuel fabrication facility and that the NRC was not required to prepare an EIS before issuing the subject amendment.

14/ Intervenors filed such a motion for reconsideration on November 12, 1990.

D.4. Plutonium-241 And Plutonium-242

As mentioned in Section D.3 supra, Intervenors' argument that Licensee's application improperly failed to disclose the presence of trace levels of plutonium-241 and plutonium-242 (Int. Pres. at 19) has been addressed both by Licensee's October 30 Submittal at 4-8 and by the Presiding Officer in LBP-90-38.

D.5. Certification Under The Emergency Planning And Community Right-to-Know Act

Intervenors contend that Licensee's applications are deficient because they did not contain a certification of compliance with the Emergency Planning and Community Right-to-Know Act under subparagraph (xiii) of §§ 30.32(i)(3) and 70.22(i)(3). Int. Pres. at 19-20. As discussed in Sections D.2 and D.3 supra, §§ 30.32(i) and 70.22(i) did not go into effect until April 7, 1990, subsequent to Licensee's applications and the license amendments issued by the NRC.

Licensee contends, therefore, that compliance with the current provisions of §§ 30.32(i)(3)(xiii) and 70.22(i)(3)(xiii) was not required by Licensee in connection with the two license amendments at issue in this proceeding. Even if §§ 30.32(i)(3) and 70.22(i)(3) were applicable, however, there are additional reasons why the Licensee was not required to comply with subparagraph (xiii) thereof.

Subparagraph (xiii) of each of the foregoing regulations contains the following identical language:

> Hazardous chemicals. A certification that the applicant has met its responsibilities under the Emergency Planning and Community Right-to-Know Act of 1986, Title III, Pub.L. 99-499, if applicable to the applicant's activities at the proposed place of use of the [byproduct or special nuclear materials].

Thus, the certification is required only if the Emergency Planning and Community Right-to-Know Act is applicable to Licensee's activities at MURR with the transuranic elements. That Act can be found at 42 U.S.C. § 11001, et seq. The provision related to material safety data sheets is 42 U.S.C. § 11021, which provides, in relevant part, as follows:

> (a) Basic requirement
>
> (1) Submission of MSDS or list
>
> The owner or operator of any facility which is required to prepare or have available a material safety data sheet for a hazardous chemical under the Occupational Safety and Health Act of 1970 and regulations promulgated under that Act [citations omitted] shall submit a material safety data sheet for each such chemical, or a list of such chemicals as described in paragraph (2), to each of the following:
>
> (A) The appropriate local emergency planning committee.
>
> (B) The State emergency response commission.
>
> (C) The fire department with jurisdiction over the facility.

Licensee is The Curators of the University of Missouri, an arm of the State of Missouri. Mo. Const. of 1945 art. 9, § 9;

Section 172.020, RSMo 1986; Todd v. Curators of the University of Missouri, 147 S.W.2d 1063 (Mo. 1941). As such, it is excluded from the definition of "employer" found in 29 U.S.C. § 652(5) and 29 C.F.R. Part 1910.2(c) defining the employers to whom the provisions of OSHA apply. Thus, because Licensee is not required by OSHA to prepare material safety data sheets, the Licensee was not and is not required by the Emergency Planning and Community Right-to-Know Act to submit material safety data sheets to the local emergency planning committee, the State emergency response commission or the local fire department.

The inapplicability of the Emergency Planning and Community Right-to-Know Act to Licensee's activities involving the pure transuranic elements at MURR is also apparent after analyzing the definition of the phrase "hazardous chemical", found in 42 U.S.C. § 11021(e). That definition provides, in relevant part, as follows:

> (e) Hazardous chemical defined
>
> For purposes of this section, the term "hazardous chemical" has the meaning given such term by section 1910.1200(c) of title 29 of the Code of Federal Regulations, except that such term does not include the following:
>
> * * *
>
> (4) Any substance to the extent it is used in a research laboratory or a hospital or other medical facility under the direct supervision of a technically qualified individual.
>
> * * *

The objective of the University's component of the TRUMP-S research is to conduct basic scientific research on the thermodynamic, nuclear, analytical and health physics aspects of the TRUMP-S project. May 24 Morris Affidavit, ¶ 7. The research will be performed in the Alpha Laboratory, which was installed in the basement of the MURR laboratory building and which was specially constructed for the purpose of working with small quantities of alpha emitters. Id. at ¶ 8. Such research will be conducted only under the direct supervision of technically qualified individuals. Affidavit of Dr. Sue M. Langhorst Regarding Adequacy of Safety Procedures, Administrative Controls and Licensee's Personnel Qualifications ("Langhorst Procedures Affidavit") (Lic. Exh.) at ¶ 34. Thus, the materials used at the Alpha Laboratory are excluded from the definition of "hazardous chemical" under 42 U.S.C. § 11021(e)(4) as substances "used in a research laboratory . . . under the direct supervision of a technically qualified individual."

In addition to establishing the legal inapplicability of the Emergency Planning and Community Right-to-Know Act to Licensee, it is important to respond to Intervenors' other contentions contained in the Intervenors' Written Presentation at 19-20 and in Intervenors' Exhibit 1 at ¶¶ 50 and 51.

The Declaration of the TRUMP-S Review Committee, Intervenors' Exhibit 1, contends that Licensee has not informed the Columbia Fire Department as to the presence of the transuranics used in the TRUMP-S research. That contention,

apparently based upon the Declaration of Henry Ottinger which contained hearsay and was subsequently discredited by the Affidavit of Battalion Fire Chief Erman L. Call (Oct. 24, 1990), is blatantly false. The contention has been refuted by the Affidavit of Walter A. Meyer, Jr. Regarding Emergency Planning (Oct. 29, 1990) ("Meyer Affidavit") submitted with Licensee's October 30 Submittal.

The Meyer Affidavit (at ¶¶ 19, 20 and 32) makes clear that the Columbia Fire Department was contacted about the installation of the Alpha Laboratory, toured and inspected the facility, and found it adequate from a fire safety point of view. The Call Affidavit confirms that the Columbia Fire Department has given assurances that it would fight a fire involving radioactive materials at the MURR Facility, including those in the Alpha Laboratory.

In short, the arguments in Intervenors' Written Presentation related to the Emergency Planning and Community Right-to-Know Act are without merit, legally and factually.

D.6. HEPA Filters

Intervenors' argument regarding the HEPA filters that are part of the argon glove box exhaust system (Int. Pres. at 20-21) are responded to under Section F.1.b infra.

D.7. Safety Procedures

Intervenors allege that the applications are deficient because they did not contain the procedures; that the procedures

might not have been prepared if Intervenors had not intervened; and that, even if they had been submitted, they would have been found inadequate because, for example, no detailed procedure exists for separating a sample, and because, one procedure (TAM-62) does not instruct Licensee's staff regarding the pyrophoric nature of plutonium. Int. Pres. at 21-22.

The Langhorst Procedures Affidavit provides detailed responses to all but the last allegation. Lic. Exh. 9. As explained by Dr. Langhorst, the pertinent NRC regulations require that a description of the proposed procedures be submitted, not the procedures themselves. Lic. Exh. 9 at ¶¶ 10-13. The required description was provided in the application. Id. at ¶ 10. No additional procedure for subdivision of the actinide metal is required, since the activity is appropriately governed by several existing procedures with overlapping safety and accountability requirements. Id. at ¶¶ 16-21.

Intervenors' last allegation regarding TAM-62 was addressed in the Meyer Affidavit at ¶¶ 61-65. Mr. Meyer explained that the Intervenors took out of context a single sentence in one procedure that was intended to alert the experimenter to the fact that the inert atmosphere is important to retain the chemical purity of the actinide materials even though there is little likelihood that these small quantities of plutonium will self-ignite. Meyer Affidavit at ¶ 63. Moreover, TAM-62 is part of a set of procedures, with which the experimenter would be familiar, that state that maintaining an

inert argon atmosphere is the principal safety feature of the glove box. Id. at ¶ 64. Intervenors also ignore that the actions to be taken under TAM-62 are exactly the same whether the purpose is protecting the material or preventing combustion. Id. at ¶ 65.

Thus, all of Intervenors' allegations are totally without merit.

Intervenors also request that all TAMs, SEPs and FEPs, including any that are claimed to be proprietary, should be presented to the NRC Staff, the Intervenors and the Presiding Officer and become part of the hearing file. Such a request constitutes discovery that is not permissible under § 2.1231(d). Moreover, Licensee has already made a number of procedures available to Intervenors voluntarily in accordance with Attachment A of Licensee's letter of June 26, 1990 and on August 1, 1990. See list appearing on pp. a-r of Int. Exh. 19. Intervenors have not identified any additional information that is necessary for the Presiding Officer's resolution of the issues before him.

D.8 Personnel Qualifications

Intervenors allege that the applications fail to demonstrate the technical qualifications of Licensee's staff and that its personnel are not qualified to engage in the TRUMP-S experiments. Int. Pres. at 22-24.

The Langhorst Procedures Affidavit (Lic. Exh. 9) responds in detail to these allegations at ¶¶ 23-41. As Dr. Langhorst explains, as a Type A broad scope licensee, Licensee is required to establish a radiation safety committee which has the responsibility for the review, approval and control of work performed under both NRC licenses. Lic. Exh. 9 at ¶¶ 24-25. The resumes provided with the applications include those of the members of the Isotope Use Subcommittee (IUS) which discharges those functions for the TRUMP-S experiments. Id. at ¶¶ 26-27. The applications included the resume of the only authorized user at the time of submission, the material custodian. Id. at ¶¶ 29-30. Training to establish additional authorized users was described in the applications, and has been properly implemented. Id. at ¶¶ 31-33. As reflected in the excerpts of IUS minutes, specific individuals have been authorized as authorized users only as they demonstrate the required qualifications. Id. at ¶¶ 39-41.

Although Intervenors allege that Licensee personnel "did not even understand that the plutonium would include plutonium 241 and 242," (Int. Pres. at 23), this canard has been amply responded to in Licensee's October 30 Submittal and LBP-90-38.

Intervenors also allege that a consultant, Mr. Steppen, found "numerous, flagrant errors" that the Licensee's personnel were not capable of recognizing, and that Licensee was unwilling or unable to recognize fundamental premises of nuclear

engineering. Int. Pres. at 23. To the contrary, Licensee is to be commended for seeking the advice of an expert in health physics practices with actinide elements. As discussed in detail under Section F.1.b infra, Licensee had valid reasons for not implementing his suggestion regarding an additional HEPA filter and carefully considered all of his other recommendations.

D.9. Environmental Report

Intervenors allege that the applications are deficient since no environmental report was included. Int. Pres. at 24-25. Their allegation is based on two arguments, both of which are mistaken.

First, they argue that, since the activities constitute "a § 70.4(r) fuel processing/scrap recovery R&D effort" an environmental report was required under § 51.60(b)(1)(i). Id. That argument fails because, as shown in Section F.5 infra, the TRUMP-S activities do not constitute a "plutonium processing and fuel fabrication plant" under the definition of § 70.4.

Second, they argue that, since Licensee will have inexperienced personnel working with transuranics, there will be a significant increase in the potential for radiological accidents and an environmental report is required by § 51.60(b)(2)(v). Id. That argument also fails because, as shown in Section D.8 supra, experiments will be conducted only under the direction and supervision of authorized users, and Licensee has in place and has administered a comprehensive training and

review program to assure that only qualified personnel will be approved as authorized users. Thus, the qualifications of personnel will not result in a significant increase in the potential for radiological accidents.

D.10. Decommissioning Plan

Intervenors allege that the applications were deficient because they did not contain a decommissioning funding plan or certification of financial assurance and that there are deficiencies in the relevant filings subsequently made by Licensee. Int. Pres. at 25-27. Licensee has previously explained that this subject is not within the scope of any admitted concern and has moved that the Presiding Officer strike this portion of Intervenors' Written Presentation. See Licensee's Response to "Intervenors' Motion for Reconsideration of Memorandum and Order of October 15, 1990 (Motion for Order Concerning Documents)" and Licensee's Related Motion to Strike (Nov. 5, 1990). Not only is this portion of Intervenors' Written Presentation outside of the scope of any admitted concerns, but, as shown in Licensee's above referenced pleading, all of Intervenors' basic arguments are flawed.

E. NRC Staff Review

Intervenors argue that the NRC Staff did not adequately review the applications. Int. Pres. at 27-30. As shown in Section C supra, the adequacy of the NRC Staff's review is not

subject to review by a Presiding Officer in a licensing proceeding; the NRC Staff is not on trial.

Thus, Intervenors' allegations concerning the NRC Staff's review are not within the scope of the Presiding Officer's determinations in this proceeding. Nevertheless, Licensee should point out that the Intervenors' specific allegations are also in error.

There are no requirements in the "[f]undamental principles of administrative law" or the Administrative Procedure Act (APA) that would mandate that "findings and supporting rationale" be recorded in support of the NRC Staff's decision to issue an amendment to a materials license. Int. Pres. at 27. Nor do the regulations cited by Intervenors require such written findings or rationale. In fact, as is indicated in the 10 years of license amendments provided in the hearing file, it is not the NRC's standard practice to provide such written findings or rationale. 15/

Contrary to Intervenors' allegations (id. at 27-28), there is no regulatory or statutory requirement that the NRC Staff issue a safety evaluation report in a materials licensing action. Furthermore, since this amendment falls within the

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15/ The Presiding Officer seemed to acknowledge that in materials licensing actions the NRC Staff does not routinely record its findings or rationale, when he encouraged the Staff to issue documents explaining the basis for its licensing actions in order to expedite future cases. See Memorandum and Order (Completeness of the Hearing File), LBP-90-27, slip op. at 2-3 n.3 (July 30, 1990).

categorical exclusion under § 51.22(c)(14)(v), the NRC Staff was not required to issue an environmental assessment. See infra Section F.5.

The NRC Staff had ample basis in the applications to determine whether the governing regulatory criteria were satisfied. Moreover, it should be noted that the subject amendments were issued within the context of existing licenses. As the NRC reviewer has stated:

> 4. I reviewed the applications for amendments to the Parts 30 and 70 licenses of the University of Missouri in the context of the University's existing Part 30, Part 50 (104), and Part 70 licenses for its research reactor facility (Missouri University Research Reactor (MURR)). The six issues admitted to the hearing are not related to any review of the amendments issued because they concern matters previously reviewed prior to the issuance of the existing licenses . . . .

Affidavit of William J. Adam at ¶ 4 (July 26, 1990).

In regard to Intervenors' claim that the NRC Staff failed to realize that the amount of americium allowed under the amendment to the Part 30 license exceeds the 2 curies amount that would require an emergency plan under § 30.32(i)(1) (Int. Pres. at 28), Dr. Adam's corrected affidavit now states:

> [T]he amount of americium-241 authorized for the University is above the threshold for emergency plans or alternatives now called for by section 30.32(i). This regulation however, was not in effect at the time of the February and March 1990 applications, or the issuance of the March 12 and April 5 amendments, since they are dated before the April 7, 1990 effective date of the regulation.

Affidavit of William J. Adam at ¶ 2 (Nov. 2, 1990). Thus, § 30.32(i)(1) was not applicable to the issuance of the subject license amendment. See supra Section D.2.

Intervenors' charge that the NRC Staff failed to recognize the "omission of plutonium 241 and 242" (Int. Pres. at 29) ignores the fact that these trace elements are not "significant contaminants" and would not be major contributors to the potential dose from the use of the plutonium. Thus, these trace elements did not have to be listed in the application or considered by the NRC Staff. See supra Section D.3.

Intervenors' allegations that the NRC Staff failed to make the findings required by § 70.23 and parallel Part 30 regulations (Int. Pres. at 29) are irrelevant because, as previously noted, the NRC is not required to record written findings. Their claim that the NRC Staff did not find alleged "inadequacies in the application" suffers from the fact that Intervenors have not demonstrated that there were any such "inadequacies." See supra Section D.

Finally, there is simply no basis for Intervenors' accusation that the NRC Staff's review must have been inadequate simply because the requested amendments were issued promptly. Int. Pres. at 30. As noted before, the amendments were issued within the context of existing broad-scope materials and reactor licenses, under which the NRC Staff was familiar with Licensee, its personnel, its radiological control program, etc., and a

number of matters did not need to be rereviewed or could be reviewed quickly. Lic. Exh. 9 at ¶ 9.

F. Arguments Regarding Each Concern

Finally, beginning at page 31 of Intervenors' Written Presentation, Intervenors present their position with respect to each concern. Licensee will present its position on such concerns in the same sequence.

F.1. Concern No. 1: The Potential For An Accident Such As A Fire

At pages 31-47, Intervenors present seven arguments in support of their position regarding Concern No. 1. Licensee will respond to each argument below, but first will place such arguments in their proper context by briefly describing the Alpha Laboratory, the limited potential for a severe fire at the Laboratory and the limited off-site consequences even if such a fire were to occur. In view of the concerns that had been expressed by the Presiding Officer in issuing a temporary stay order on October 20, 1990, Licensee retained a consultant, Mr. Daniel J. Osetek, who is an expert both on glove box design and severe accidents to provide an additional evaluation of these matters. He visited the site for two days, examined the Alpha Laboratory and TRUMP-S experimental apparatus, reviewed the operating procedures and interviewed project personnel to obtain relevant information. The results of his review are contained in the attached Affidavit of Daniel J. Osetek Regarding Safety of

the TRUMP-S Project ("Osetek Affidavit") (Lic. Exh. 1) and will be referred to in the following discussion.

As discussed in detail in the attached affidavit of Mr. Chester B. Edwards, Jr., the Alpha Laboratory has been constructed so as to minimize combustibility of floor, walls and ceilings. See Affidavit of Chester B. Edwards, Jr. Regarding the Adequacy in Alpha Laboratory Equipment, Fire-Related Features in the Alpha Laboratory and General Basement Area, and Storage and Transfer of Actinides and Archived Materials ("Edwards Affidavit") (Lic. Exh. 4) at ¶¶ 20-22. Other features of the Alpha Laboratory that would minimize the effects of any fire or explosion that occurs in the Laboratory have been described in the Meyer Affidavit (Oct. 29, 1990) at ¶¶ 24-31, 44, 45, 47, 59, 66 and 67. The ventilation and exhaust systems are designed so that, in the event of a fire, fans can be shut off and dampers can be closed as a separate action. Lic. Exh. 4 at ¶¶ 24-30.

The contents of the Alpha Laboratory are primarily limited to non-combustible research equipment systems, other research equipment and miscellaneous items, as enumerated by Mr. Edwards. Lic. Exh. 4 at ¶¶ 12-16. As described in the attached affidavit of Dr. Krueger, both the equipment in the Alpha Laboratory and the procedures for the TRUMP-S experiments were designed to reduce the possibilities of fire, by minimizing the presence of a fuel source, an oxidizer or the minimal energy/ignition temperature needed for a fire. See Affidavit of Dr. C. Leon Krueger Regarding the Potential for a Fire from the

Experiments Being Performed in the Alpha Laboratory ("Krueger Fire Potential Affidavit") (Lic. Exh. 5) at ¶¶ 10-18. The TRUMP-S experiments are conducted inside a stainless steel argon glove box designed to minimize a potential fire hazard. Id. at ¶ 11. The glove box is filled with argon, the oxygen level is typically less than 0.1 parts per million (ppm) and an alarm is issued if the level exceeds 7 ppm. Plutonium cannot continue to burn at oxygen concentrations below 10,000 ppm. Id. at ¶ 11. There are only two sources of heat in the TRUMP-S experiments. Id. at ¶ 14. The first is a pot furnace, which is closely monitored, and which is of a type that could be used in an ordinary laboratory on a heat resistant benchtop. Id. The second is the heater for the thermal well in which the tests are performed. It is a standard tube furnace, with a controller to maintain the thermal well at 400-500°C and with protection from overheating by a thermal cut-out at 650°C. Id.

The contents of the glove box consist of metal tools, non-combustible ordinary laboratory reagents, ordinary laboratory equipment, and minor amounts of paper, writing materials and adhesive labels. Id. at ¶ 12. The only combustibles within the Alpha Laboratory are the rubber gloves in each glove box, the foregoing minor contents of the glove box, the paper for the computers and a small amount of stored items required for the research. Id. at ¶ 20. Good housekeeping practices prevent the accumulation of debris and combustibles. Id. There are no explosives, gasoline, diesel fuel, kerosene, fuel oils, motor

oils, alcohol, acetone or other flammable solvents or cleaning agents or natural gas piping systems housed inside the Alpha Laboratory. Id. at ¶ 18.

If a fire were to involve the small amount of actinides used in experiments, the burning of these materials would not significantly contribute to the energy of the fire. Even if the entire licensed quantity of 10 grams of plutonium were to burn, only a small release of energy would occur (enough to raise the temperature of 250 ml of water approximately 80 degrees Fahrenheit). See Lic. Exh. 3 at ¶ 48; Meyer Affidavit at ¶ 70.

As described in detail by Mr. Edwards, even if a fire were to occur in the Alpha Laboratory, the construction of the basement area is such that it would prevent the spread of the fire any further. Lic. Exh. 4 at ¶¶ 31-33. The ceiling, walls and floor of the basement area are 8" to 16" thick concrete; in effect the Alpha Laboratory is entombed inside a concrete vault isolated from the rest of the facility. Id. at ¶ 31. The basement has no windows and only two exit points, one to a deeper area and another up the stairs to a landing which is isolated from the grade level by two fire doors, one in each direction. Id. at ¶ 32.

The general basement area does not present a hazard to the Alpha Laboratory from flammables, combustibles or explosives. Id. at ¶¶ 34-38. A low pressure natural gas distribution piping system is installed throughout the facility. There is no natural gas line or supply in the Alpha Laboratory, the closest gas line

is about 15 feet from the Laboratory and closest area that uses natural gas is about 85 feet. Id. at ¶ 36.

The fire detection and fire fighting equipment in the Alpha Laboratory and in the general basement area have been fully described by Mr. Meyer. Meyer Affidavit at ¶¶ 27-33. The Alpha Laboratory is equipped with sensors to detect both fires (smoke detectors and heat sensors) as well as other conditions that would precede an emergency (low argon system pressure, high glove box oxygen content). This equipment will cause alarms local to the Alpha Laboratory and remotely in the reactor control room (which is manned 24 hours a day by NRC licensed operators). Id. at ¶¶ 28-29. Officials of the Columbia Fire Department toured the Alpha Laboratory and concluded that the safeguards and precautions incorporated into the design of the Laboratory seemed to be adequate from a fire safety point of view. Id. at ¶ 32.

The Licensee has developed Standard Operating Procedures ("SOPs") to direct the control room operators and TRUMP-S Standard Operating Procedures ("TAMs") to direct laboratory personnel in the event of an emergency in the Alpha Laboratory. Meyer Affidavit at ¶¶ 34-35. Furthermore, the Licensee has specific procedures that are directed at responding to a fire in the Alpha Laboratory. These procedures and the response of the Licensee and the Columbia Fire Department to a fire in the Alpha Laboratory are detailed in the Meyer Affidavit at ¶¶ 35, 44-60.

Thus, the design and construction of the Alpha Laboratory and surrounding basement area, the limited flammable contents of the Alpha Laboratory, the monitors, alarms and other fire-related features, the absence of any significant heat sources in the Laboratory, and the operating procedures and emergency procedures all make it extremely unlikely that a severe fire could occur in the Alpha Laboratory.

Nevertheless, Licensee has carefully analyzed the potential off-site consequences of a severe fire in the Alpha Laboratory, even though it is difficult to conceive how such a fire could even occur, let alone persist for any significant period.

As discussed in an attached affidavit of Dr. Morris, for purposes of a public meeting held on May 30, 1990, he prepared some transparencies that were utilized to discuss the fate of any airborne plutonium that might result from a "Hypothetical Accident Involving Plutonium" using conservative factors from the literature and specified assumptions (including a conservative assumption regarding one remaining HEPA filter) See Affidavit of Dr. J. Steven Morris Regarding Safety Analysis ("Morris Safety Analysis Affidavit") (Lic. Exh. 3) at ¶ 9. These transparencies, with the addition of several references, were later reproduced as a document entitled "Summary of the TRUMP-S accident analysis at the University of Missouri Research Reactor (MURR), June 5, 1990, Revision" (the "Summary"). Id. at ¶¶ 5, 9. Since Petitioners' Reply of June 12, 1990 discussed the Summary,

it was filed by Licensee as part of the Affidavit of Dr. J. Steven Morris Regarding Errors in Petitioners' Analyses (The "June 15 Morris Affidavit") (June, 15, 1990) responding to that pleading. Id. at ¶ 10.

The Morris Safety Analysis Affidavit responds in detail to the Intervenors' criticisms of the Summary, which will be discussed in Section F.1.d., below. See Lic. Exh. 3 at ¶¶ 7-18, 33-37. Dr. Morris goes on to elaborate on the substance of his accident analysis, including providing explanations and justifications for his assumptions. Id. at ¶¶ 38-53.

Briefly stated, Dr. Morris explains that in view of the low fire loading, design and construction of the Alpha Laboratory, fire-related features and experimental process (as described above), a fire with loss of containment/confinement is not credible. Id. at ¶¶ 38-43. Thus, any release from a fire would be through the stack. Id. at ¶ 43. Because the applications limit the use of actinides in an experiment to 1 gram, that amount is used for the analysis even though the quantity of actinide used in practice has been less than 0.3 gram. Id. at ¶ 44. Dr. Morris' analysis uses a fractional release factor of 1×10^{-6} which is the product of two conservative factors: 1×10^{-4} (which is a fractional entrainment factor conservatively derived from the literature) and 1×10^{-2} (which is the conservative credit for one remaining HEPA filter). Id. at ¶¶ 33-37. As explained by Dr. Morris, that

combined factor is conservative by a factor of at least 10^4. Id. at ¶ 35. He also explains that the assumption that one HEPA filter remains functional is very conservative. Id. at ¶¶ 47-49.

Dr. Morris explains the other conservative assumptions employed in his analysis. Id. at ¶ 51. He shows that the resulting doses at 100 meters from the stack would be negligible, i.e., 1×10^{-9} mrem, 1×10^{-5} mrem, 1×10^{-3} mrem and 0.13 mrem depending upon whether the 1 gram sample assumed is depleted uranium, neptunium, plutonium or americium. Id. at ¶¶ 51-52.

Licensee has performed another analysis of potential doses at 100 meters, using the generic approach described in NUREG-1140, "A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licenses" (Jan. 1988). See Affidavit of Dr. Susan M. Langhorst Regarding NUREG-1140 and Intervenors' Dispersion Concentrations ("Langhorst NUREG-1140 Affidavit") (Lic. Exh. 2) at ¶¶ 18-19. Although Dr. Langhorst discusses NUREG-1140 at great length, briefly stated, it presented the accident analysis performed by the NRC to evaluate the need for NRC rulemaking to impose additional emergency preparedness requirements on licensees. Id. at ¶ 10. As a result of the suggestions in NUREG-1140, the NRC adopted the requirements established in §§ 30.32(i) and 70.22(i). Id. at ¶¶ 11-14. In adopting these regulations, the NRC stated its agreement that the "dose calculations [in NUREG-1140] are very conservative and that doses from an actual accident are likely to

be far lower than calculated." Id. at ¶ 15. The highly conservative factors utilized in the generic analysis are spelled out in NUREG-1140. They include, among others, worst-case release fractions, no credit for engineered safeguards or response efforts, an assumed open-field site, adverse meteorology, and no response by the exposed individual. Id. at ¶ 16. These conservative assumptions greatly outweigh the few assumptions that may be nonconservative factors in certain instances. Id. at ¶¶ 16-17.

Because of the highly conservative nature of the generic calculations in NUREG-1140, the regulations as adopted by the NRC permit applicants to submit an evaluation for their specific site showing that the maximum dose to a person off-site would not exceed 1 rem effective dose equivalent, in lieu of having to submit an emergency plan. See, e.g., 10 C.F.R. § 30.32(i)(1)(i) (1990). The regulations identify the types of site-specific factors that may be used. See 10 C.F.R. § 30.32(i)(2) (1990).

Neglecting any site-specific factors, Dr. Langhorst performed a generic NUREG-1140 analysis for a quantity of one gram of plutonium. Lic. Exh. 2 at ¶ 18. One gram was used rather than the license limit of 10 grams because Licensee had committed in its application to conduct experiments with less than one gram in the cell. As shown in the Morris Safety Analysis Affidavit, the possibility of a release of the entire inventory is not credible. Lic. Exh. 3 at ¶¶ 39-44. The result

of Dr. Langhorst's highly conservative generic NUREG-1140 analysis was an effective dose equivalent of 0.034 rem at 100 meters, a small percentage of the 1 rem protective action guide.

The same NUREG-1140 generic analysis was also performed for one gram of depleted uranium, neptunium o americium. Lic. Exh. 2 at ¶ 19. The resulting effective dose equivalents were 0.0000004 rem, 0.0003 rem and 1.6 rem for depleted uranium, neptunium and americium, respectively. This highly conservative analysis results in a calculated effective dose equivalent somewhat higher than the 1 rem protective action guide for americium only. However, a site-specific evaluation replacing the NUREG-1140 factors with justifiable site-specific factors (as permitted by § 30.32(i)(1)(i)) would reduce the effective dose equivalent by several orders of magnitude, i.e., to a small fraction of the 1 rem protective action guide. Id.; see, e.g., Osetek Affidavit (Lic. Exh. 1) at ¶¶ 22, 23.

Mr. Osetek also performed an evaluation of potential accidents at the Alpha Laboratory. He noted that the highly conservative generic approach described in NUREG-1140 is only useful for emergency planning or certain project planning purposes. Lic. Exh. 1 at ¶ 21. He pointed out that a more realistic analysis is necessary to evaluate the true risk of an operation. Id.

Accordingly, he prepared a more realistic, or best-estimate, analysis of a severe accident involving the TRUMP-S experiments including best-estimates for the following parameters

(which constitute a subset of the factors identified in NRC regulations): inventory, release fraction, filtration, emergency action, plume rise, and wind speed. Id. at ¶¶ 22-23. For each parameter he fully justified the parameter that he used. Id. at ¶ 22. For example, he assumed that the exhaust and ventilation systems are secured, and discussed the physical phenomena (including residence time and deposition) that will occur while an aerosol must negotiate the pathway from the glove box through ducts or Alpha Laboratory open space, Alpha Laboratory door(s), the large basement room, the stairwell to the ground floor, the door to the ground level, the ground level hallways and the door, and window or leak paths to the environment. The resulting effective dose equivalent for a .3 gram sample of plutonium was 2.0×10^{-5} rem for the maximum exposed individual. Id. at ¶ 23. If a 0.3 gram sample of americium is substituted in his analysis, the calculated effective dose equivalent for the maximum exposed individual would be 9.4×10^{-4} rem or about one millirem. Id. at ¶ 25.

Mr. Osetek explains why, in addition to this very low consequence, the probability of such an accident also appears to be very low, thus further reducing the estimated risk to the project. Id. at ¶ 26. He concludes that "the project presents acceptably low risk to the health and safety of facility personnel, the general public and the environment." Id. at ¶ 27.

It is within the framework of these low probabilities of a severe fire and low consequences of even conservatively analyzed severe fires that Intervenors' claims must be examined.

F.1.a. Safety Procedures

Intervenors argue that Licensee's safety procedures for a fire or another emergency are inadequate. Int. Pres. at 31-32. Their discussion does not add anything to the argument they presented at pages 21-22, which has been responded to in Section D.7 supra. A detailed discussion of the adequacy of Licensee's safety procedures is presented in the Langhorst Procedures Affidavit (Lic. Exh. 9) at ¶¶ 10-22.

Licensee would only add that Intervenors mistakenly claim that Licensee's attitude is that "no matter what is done" only a millionth can escape, which will be diluted in the stack and therefore obviates the need for safety precautions. Int. Pres. at 31. The entire Licensee's Written Presentation demonstrates the many safeguards in design, construction and operating procedures that Licensee has adopted in undertaking these experiments. These entirely disprove Intervenors' suggestion of a lack of concern for safety. Of course, as shown above, Licensee has also shown that the off-site risks of the TRUMP-S experiments are minimal. But such showing is in addition to, not in lieu of, painstaking care to assure that the activities are performed safely.

F.1.b. The HEPA Filter Exhaust System

Intervenors raise again the question of an alleged "major design flaw" noted by a consultant of the Licensee, Mr. Steppen, who suggested that another DOP testable-in-place HEPA filter should be installed in the exhaust line because of backflow concerns. Int. Pres. at 32-33. Licensee believed that it had satisfactorily addressed that subject in the Affidavit of J. Steven Morris Regarding Temporary Stay Application (Aug. 23, 1990) submitted with Licensee's Response to "Intervenors' Application for Temporary Stay to Preserve the Status Quo" (Aug. 23, 1990). However, since the Presiding Officer, in issuing a temporary stay on October 20, 1990, expressed some concerns as to whether the Licensee's exhaust system conformed to industry practice, Licensee retained Mr. Veryl G. Eschen, an expert on the design of plutonium glove ventilation and exhaust systems, to provide his opinion on the adequacy of the systems at the Alpha Laboratory. The attached Affidavit of Veryl G. Eschen Regarding Argon Glovebox Exhaust System ("Eschen Affidavit") (Lic. Exh. 7) provides the result of his review.

Mr. Eschen visited the Alpha Laboratory for two days and inspected the argon glove box and laboratory ventilation system to familiarize himself with the operation in order to provide an analysis of the argon glove box exhaust system and respond to Intervenors' related comments. Lic. Exh. 7 at ¶ 5.

Mr. Eschen first explains, as the Presiding Officer is aware, that small quantities of argon are exhausted through three

tested-in-place HEPA filters (HEPA-2, HEPA-3 and HEPA-4) and one HEPA filter (HEPA-1) not tested-in-place. Id. at ¶ 7. Although credit cannot be taken for HEPA-1 for purposes of safety analysis, it does serve to protect the other exhaust HEPA filters. Since the final two-stage filter system provides a dual pathway, there is built-in redundancy to the system even if one of the pathways through the two-stage filter is plugged and the first testable HEPA filter is destroyed. This would constitute at least two simultaneous failures which is not a normal design requirements under the single failure criteria. Id.

Mr. Eschen also contacted Mr. Steppen by telephone and met with him in order to determine why Mr. Steppen felt that an additional DOP testable-in-place HEPA filter was needed. Id. at ¶ 8. Mr. Steppen stated two reasons. One was to prevent particles trapped on the two-stage HEPA filter from becoming dislodged during a backflow event and entering the Alpha Laboratory. The second was a concern about backflow through the interconnection between the glove box and laboratory exhaust. Id.

With respect to the first reason, Mr. Eschen explains that at least three failures are required, which is a highly unlikely scenario. Id. In addition, alarms would sound which would give rise to corrective action. Moreover, the small driving force during the postulated event would result in very small flow rates which would be hardly enough to transport particulates or dislodge them from a filter. Id.

With respect to the backflow through the interconnection, Mr. Eschen explains that the event would require at least three simultaneous failures and then would still admit argon that had passed through a single-stage, tested in-place HEPA filter. Id. Thus, even under this scenario the resulting condition would still provide single-stage, tested in-place HEPA filtration into the work area which is standard industrial practice. Id.

After considering both reasons, Mr. Eschen concluded that the redundancy provided by the additional filter proposed by Mr. Steppen is not necessary. Id.

Mr. Eschen then considered the arguments raised by Intervenors.

To the extent that Intervenors seek to raise an argument based on DOE Order 6430.1A, Mr. Eschen explains that even if it is assumed that such Order is applicable to the Alpha Laboratory, as previously explained, it does meet the Order's basic single failure and redundancy criteria. Id. at ¶ 9. It should be noted, however, that since the Alpha Laboratory does not fall within the DOE facilities identified under the Purpose and Applicability sections of DOE Order 6430.1A, such Order does not apply to the Laboratory. See Affidavit of Dr. J. Steven Morris Regarding Steppen Suggestions and Comments (Lic. Exh. 8) at ¶ 5.

Mr. Eschen also explains how the in-place testable filters at the Alpha Laboratory satisfy the standards included in

Intervenors' Exhibits 9 and 10. Lic. Exh. 7 at ¶¶ 10. 11. In response to the allegation in Intervenors' Exhibit 7, that all filters should be tested in place, Mr. Eschen explains that this applies only to filters for which credit is taken for a safety analysis, which does not include HEPA-1. Id. at ¶ 12. Nevertheless, he points out that HEPA-1 would usefully perform the function of a roughing filter or prefilter under another section of DOE Order 6430.1A. Id. Dr. Morris also notes that DOE's Health Physics Manual of Good Practice for Plutonium Facilities (PNL-6434) (May 1988) explicitly contemplates that filters, such as HEPA-1, would be provided at a glove box exhaust outlet to keep ventilation duct work clean, would not need to be tested in place, but would be tested prior to installation. Lic. Exh. 8 at ¶ 6.

Thus, the affidavits of both Mr. Eschen and Dr. Morris demonstrate that the argon glove box ventilation system satisfies standard industrial practice for nuclear facilities. Mr. Eschen further concludes that "the argon glovebox ventilation system represents a reasonable 'state of the art' system and meets the requirements of the program as presented." Lic. Exh. 7 at ¶ 14.

Dr. Morris also responds in detail to Intervenors' allegation that he took it upon himself to overrule the recommendation of Mr. Steppen. Int Pres. at 35. He explains how he participated in the decision and the reasons for that decision. Lic Exh. 8 at ¶¶ 7-10.

Finally, Intervenors note that Mr. Steppen made "other major recommendations." Although Intervenors have not indicated in what way all of such recommendations are relevant to their admitted concerns, Dr. Morris explains how each of Mr. Steppen's recommendations were considered by Licensee and what actions were taken. Id. at ¶¶ 11-30.

F.1.c. Response Measures

Intervenors' concern with respect to response measures is apparently subsumed under Section F.1.d. infra. Int. Pres. at 38.

F.1.d. "Summary Of Accident Analysis"

Intervenors raise a number of criticisms regarding Dr. Morris' "Summary" (Int. Pres. at 38-40), which are responded to in detail in the Morris Safety Analysis Affidavit (Lic. Exh. 3).

In response to Intervenors' snide aside that the "Summary" is not a summary or revision of anything (Int. Pres. at 38), Dr. Morris explains, as Intervenors are well aware, the origin of this document and its purpose. Lic. Exh. 3 at ¶ 7-13.

With respect to Intervenors' assertion that the Summary's release factor of 1×10^{-6} is an assumption and "has no basis in the literature" (Int. Pres. at 38-40), Dr. Morris explains both the conservative nature of the 1×10^{-6} factor (Lic. Exh. 3 at ¶¶ 33-37) and how the references to the literature made by Licensee in the Summary are accurate (Id. at

¶¶ 14-18). His affidavit includes an explanation of how the Summary used a factor (1×10^{-4}) more conservative than the mean fractional entrainment factor for static burning from the Schwendiman data, and not the lowest (least conservative) number from that paper. Id. at ¶¶ 33-35; see discussion in Section F.1 supra. Although Intervenors now claim otherwise, it seems clear that they understood that the Summary's treatment of the fractional release factor data from both the Seehars, et al. and Schwendiman, et al. papers was in concert with the conservative credit of 1×10^{-2} being taken for one HEPA filter and that the 1×10^{-6} combined factor was not taken directly from the literature. Id. at ¶ 37.

The assumption that only one gram of transuranics would be involved in an accident during an experiment (Int. Pres. at 40) is justified because Licensee has committed in its applications to limit experimental use to one gram or less. Lic. Exh. 3 at ¶ 24. In fact, in practice, 0.3 grams has been the maximum used to produce the actinide chloride stock material, and approximately 0.01 grams are used in the thermodynamic measurements. Id.

On those infrequent occasions when the entire sample is subdivided, at least two persons are involved in the work and verification is made that all safety features are within specifications -- especially the argon atmosphere in the glove box. Id. at ¶ 41. No heat source is operational and the

material can be readily placed into a covered metal container. Thus the risk of a fire during that limited period is extremely small. Lic. Exh. 9 at ¶ 18.

With respect to initial storage of the material and its movement to the Alpha Laboratory, and with respect to movement and storage of the "archived" samples, a detailed discussion of the storage areas, containers for transportation and storage, and applicable procedures is contained in the Edwards Affidavit. Lic. Exh. 4 at ¶¶ 39-78. All of these considerations make the risk of a severe fire releasing the entire inventory very low. Osetek Affidavit, Lic. Exh. 1 at ¶¶ 10-13; Lic. Exh. 4 at ¶ 78.

F.1.e. NUREG-1140

Intervenors' assertions regarding NUREG-1140 (Int. Pres. at 40-42) are responded to in detail in the Langhorst NUREG-1140 Affidavit (Lic. Exh. 2) at ¶¶ 8-32.

It should first be noted that Licensee has not "backed away" from its defense of its Summary in mistaken reliance on NUREG-1140. Int. Pres. at 40. Instead, Licensee has fully justified the analysis presented in the Summary (see, e.g., supra Section F.1), and has provided additional analyses which buttress the Licensee's position, i.e., an analysis by Dr. Langhorst based upon the generic NUREG-1140 approach and an analysis using the site-specific factors contemplated by NUREG-1140 and the regulations based on NUREG-1140. See id.

Dr. Langhorst's affidavit first provides a useful discussion of NUREG-1140 as the basis for the additional emergency preparedness requirements adopted by the NRC (Lic. Exh. 2 at ¶¶ 10-14) and of the conservative nature of the analysis in NUREG-1140. Id. at ¶¶ 15-17. She then presents the results of her generic NUREG-1140 analysis for a severe accident involving 1 gram of actinide at the Alpha Laboratory. Id. at ¶¶ 18-19.

Dr. Langhorst then shows that Intervenors' allegation that Licensee's reliance on NUREG-1140 "is misplaced" (Int. Pres. at 40-41) is mistaken. Licensee has used the highly-conservative NUREG-1140 generic analysis approach to show that even with such assumptions potential off-site doses would be low. Lic. Exh. 2 at ¶ 23. Then, using more realistic site-specific factors, the potential off-site dose from a major fire would be minimal. Id.

Licensee agrees with Intervenors' statement that the NUREG-1140 analysis was not intended to indicate that assurance was not needed of safe operation, etc., for inventories below estimated levels in the Report, and never said otherwise. Id. at ¶ 24. However, since Licensee would have been able to justify not having an emergency plan even if the regulations based on NUREG-1140 had been applicable to the subject amendments, Licensee has gone beyond regulatory requirements by installing the Alpha Laboratory at a location covered by an established emergency plan. Id.

Intervenors are mistaken in their statement that NUREG-1140 identifies licensees for which additional emergency measures would be cost-effective (Int. Pres. at 41), since the conclusion of NUREG-1140 states just the opposite. Id. at ¶ 25.

Finally, Dr. Langhorst responds to a number of assertions regarding NUREG-1140 appearing in Intervenors' Exhibit 1. Id. at ¶¶ 26-30. In particular, Intervenors falsely portray the Licensee as having one of the most dangerous nuclear materials licenses in the entire country. Int. Exh. 1 at 77, 79. NRC does not come to the conclusion that any of the country's material licenses are dangerous to the public. Lic. Exh. 2 at ¶ 29. In fact, in reviewing a history of accidents involving 21,000 NRC or Agreement State materials licenses, the NRC found no instance of an accidental release causing an effective dose exceeding even 1% of the EPA's 1-rem protective action guide and that no emergency protective action has ever been necessary to protect people off-site from airborne releases. Id. The limited potential off-site hazard presented by such licensed activities is emphasized by the guidance provided by NUREG-1140 regarding appropriate emergency responses. This guidance provides for a response distance of only about 100 meters to 500 meters, based upon quantities exceeding the NUREG-1140 table by a factor of 10 to 100. Id. The conclusion of NUREG-1140 states:

> The conclusion of this Regulatory Analysis is that accidents at fuel cycle and other radioactive materials licensees pose a very small risk to the public.

Id. at ¶ 31.

Licensee cannot overlook Intervenors' accusation that "lust for money" is causing Licensee "to sacrifice safety." Int. Pres. at 42. Since it appears in the section on NUREG-1140, this accusation seems to be based on an alleged misuse of NUREG-1140 by Licensee. To the contrary, as shown by, among other things, the scholarly discussion in the Langhorst NUREG-1140 Affidavit, Licensee has carefully reviewed the teachings of NUREG-1140 and applied them with care to the analysis of the safety of the Alpha Laboratory. It is unfortunate that Intervenors prefer to stoop to sensationalism in their attacks, rather than presenting supported criticisms of Licensee's actions.

F.1.f. Concentrations Resulting From Accidents

The most preposterous assertion in Intervenors' Written Presentation is the statement: "A real safety analysis, using release fractions really supported by the literature, has been prepared by the Review Committee. See Exhibit 1." Int. Pres. at 42.

This subject is dealt with at length in several of Licensee's Exhibits.

As summarized by Dr. Langhorst, Intervenors' "alleged concerns for public health and safety are based on 'analyses' using incorrect methods, unknown assumptions and misapplied

data." Lic. Exh. 2 at ¶ 33. The authors of Intervenors' Exhibit 1 (Warf, et al.) provide a table of numbers described as resulting from their calculations of estimated concentrations of plutonium released in a fire. They provide some of their assumptions, but fail to describe the dispersion model used and the associated weather conditions. Id. at ¶ 34. Dr. Langhorst performed a detailed calculation which shows the incredible nature of these "missing" bases for the professed calculations of Warf, et al. Id. at ¶¶ 34-37. This showed that the Warf, et al. "model" for dispersion overestimates X/Q values by factors ranging from 30 to 90 times those associated with the most conservative values in NUREG-1140. Id. at ¶ 36.

Furthermore, using a simpler and more conservative dispersion model, Dr. Langhorst showed that the prerequisite wind speeds required to produce the Warf, et al. concentrations range from 0.041 m/sec to 0.095 m/sec, or at most 0.2 mph. Id. at ¶ 37. At this wind speed, hours are available to instruct the public at 500 m and beyond in the proper protective action. Moreover, such calm wind conditions are far from reality and would allow for smoke to rise and the plume to wander. Id. at ¶ 38.

As detailed by Dr. Langhorst, other aspects of the analysis are equally incredible. Id. at ¶ 39. For example, Intervenors appear to assume that plutonium released within the Alpha Laboratory, which would naturally mix within the air space, would somehow concentrate as it leaves the building. Id.

Intervenors' claims of incredibly high concentrations of released plutonium are completely without merit. Id.

As finally discussed by Dr. Langhorst, Warf, et al. also misapply the emergency action level associated with classifying an emergency as an Unusual Event. Id. at ¶ 41. They take the action level of 10 MPC from ANSI/ANS-15.18-1982, which applies at the site boundary (approximately 400 meters at MURR), and apply it at all distances from the Alpha Laboratory. They criticize Licensee's use of 3800 MPC, without recognizing that it was properly used as the concentration "at the stack monitor" under Licensee's Emergency Plan. Id.

Dr. Morris shows, in some detail, how the use of a fractional release factor of 3% by Warf, et al. is completely unreasonable for a fire accident at the Alpha Laboratory. Lic. Exh. 3 at ¶¶ 19-23. As summarized by Dr. Morris after review of Chernobyl literature and other references, "Intervenors stand alone in believing that the fractional release factor derived from the Chernobyl fire is comparable to credible accidents at the MURR." Id. at ¶ 23. He also shows how Intervenors have misused the Schwendiman Report in the Declaration of James C. Warf and Daniel O. Hirsch ("Warf-Hirsch Declaration") provided with Petitioners' Reply (June 12, 1990). Id. at ¶¶ 25-32. Finally, since Intervenors did not postulate an accident scenario in their October 15, 1990 filings, Licensee assumes that the scenario filed with the Warf-Hirsch Declaration is still considered valid by Intervenors. Id. at ¶ 54. Dr. Morris

explains step-by-step why such scenario must be rejected as incredible. Id. at ¶¶ 55-57.

Mr. Osetek examined the results of the Warf, et al. calculations and found that they disagreed with his own calculations. Lic. Exh. 1 at ¶ 28. Even using their assumptions of 1 gram and a 3% release factor he calculated a concentration 37 times lower than their value. Id. He concluded that they seem to be overestimating concentrations. Id.

Mr. Osetek also reviewed the Warf-Hirsch Declaration and its suggestion that "at least a few percent" release should be assumed for the TRUMP-S accident analysis, based on the 3% release of actinides at Chernobyl. Id. at ¶ 29. Based upon his work with reactor safety and his familiarity with the Chernobyl event, Mr. Osetek explained why the Chernobyl accident bears no resemblance to a postulated accident for TRUMP-S. He concludes that good engineering practice would preclude the application of any Chernobyl data in any manner to the accident postulated for the TRUMP-S project, and reiterates that the proper release fraction would be derived from experiments that most closely simulated expected conditions. Id.

Dr. Krueger reviewed in detail Professor Warf's "A Critique of the TRUMP-S Process" (the "Critique") which is attached to Intervenors' Exhibit 1. See attached Affidavit of Dr. C. Leon Krueger Regarding Literature on Fractional Release Factors (the "Krueger Literature Affidavit") (Lic. Exh. 6). He

points out that Professor Warf provides a lot of information that is irrelevant to Licensee's amendments. Lic. Exh. 6 at ¶ 3.

More importantly, Dr. Krueger notes that Professor Warf's treatment of the literature is not very even-handed, and that, in selectively using literature, he fails to mention a number of statements that the author seems to consider important. Id. at ¶¶ 4-12. Professor Warf also omits a paper by a leading author that contains conclusions that major incidents have not released hazardous quantities of plutonium into the environment. Id. at ¶¶ 13-14. Finally, although only two of the 17 values listed in the table on page 12 of his paper had release fractions in excess of 1% (both involved gasoline fires), in Intervenors' Exhibit 1, Table III, Professor Warf recommends the use of 3%, a value higher than all but those most contrived to maximize the release. Id. at ¶ 16. Dr. Krueger concludes that, although release fraction experiments are subject to much uncertainty, the results reported by Schwendiman et al. (Warf's reference 10) have held up in subsequent investigations and provide the best comparison data that exists for TRUMP-S. Id. at ¶ 18.

F.1.g. Reliability Of Morris Testimony

Intervenors assert that no weight should be given to the testimony of Dr. Morris (Int. Pres. at 43), and allege that certain "facts" support their assertion. Id. at 43-47. To the contrary, the Presiding Officer's observations regarding previous affidavits filed by Dr. Morris and Licensee's response below

demonstrate that Dr. Morris' affidavits have been thorough, complete, well-documented and entitled to great weight. They are especially worthy of careful consideration when compared to the generalized and unsupported declarations that have been submitted by Intervenors, as Licensee has shown throughout Licensee's Written Presentation.

Two affidavits of Dr. Morris in particular have resulted in specific commendation by the Presiding Officer. After reviewing the Affidavit of J. Steven Morris Regarding Temporary Stay Application (Aug. 23, 1990), the Presiding Officer commented:

> Furthermore, the affidavit is well organized and logical, attending to specific details that support the conclusions. It is the kind of careful technical memorandum that not only makes its point but adds to my confidence in the professional competence and carefulness of Mr. Morris [Dr. Morris] and of the research reactor and laboratory that he runs.

Memorandum and Order (Temporary Stay Request), LBP-90-30, slip op. at 12 (Aug. 24, 1990).

Similarly, after reviewing the Affidavit of Dr. J. Steven Morris Regarding Plutonium Content (Oct. 29, 1990), the Presiding Officer commented that "Now Licensee has responded in a thoughtful, well-documented way . . ." and referred to "Licensee's thoughtful response. . . ." Memorandum and Order (Licensee's Partial Response Concerning Temporary Stay), LBP-90-38, slip op. at 2-3 (Oct. 30, 1990). After referring to Intervenors' reliance on "library research," the Presiding

Officer pointed out that "[b]y contrast, the Morris Affidavit provides a detailed analysis of the form of plutonium Licensee possesses. . . ." Id. at 4. Licensee is confident that the Presiding Officer will find that the additional affidavits prepared by Dr. Morris for submittal with Licensee's Written Presentation meet the same standards of professionalism and care that the Presiding Officer has found to date.

Intervenors' criticism of Dr. Morris' previous affidavits are scarcely worthy of response. Nevertheless, Dr. Morris has responded to Intervenors' accusations concerning the origin and use of the "Summary of the TRUMP-S Accident Analysis at the University of Missouri Research Reactor (MURR)" (Int. Pres. at 43-44) at ¶¶ 7-18 of the Morris Safety Analysis Affidavit (Lic. Exh. 3).

Intervenors try to make much of what questions were asked or might have been asked of Mr. Steppen by Dr. Langhorst. Int. Pres. at 44-45, 57. As was apparent from Dr. Morris' affidavit, in responding on an expedited basis to Intervenors' request for an immediate temporary stay, all that Licensee was attempting to do was to identify whether there was a DOE regulation or written requirement applicable to the HEPA filters in the Alpha Laboratory. None was identified then, and, as shown in Licensee's Written Presentation, none has been identified now.

Licensee acknowledges that Dr. Morris' mention of Regulatory Guide 10.3 as being applicable to up to 2,000 grams of plutonium would have been clearer if it had pointed out that such

amount referred to plutonium in the form of sealed plutonium-beryllium neutron sources. Int. Pres. at 45-46. However, the same section of Regulatory Guide 10.3 specifies that it is applicable to up to 200 grams of plutonium in any form other than plutonium-beryllium neutron sources. The point being made by Dr. Morris, namely that Regulatory Guide 10.3 is applicable to quantities of plutonium far in excess of Licensee's actual inventory of 5 grams or use of 0.1 gram in any one experiment, was not affected by whether 2,000 or 200 grams were referred to.

Intervenors' accusation that Dr. Morris' conclusory statement in his August 23, 1990 affidavit was "greatly misleading" is itself misleading. Int. Pres. at 46. Although Intervenors seem to complain that "six pages of detailed single-spaced comments" are too much to absorb (id.), in that detailed affidavit Dr. Morris pointed out specifically that the HEPA-1 filter had not been tested in place; that this was the apparent source of Mr. Steppen's concern; that filter was, nevertheless, acceptable; and that the argon glove box exhaust system fully satisfied all applicable requirements. No one who had read the entire affidavit could have been misled by the conclusion.

Finally, Licensee finds particularly offensive Intervenors' tasteless accusation that Dr. Morris is a lackey who "must do what he is told." Int. Pres. at 46. This is not the first time that Intervenors have relied on vituperative language rather than objective fact. In view of these repeated and unjustified personal attacks, the Presiding Officer, in judging

the value of Dr. Morris' testimony, may wish to take the time to also express his views concerning Dr. Morris' demonstrated professionalism and integrity.

F.2. Concern No. 2: Adequacy Of Equipment And Site

With respect to adequacy of equipment, Intervenors' Written Presentation mentions only the "HEPA filter concern." Int. Pres. at 47. That concern has been fully addressed under Section F.1.b supra.

It should be noted, however, that the Edwards Affidavit identifies all of the research equipment systems and other research equipment at the Alpha Laboratory. Lic. Exh. 4 at ¶¶ 13-15. Such equipment has been selected, installed and tested to reduce undesired experimental interference with data collection. Id. at ¶ 16. Each piece of equipment was inspected and approved prior to installation and verified operable in accordance with applicable requirements. Id. at ¶ 17. The controls and components have been inspected, installed, calibrated and operationally tested. Id. at ¶ 18. Calibrations, functional tests and operating limits are recorded; all research equipment is certified; and final review, acceptance and approval of readiness tasks were performed by the principal investigator and the Associate Facility Director. Id. at ¶ 19.

Intervenors imply that the use of the term "antique" to describe the argon glove box was derogatory. Int. Exh. 17. Dr. Krueger explains that the term was used appreciatively to

describe the glove box as a high quality, high value, reusable piece of equipment. Lic. Exh. 5. at ¶ 21. The glove box and antechamber are constructed of stainless steel and were found free of defects; and the operability of the glove box was verified to satisfy acceptable operating criteria. Id.

Mr. Eschen stated that basic glove box designs have not changed significantly in his 31 years of experience. Lic. Exh. 7 at ¶ 13. He observed that the argon glove box was in good condition and suitable for the application, and that the high purity argon atmosphere requires a tight (very low leakage system) and was operating properly. Id. He concluded that "the argon glove box ventilation system represents a reasonable 'state of the art' system and meets the requirements of the program as presented." Id. at ¶ 14.

Mr. Osetek reviewed the experiment design and personally inspected the Alpha Laboratory, the glove boxes and the ventilation system. Lic. Exh. 1 at ¶ 19. In his opinion, "the apparatus is well designed and constructed and includes all the features expected for a system of this type and purpose and some added features beyond the minimal requirements (e.g., four banks of HEPA filters, three in-place tested, in the glove box exhaust lines)." Id. He concluded that "the TRUMP-S project has not only complied with the safety requirements appropriate to an operation of this type, but it has exceeded the usual requirements by adding safety features and controlled procedures

usually reserved for much more hazardous operations." Id. at ¶ 20.

With respect to adequacy of the site, Intervenors allege that "There is no real dispute about the buffer zone issue." Int. Pres. at 47. They could not be more mistaken.

The attached affidavit of Mr. McKibben first describes the site. See Affidavit of J. Charles McKibben Regarding Adequacy of Site ("McKibben Site Affidavit") (Lic. Exh. 10) at ¶¶ 6-8. The Alpha Laboratory is located in the basement of the MURR laboratory building, outside the containment area of the 10 MW pressurized water moderated pool type reactor. Id. at ¶ 6. The area bounded by a 100 meter radius from the MURR exhaust stack is designated as the Emergency Planning Zone (EPZ) in the MURR Facility Emergency Plan, and lies completely within the site boundary. Id. at ¶ 7. MURR is located in the center of a Licensee owned 550 acre tract of land. One public road crosses the Licensee's property approximately 400 meters east of MURR. Licensee has the right to determine all activities, including exclusion or removal of personnel and property. Id. at ¶ 8.

"Buffer zone" is a term coined by the Intervenors, which does not appear in NRC regulations and has no regulatory significance. Id. at ¶ 9. If Intervenors mean "exclusion area, as defined in 10 CFR 100.3(a), that term does not apply to materials licensees or even to the MURR research reactor. Id. at ¶ 10. However, the MURR research reactor site could meet the NRC suggested minimum exclusion area for a power reactor. Id.

There is no requirement in NRC regulations, regulatory guidance or NRC application forms that a licensee control an area surrounding the location of licensed activities (i.e., a "buffer zone") for purposes of reducing doses to the public in the event of an accident. Id. at ¶ 11.

If by the term 'buffer zone' Intervenors meant to refer to an EPZ, it should be noted that, in adopting the additional emergency planning requirements, the Commission stated that it "intentionally did not establish emergency planning zones . . . ." Id. at ¶ 12. However, the Alpha Laboratory does have the benefit of the existing 100 meter EPZ, and of procedures that can be used to evacuate buildings or fields within 400 meters. Id.

Finally, Licensee complies with all requirements under 10 CFR Part 20 with respect to "restricted areas" and "unrestricted areas." Id. at ¶ 13.

F.3. Concern No. 3: Administrative Controls

Intervenors' Written Presentation does not appear to raise any issues regarding administrative controls of the performance of the TRUMP-S experiments, except with respect to "the use of students in this work . . . ." Int. Pres. at 47.

Dr. Langhorst has described how a Type A broad-scope licensee, such as the Licensee, must satisfy the requirements of § 33.13(c) with respect to establishing administrative controls. Lic. Exh. 9 at ¶ 24. This includes the establishment of a

radiation safety committee, which is designed to act as the Licensee's internal governing body with responsibility for the review, approval and control of work performed under the license. Id. Licensee's radiation safety committee is the Central Radiation Safety Committee. Id. at ¶ 26. This Committee has delegated its functions at MURR with respect to the subject licenses to the Isotope Use Subcommittee ("IUS"). Id. Dr. Langhorst explains in some detail how the IUS has exercised control of the radiological control program for the TRUMP-S experiments beginning with the initial meeting on the research proposal, and includes a discussion of relevant IUS meetings, with attached excerpts from the minutes. Id. at ¶¶ 36-42. As she concludes: "The deliberations of the IUS are yet another indication of the University's dedication to assure the safe operations of the TRUMP-S project." Id. at ¶ 43.

Intervenors voice concern with the involvement of students in the TRUMP-S experiments. Int. Pres. at 47. A major role of a University is to educate and train students. Lic. Exh. 9 at ¶ 41. The University believes that the TRUMP-S project has outstanding potential to provide graduate research opportunities having national significance and involving a unique, one of a kind research facility. Id. and Lic. Exh. 14 at ¶ 4. Furthermore, there is an identified national need to train students in nuclear chemistry, radiochemistry and related areas. Lic. Exh. 14, Attachment 2. Students working on the TRUMP-S experiments are closely supervised by experienced authorized

users, and are provided "hands-on" training by both the experienced authorized users and the MURR Health Physics Group specific to the TRUMP-S experiments. Lic. Exh. 9 at ¶ 41. In this way, students, i.e., this country's next generation of scientists and engineers, gain the appreciation for the safety requirements and management control needed to work with the actinide materials. Id.; Lic. Exh. 14 at ¶ 4. The University believes that the TRUMP-S project has outstanding potential to provide graduate research opportunities having national significance and involving a unique, one of a kind research facility. Lic. Exh. 9 at ¶ 41.

Although Intervenors seek to make much of events concerning the irradiation and distribution of topaz by the Licensee (Int. Pres. at 47-48), those events have no relevance to the safe performance or management of the TRUMP-S experiments. The following discussion is provided solely in case the Presiding Officer does not determine that this subject is wholly irrelevant.

As described in the attached affidavit of Mr. Reilly, the events relating to the State Auditor's concern dealt solely with accounting problems and a potential conflict of interest. See Affidavit of William F. Reilly Regarding Topaz Irradiation ("Reilly Affidavit") (Lic. Exh. 12 at ¶ 6). The University's response refuted the State Auditor's allegations. Id. at ¶ 7. Management reorganization and accounting changes were instituted. Id. at ¶ 8.

For reasons entirely unrelated to the foregoing, Licensee's topaz irradiation program did become involved in NRC considerations. However, Intervenors misrepresent the NRC Policy Issue document (Int. Exh. 14) as stating an interest in "the safety implications of lax management" and finding "a long history of unlawfully distributing irradiated material to the public . . . ." Int. Pres. at 48. No such statements appear in Int. Exh. 14. As described in more detail in the Reilly Affidavit, there was a cloudy regulatory area, in which the NRC conducted a lengthy internal debate about the irradiation of gemstones until early 1988. Lic. Exh. 12 at ¶ 9. Although the NRC noted that "under strict interpretation of the regulations" the University was in violation, it acknowledged that after 1986 the University had restricted distribution of the irradiated topaz in accordance with guidance from the NRC. Id. Licensee submitted a position paper and an early license application to prod the NRC into a resolution. It was never cited for a violation and acted in accordance with responsible guidance. Id. In 1988, it received the second license granted by the NRC for distribution of topaz in the United States. Id. at ¶ 10.

F.4. Concern No. 4: Adequacy Of Emergency Plans

Intervenors raise four arguments regarding emergency plans. Int. Pres. at 49-50.

Their first argument refers to their discussion of the application and alleges that the requirements of Part 30 and

Part 70 (presumably §§ 30.32(i) and 70.22(i)) have not been met. Id. at 49. This argument has been addressed under Sections D.2 and D.3 supra.

Their second argument relates to an alleged deficiency in the fire response procedure and the absence of a procedure on how to fight a fire involving transuranics. Id. These allegations were responded to in the Meyer Affidavit at ¶¶ 51-60.

Their third argument relates to the Emergency Planning and Community Right-to-Know Act. Int. Pres. at 49. It has been responded to under Section D.5 supra.

Their final argument relies on the Ottinger declaration as indicating that the Columbia Fire Department has a policy that it will not fight a fire involving radioactive materials. Id. at 49-50. The Affidavit of Mr. Erman Call, the Fire Battalion Chief, filed with Licensee's Submittal of October 30, 1990, squarely rebuts that assertion.

Strangely enough, Intervenors request that the Presiding Officer require Licensee to make its emergency plan part of the hearing file. Int. Pres. at 50. The MURR Facility Emergency Plan has been part of the hearing file since the NRC Staff filed its supplement of August 16, 1990. Moreover, the MURR Facility Emergency Plan was made available by Licensee to Intervenors as early as June 26, 1990.

F.5. Concern No. 5: Need For An EIS Or EA

Intervenors' basic argument is that the TRUMP-S project is a "plutonium processing and fuel fabrication plant," as defined in § 70.4(r), and that an environmental impact statement (EIS) was therefore required pursuant to § 51.20(b)(7) prior to license issuance. Int. Pres. at 50.

Licensee has previously pointed out that Part 51 of the NRC regulations identifies the licensing actions for which an EIS or environmental assessment (EA) must be prepared, as well as those actions for which neither an EIS nor an EA is required (the categorical exclusions). Response of Licensee to Request for Hearing and Stay Pending Hearing at 23 (May 25, 1990). Section 51.22(c)(14)(v) specifically lists, among the categorical exclusions, the issuance of an amendment to a materials license that involves the "[u]se of radioactive materials for research and development and for educational purposes." Since the subject license amendments fall squarely within that categorical exclusion, neither an EIS nor an EA was required. Id. The NRC Staff has attested that "no environmental assessment was necessary because the types, quantities and uses of licensed material authorized are categorically excluded by 10 CFR 51.22(c)(14)(v)." Affidavit of William J. Adam at 2 (July 26, 1990).

Intervenors' argument to the contrary, based on the definition of "plutonium processing and fuel fabrication plant," appears to be twofold. In their first argument, they

characterize such definition as including "a plant in which are conducted research and development activities involving preparation of fuel material, recovery of scrap material, or storage associated with such activities." Int. Pres. at 18. They then assert that "According to the University, Rockwell, and DOE, this is exactly what the University is doing." Id. Not surprisingly, they provide no citation for such assertion, because Licensee is not aware of any such statement by either the University, Rockwell or DOE. Nor could there be. The TRUMP-S experiments to be conducted at the University under the subject amendments are concededly "research and development activities," but they will be "limited to pure elements (99% or better)." See May 24 Morris Affidavit at ¶ 6. Thus, Licensee's TRUMP-S experiments will neither involve "preparation of fuel material" nor "recovery of scrap material" nor "storage associated with such activities."

Intervenors' sole support for its legal position is a reference to a Memorandum and Order issued on March 19, 1990 in the Rockwell proceeding. Int. Pres. at 18. However, that decision, which was tentative, was based upon the Presiding Officer's understanding at that time of the particular facts in that proceeding. As he then stated, it was his understanding that:

> [Rockwell] has been involved in recovery of scrap material[8] and -- under the TRUMP-S proposal as I now understand it -- may well continue to be involved in recovery of scrap

> material. In addition, it is involved in research and development activities that involve recovery of scrap material . . . .
>
> ---
>
> 1/ Rockwell is not precluded from proving that it has not been involved in the recovery of scrap material or that it will not be involved in such recovery. I note that the regulations have no further definition of the meaning of scrap recovery.

Rockwell International Corp. (Rocketdyne Division), LBP-90-10, 31 NRC 295, 296 (1990).

Whatever facts concerning "scrap recovery" might ultimately have been established in the Rockwell proceedings, the facts at the Alpha Laboratory are undisputed; transuranic elements with a purity of 99% or better are not "scrap." Thus, Licensee's activities do not fall within the definition of § 70.4.

At the outset of Intervenors' second argument, they acknowledge that, even if the TRUMP-S experiments constitute research and development activities within the definition of a "plutonium processing and fuel fabrication plant" under § 70.4, they can still fall within an exception to that definition if they utilize "unsubstantial amounts of plutonium." Int. Pres. at 18. However, since the regulations do not define the term "unsubstantial," Intervenors argue that guidance should be obtained from § 70.22(i). According to Intervenors, that regulation draws the line "at 2 curies of plutonium" between unsubstantial quantities and quantities so substantial that safety evaluations or emergency plans are required. Id.

(emphasis added). Based upon their mistaken calculations and assumptions (see supra Section D.3), Intervenors conclude that Licensee's use will significantly exceed 2 curies of plutonium and therefore does not involve an unsubstantial quantity.

As Licensee will show below, Intervenors' attempt to use 2 curies as the dividing line between "substantial" and "unsubstantial" quantities of plutonium in § 70.4 has no support in the regulation and is inconsistent with its legislative history. Moreover, such amount cannot logically be used in any rational attempt to determine what is included in the term "plutonium processing and fuel fabrication plant." In addition, as recognized by the Presiding Officer, even for purposes of § 70.22(i), where the 2 curies amount appears, Pu-241, which is a beta-emitter, would not be considered in the same fashion as alpha-emitting plutonium isotopes. See Memorandum and Order (Licensee's Partial Response Concerning Temporary Stay), LBP-90-38, slip op. at 5-6 n.9 (Nov. 1, 1990).

Within the context of the definition in § 70.4, Licensee's quantity of plutonium is "unsubstantial" using any conceivable standard. Although the Commission did not define "unsubstantial quantities" when it adopted the regulations pertaining to a "plutonium processing and fuel fabrication plant," it clearly indicated the type of facilities and magnitude of involved materials that it had in mind. As the Commission stated when it proposed the regulation:

> The additional requirements would be applicable to plants for the manufacture of plutonium reactor fuel and plants for the conduct of plutonium fuel research and development activities. These plants typically process kilogram quantities of plutonium.

See Plutonium Processing and Fuel Fabrication Plants, 36 Fed. Reg. 9786 (May 28, 1971) (emphasis added). Essentially the same two sentences (with the words "will apply" being substituted for "would be applicable") were repeated when the regulation was adopted. See Plutonium Processing and Fuel Fabrication Plants, 36 Fed. Reg. 17,573, 17,754 (Sep. 2, 1971). Thus, the quantity of 10 grams or less of plutonium to be possessed and used by Licensee in the TRUMP-S experiments is at least two orders of magnitude less than the kilogram quantities envisioned by the Commission by its definition.

There are other indicia of amounts of special nuclear materials that would have to be authorized before the Commission would consider them to be substantial. For example, § 1.1 of Reg. Guide 10.3 specifies 200 grams 16/ as the quantity of plutonium (in any form other than plutonium-beryllium neutron sources) that is considered not sufficient to form a critical mass and which, therefor is covered by that Reg. Guide. Similarly, 10 CFR § 150.11 also defines the quantity of plutonium not sufficient to form a critical mass as 200 grams, and therefor

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16/ In this instance, as in others cited below, if more than one special nuclear material is present, a ratio of the quantities of the various materials is used.

dictates the limit on regulatory jurisdiction over plutonium that can be transferred from the NRC to an Agreement State. Section 70.24(a) identifies 450 grams of plutonium (or one-half such quantity if certain moderators or reflectors may be present) as the authorized quantity that triggers a requirement for criticality accident monitoring. Section 73.6(c) identifies 350 grams of plutonium "possessed in any analytical, research, quality control, metallurgical or electronic laboratory" as exempt from specified requirements relating to the physical protection of plants and materials. Section 70.22(h)(1) identifies 5000 grams of plutonium as the authorized quantity that triggers a requirement for a physical security plan.

Wherever one may look for guidance to how much plutonium may constitute an "unsubstantial amount" for purposes of § 70.4, it is obvious that the 10 gram quantity authorized under the subject amendment falls significantly below any amount that the Commission could have considered "substantial" and that the categorical exclusion under § 51.22(c)(14)(v) was properly applied.

Apart from their mistaken legal arguments regarding § 70.4, Intervenors provide no information in the Intervenors' Written Presentation that is relevant to the applicability of § 51.22(c)(14)(v). They argue that the "FONSI and EA" that have been issued by DOE "are unlikely to survive judicial review" (Int. Pres. at 51), but any arguments regarding DOE's actions in discharge of its own programmatic responsibilities are wholly

irrelevant to whether the NRC has acted properly under § 51.22(c)(14)(v). Intervenors' arguments based on Dr. Taylor's declaration and potential impacts in Columbia (Id.) are not only contrary to the record in this proceeding (including Licensee's Written Presentation), but is contrary to the Commission's categorical determination in § 51.22(c)(14)(v) that an EIS or EA is not required for these licensed activities. 17/

F.6. Concern No. 7: Role Of Rockwell

Intervenors allege that Rockwell is "controlling every major aspect of this project" and that pressure from Rockwell is "resulting in safety corners being cut to meet deadlines." Int. Pres. at 52. Essentially, their sole support for these allegations is their characterization of several memoranda. Id. at 52-53.

The attached affidavit of Mr. McKibben discusses the Licensee's administrative and managerial control of the TRUMP-S experiments at the Alpha Laboratory, the participation of Rockwell personnel in the TRUMP-S experiments and the fact that they do so under the direction and supervision of a Licensee

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17/ Intervenors previously sought unsuccessfully to bring into this proceeding the remote and speculative question of nuclear weapon proliferation based upon hypothetical improper future use of the results of TRUMP-S research. In essence, they now seek improperly to have this proceeding consider the remote and speculative environmental impacts of disposal of wastes under the hypothetical future full-scale use of an entirely successful TRUMP-S program, rather than the limited aspects of the basic research to be conducted by Licensee.

authorized user. See Affidavit of J. Charles McKibben Regarding Rockwell Participation in TRUMP-S Experiments at the Alpha Laboratory ("McKibben Rockwell Affidavit") (Lic. Exh. 11 at ¶¶ 4-8. Mr. McKibben also discusses the provisions of the contract between Licensee and Rockwell (Id. at ¶¶ 9-13), pointing out, among other things, that Licensee is an independent contractor (Id. at ¶ 9), that Licensee remains in charge and must satisfy itself that the work is in compliance with all requirements of NRC licenses and MURR's health physics practices (Id. at ¶ 11), and that Rockwell provided a starting point for some of the Alpha Laboratory procedures, but that the final procedures were all written and approved by Licensee's staff. Id. at ¶ 12.

Then Mr. McKibben responds to each of Intervenors' allegations. He points out that the June 7 memorandum from Mr. Gabler was not a threat and stressed that health and safety considerations must remain paramount. Id. at ¶ 14. He explains that the final contract authorizing publication by Licensee, subject to a review by Rockwell of up to one year, indicates Rockwell's willingness to deviate from standard corporate contractual restrictions to allow for the academic needs of a University. Id. at ¶ 15. He also points out that Rockwell has consented to publication of the first results of the research in the Journal of the Electrochemical Society. Id. at ¶ 10. He also explains that the July 23, 1990 memo from Mr. Gabler, when read in its entirety, shows that DOE had just given permission to

use DOE supplied actinide materials in the experiments and indicates Rockwell's understanding that the work is controlled by Licensee's Isotope Use Subcommittee. Id. at ¶ 16. Finally, he describes the experiments and points out that the need to run the experiments continuously once they are begun arises from the scientific nature of the experiments, not from any "pressure" by Rockwell. Id. at ¶ 17.

F.7. Concern No. 6: Common Defense And Security

Intervenors' concern regarding "nuclear proliferation" (Int. Pres. at 53) was previously denied admission by the Presiding Officer. Licensee has responded to Intervenors' request for reconsideration of the denial in Licensee's Response to Intervenors' Request for Reconsideration of Denial of Concern No. 6 (Oct. 30, 1990).

G. Areas Of Information And Further Questions To Be Explored

1. Intervenors' Suggested Questions

At pages 55-60 of Intervenors' Written Presentation, Intervenors submit a number of areas of information and proposed questions to Licensee that "they wish the Presiding Officer to explore." Licensee has reviewed those questions and has addressed a large number of them throughout Licensee's Written Presentation. Licensee respectfully suggests that the remainder of the questions call for cumulative, irrelevant or immaterial

information and therefore should not be pursued by the Presiding Officer. See 10 C.F.R. § 2.1233(e) (1990).

2. Licensee's Suggested Questions

As indicated in the Langhorst NUREG-1140 Affidavit, Intervenors' TRUMP-S Review Panel does not identify the dispersion model and the associated weather conditions assumed in their calculations of estimated concentrations of plutonium released in the case of a fire. Lic. Exh. 2 at ¶ 34. Dr. Langhorst calculated that their dispersion model must greatly overestimate X/Q values and/or that their weather assumptions must be very unrealistic. Id. at ¶¶ 36-37. Similarly, Mr. Osetek found that the TRUMP-S Review Panel calculations seem to be overestimating the plutonium concentrations resulting in the case of a fire. Lic. Exh. 1 at ¶ 29. Licensee suggests that the Presiding Officer ask the Intervenors to provide a copy of their calculations and an identification of all of their assumptions, including, but not limited to, their dispersion model and assumed weather conditions.

H. Intervenors' Request For Hearing

At pages 59-60 of Intervenors' Written Presentation, they request:

1. "Pursuant to § 2.1235 ... an opportunity for oral presentations, including testimony, and an opportunity to cross-examine, and to propose

questions for the Presiding Officer to pose to the witnesses."

2. Pursuant to § 2.1209, that the Presiding Officer issue subpoenas to certain witnesses.

3. Pursuant to § 2.1209(k), that the Presiding Officer recommend to the Commission that Intervenors be permitted to cross-examine.

With the exception of the reference to cross-examination, Intervenors' first request is apparently a suggestion that the Presiding Officer schedule an oral presentation of the type contemplated by § 2.1235.

However, under the circumstances of this proceeding, Licensee believes that scheduling an oral presentation would be contrary to the explicit guidance provided by the Commission to presiding officers. In adopting Subpart L, the Commission stated:

> As proposed, the informal hearing procedures differ substantially from the existing regulations in 10 CFR Part 2, Subpart G that govern the conduct of NRC formal, trial-type adjudications. Specifically, the presiding officer is to receive and to make his or her determination based solely upon a "hearing file" compiled by the NRC staff, which need not be a party to the proceeding, and written presentations by the parties. There would be no discovery. Only if the presiding officer found that the written presentations were insufficient to create an adequate record would oral presentations be permitted.

54 Fed. Reg. 8269 (Feb. 28, 1989) (emphasis added).

Licensee believes that Licensee's Written Presentation, together with the earlier Licensee's October 30 Submittal, provides much more than the "adequate record" contemplated by the Commission. It is an overwhelming record that requires no further amplification.

Licensee acknowledges that when Subpart L was proposed the Commission suggested the possibility of an oral presentation "when the presiding officer is convinced that such a presentation is the most expeditious way to clarify specific ambiguities or controversies arising from the written presentations." 52 Fed. Reg. 20089, 20091 (May 29, 1987). However, in Licensee's view, that is not the present state of the record. Licensee believes that there is no specific ambiguity or controversy that requires clarification, and Intervenors have identified none. If they attempt to do so in their rebuttal and Licensee does not satisfactorily address them in his response, then the Presiding Officer might consider whether an oral presentation would be helpful. Even then, in view of the technical matters here at issue, Licensee strongly believes that the most effective manner of resolving any lingering concern that the Presiding Officer may have would be to have the parties respond to written questions, as contemplated by § 2.1233. The Commission stated that it "contemplates that oral presentations or oral questioning would not be necessary in the vast majority of cases." Id. That view is certainly applicable to this proceeding.

Since it is Licensee's belief that an oral presentation is not now required and is not likely to be required in the future, it is premature to consider what type of oral presentation might be held if the Presiding Officer determines to proceed beyond written presentations and questions. However, it should be noted the Commission stated that: "... such [oral] presentations generally would be similar to the nontestimonial oral arguments held with respect to motions in formal adjudicatory proceedings . . . ." Id. The Commission left open the possibility of oral presentations by a presenter under oath, and even of questioning of affiants, but these would appear to be less preferred choices. In particular, the questioning of witnesses was to be considered "when the veracity or demeanor of such individuals is at issue . . ." (id.), an unlikely situation when there is a conflict of expert opinion on technical issues, rather than controversy on factual details.

To the extent that, in the event an oral presentation might be held, Intervenors are seeking an opportunity to cross-examine, they seem to realize that this is not permissible under § 2.1235. As the Commission has stated; "Free-ranging cross-examination would not be allowed." Id. Thus, their third request is that the Presiding Officer recommend to the Commission under § 2.1209(k) that they be allowed to cross-examine. However, such recommendation is to be made by the Presiding Officer only if he "reaches the conclusion that a full and fair airing of the issues in the proceeding requires that additional

procedures should be used, such as discovery or allowing the parties to cross-examine witnesses . . . . The Commission contemplates that this will not be appropriate in the vast majority of cases. See generally, Sequoyah Fuels Corp. (Sequoyah UF_6 to UF_4 Facility), CLI-86-17, 24 NRC 489 (1986)." Id. In that decision, which involved an informal proceeding before the adoption of Subpart L, the Commission stated:

> questions about the adequacy of operational procedures and equipment are largely technical questions, the resolution of which lie in engineering and scientific submissions that can be evaluated fully and fairly without a trial-type presentation.

Sequoyah Fuels Corp. (Sequoyah UF_6 to UF_4 Facility), CLI-86-17, 24 NRC 489, 496 (1986). Precisely for those reasons, the Presiding Officer should not consider recommending cross-examination to the Commission in this proceeding.

Finally, Intervenors' suggestion that individuals be subpoenaed is both unwarranted and woefully premature. The question of subpoenaing an individual would arise only in the unlikely possibility that the Presiding Officer decides that an oral presentation is needed, that it should include the questioning of witnesses, and that a party refuses to present a witness requested by the Presiding Offic

I. Conclusion

Licensee's Written Presentation has amply demonstrated, among other things, that:

1. Licensee has satisfied all applicable NRC licensing requirements.

2. Licensee has adequately answered each of the admitted areas of concern:

a. The probability of a severe fire at the Alpha Laboratory is extremely low, and several highly conservative analyses demonstrate that any potential off-site dose to the general public from such an improbable event would be negligible.

b. The Alpha Laboratory is well designed and constructed and its equipment is well designed, installed, inspected and tested. There is no regulatory requirement for a "buffer zone," and materials licensees are not required to control an area surrounding the licensed activities to reduce public exposure in the event of an accident or to establish emergency planning zones.

c. Licensee's personnel are competent, knowledgeable and well trained. There are excellent administrative and managerial controls in place.

d. The Alpha Laboratory benefits from the established MURR Facility Emergency Plan within which the local fire department and MURR have participated in exercises.

e. Under the categorical exclusion of 10 C.F.R. § 51.22(c)(14)(v) the NRC Staff did not have to prepare either an environmental assessment or environmental impact statement for the subject license amendments.

f. The Licensee is in control of the work under the two materials licenses. Instead of constituting a problem, the contractual relationship with Rockwell is an excellent

example of an industrial/academic research collaboration to answer challenging technical questions in the public interest.

3. Intervenors' arguments are based on unsupported generalities, are riddled with errors and misrepresentations and do not present any facts justifying any modifications, suspension or revocation of the subject license amendments.

Accordingly the Presiding Officer should uphold the issuance of the subject license amendments.

Respectfully submitted,

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