

October 18, 2001

MEMORANDUM TO: Eugene V. Imbro, Acting Chief
Operational Experience and
Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

THRU: Patrick M. Madden, Section Chief /RA/
Non-Power Reactors and Financial Section
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FROM: Alexander Adams, Jr., Senior Project Manager /RA/
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SUBJECT: NRC DISCUSSION OF COMMENTS RECEIVED ON THE
ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF
MISSOURI-COLUMBIA CONSTRUCTION PERMIT RECAPTURE
AMENDMENT (TAC NO. MB0850)

Please find enclosed "Discussion of Comments Received on the Environmental Assessment for the University of Missouri-Columbia Construction Permit Recapture Amendment." By letter dated December 27, 2000, as supplemented on April 12 and June 6, 2001, the University of Missouri-Columbia (UMC or the licensee) submitted a request to change the expiration date of Amended Facility License No. R-103 for the University of Missouri-Columbia Research Reactor (MURR) from November 21, 2001, to October 11, 2006, to recapture the period of facility construction.

The State of Missouri Department of Natural Resources requested that the Environmental Assessment (EA) be circulated for public comment. In light of the request, the NRC determined to exercise its discretion to circulate the EA for a 30-day public comment period and on August 1, 2001, the Notice of "Request for Public Comment, Environmental Assessment and Finding of No Significant Impact" appeared in the *Federal Register* (66 FR 39803). During the comment period, the staff received 12 comment letters.

All of the comments have been reviewed by the NRC staff. The enclosure consists of the incoming comment letters and the staff's response to the comments. The majority of the comments received related to the operation of the reactor and other issues not related to the EA or the license amendment request. These comments will be addressed separately by the staff. Each comment was assigned a specific alpha-numeric identifier (e.g., A1) for ease of

tracking the staff's considerations of the comment and the public's understanding of how the comment

was dispositioned. The identifier is typed in the margin of the correspondence at the beginning of the discussion of the comment. The responses are organized by topic and like-kind comments were organized together with a common response. In response to relevant comments, several changes were made to the text of the EA to clarify issues raised in the comments.

The EA contains a brief discussion of the comments and the accession number of this memorandum. Members of the public can view the comment letters and the staff's discussion and responses in ADAMS or by contacting the Public Document Room. Each party that provided comments will be sent a copy of the comment letters and the staff's discussion and responses. In addition, each party that provided comments will be sent a copy, under separate cover, of the staff's response to those comments not related to the EA.

Enclosure: As stated

Docket No. 50-186

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Attachments: As stated

Docket No. 50-186

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Discussion of Comments Received
on the Environmental Assessment
for the University of Missouri-Columbia
Construction Permit Recapture Amendment
Docket No. 50-186
License No. R-103

By letter dated December 27, 2000, as supplemented on April 12 and June 6, 2001, the University of Missouri-Columbia (UMC or the licensee) submitted a request to change the expiration date of Amended Facility License No. R-103 for the University of Missouri-Columbia Research Reactor (MURR) from November 21, 2001, to October 11, 2006, to recapture the period of facility construction. This action is not unique and is consistent with prior precedents.

The State of Missouri Department of Natural Resources requested that the Environmental Assessment (EA) be circulated for public comment. In light of the request, the NRC determined to exercise its discretion to circulate the EA for a 30-day public comment period and on August 1, 2001, the Notice of "Request for Public Comment, Environmental Assessment and Finding of No Significant Impact" appeared in the *Federal Register* (66 FR 39803). During the comment period, the staff received 12 comment letters.

The NRC's Public Electronic Reading Room (PERR) is found on the Internet at the following web address: <http://www.nrc.gov>. From this site, the public can gain access to the NRC's Agencywide Document Access and Management System (ADAMS), which provides text and image files of NRC's public documents. Documents concerning the MURR, including comments received on the EA, can be found under docket number 05000186. Persons who do not have access to ADAMS or who have problems in accessing the documents located in ADAMS may contact the PDR reference staff at 1-800-397-4209, 301-415-4737 or by email at pdr@nrc.gov. Documents can also be examined, or copied for a fee, at the NRC's Public Document Room found at One White Flint North, 11555 Rockville Pike (first floor), Rockville, MD.

All of the comments have been reviewed by the NRC and are identified in Attachment 1. The majority of the comments received related to the operation of the reactor and other issues not related to the EA or the license amendment request. These comments will be addressed separately by the staff. Each comment was assigned a specific alpha-numeric identifier (e.g., A1) for ease of tracking the staff's considerations of the comment and the public's understanding of how the comment was dispositioned. The identifier is typed in the margin of the correspondence at the beginning of the discussion of the comment. The staff response to the specific comments is provided in Attachment 2; the responses are organized by topic and like-kind comments were organized together with a common response. In response to relevant comments, several changes were made to the text of the EA to clarify issues raised in the comments.

Enclosure 1

NRC Staff's Discussion of Comments Received on the Environmental Assessment for the
University of Missouri - Columbia Construction Permit Recapture Amendment

1. General Comments Opposed to the Amendment Request and Continued Operation of the Reactor

Comment: Three commenters stated their opposition to the license amendment request to recapture the reactor's construction period (B1, F1, L1). One commenter requested that MURR be shut down (B2). One commenter requested that any decision on this extension and/or renewal be deferred until such time as there is administrative stability at MURR and pending a total and complete re-examination of the fundamental findings of the "Environmental Assessment and Finding of No Significant Impact" (G10, G25). Another stated it is way past time to retire this reactor (L14). One commenter requested a denial of the MURR license (F8).

Response: The comments are general in nature and do not provide new information related to the NRC's EA and finding of no significant impact. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

2. General Comments in Support of the Amendment Request and Continued Operation of MURR

Comment: One letter contained comments that express general support for the license amendment request to recapture the reactor's construction period (C1). A commenter expressed support for the continued operation of MURR (C4).

Response: The comments are general in nature and do not provide new information related to the NRC's EA and finding of no significant impact. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

3. General Comments that NRC Prepare an Environmental Impact Statement

Comment: Nine letters contained comments that the Nuclear Regulatory Commission should prepare an Environmental Impact Statement for the proposed amendment. Some of the letters stated that the proposed license amendment was a major Federal action (A1, B3, D1, E1, F3, H2, J2, K2, L2).

Response: 10 CFR Part 51 contains environmental protection regulations applicable to NRC's licensing and related functions. 10 CFR 51.20 contains criteria for, and identification of, licensing and regulatory actions requiring environmental impact statements. The issuance of a license amendment to recapture construction permit time is not listed as an action requiring an environmental impact statement. The regulation states that an environmental impact statement will not be required unless the proposed action is a major Federal action significantly affecting the quality of the human environment. The period of MURR's license began with the issuance of the construction permit. The requested license amendment recaptures the period of time (about five years) when the construction permit was in effect, before operation of the facility. The amendment would give the licensee an operating period of 40 years, which is permitted under the regulations [10 CFR 50.51(a)]. The evaluations associated with the construction permit and operating license contained no restrictions on the term of the license. The requested license amendment is not an action to issue a new license or an action to renew a license which would result in a new license term. The requested license amendment is not an action that would change the design or operation of the facility. The staff's technical review focuses on ensuring that the requirements of the regulations and license will continue to be acceptably satisfied. This type of amendment is not unique and has been issued to numerous power and non-power reactors. In none of these other cases has the amendment been determined to be a major Federal action significantly affecting the quality of the human environment. None of the comments contain information that would change this conclusion for the MURR amendment. Therefore, in accordance with 10 CFR Part 51, an Environmental Impact Statement is not required to be prepared. The comments do not provide new information related to the NRC's EA and finding of no significant impact. Therefore, no changes to the EA were made as a result of these comments.

4. General Comments that the License Amendment Request will have No Significant Environmental Impact

Comment: One commenter noted that the proposed license amendment will not result in a significant increase in environmental impacts or impact to human health or the environment (C3).

Response: The comment is general in nature and does not provide new information related to the NRC's EA and finding of no significant impact. Therefore, no further evaluation was required, and no changes to the EA were made as a result of this comment.

5. Significant Benefits to Continued Operation of the MURR

Comment: One letter noted significant benefits to the continued operation of the MURR for research and the production of radioisotopes. It was stated that MURR's educational role is also important (C2).

Response: The NRC noted in the alternatives to the proposed action that if the facility was permanently shut down that the benefits of education and research conducted by the facility would be lost. The comments do not provide new information related to the NRC's EA and finding of no significant impact. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

6. Use of High-Enriched Uranium

Comment: Eight commenters raised general concerns about the use of high-enriched uranium (HEU) in the MURR reactor. Some opposed the proposed amendment or continued operation of the reactor because the reactor used HEU (A2, B5, D7, E3, F5, I1, J3, L3).

Seven letters raised concerns that the use of HEU in the MURR was a terrorism or sabotage security risk (A2, B6, D8 E4, F6, I2, J4). Three commenters raised a concern about the security of the transportation of HEU (A2, I3, J4). A commenter asked “are adequate protections in place at UMC to safeguard against the threats posed by terrorists (E7)?” Another asked “if the NRC were to decide to extend the MURR license for an additional five years, would the Commission require that the licensee provide enhanced safeguards protection and surveillance at the reactor site during that period (A4)?”

One commenter stated that it is inexcusable for an alleged “research reactor” to produce bomb-grade uranium and that the NRC should immediately prohibit MURR from enriching uranium (G20).

A commenter asked “how frequently does the campus security department and/or the reactor staff conduct drills at MURR designed to prevent the theft or diversion of the HEU fuel? How recently has the NRC evaluated such a drill? Has there ever been a surprise force-on-force test at the site, and if so, were deficiencies identified (A5)?”

A commenter asked “does the licensee plan to redesign and convert its reactor to use fuel with lower enriched uranium during the requested five-year extension? Or has the University been able to justify that it is entitled to a continued “unique purpose” exemption from the NRC’s requirement that all domestic non-power reactors were to convert from the use of HEU (as per CFR 50.64, published in the *Federal Register*, 2/25/86)? Are there not advanced low-enriched fuels to which this reactor could be converted (A3)? How much weapons-grade uranium is currently in use and stored at MURR (A6)?” Another asked “has the UMC reactor met the criteria for the continued use of this dangerous material (E5)? What are the alternatives to continued use of highly-enriched uranium at the reactor (E6)?”

Response: These comments are related to the operation of the reactor and other issues not related to NRC’s EA. These comments do not provide new information related to the EA and finding of no significant impact. The NRC will address these comments in a separate document. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

7. Operational Safety Issues

Comment: Eleven letters contained comments related to operational safety issues with regard to the MURR, administrative issues, and specific past events. Comments with regard to MURR include:

- the age of the facility (D9, F2, L7)
- reliability of computer technology (L11)

Comments with regard to administrative issues include:

- the Director has been involved in considerable controversy of a highly-visible public nature (G1)
- the operations, from a public perspective seem to be poorly supervised (G2)
- the Director has resigned, while filing defamation lawsuits against former employees (E15, G3, J14)
- there have been allegations of discrimination and retaliation or stifling of concerns of employees ("anti-whistleblower) which have warranted investigation by the NRC (E13, G5, J12)
- there is a "chilling effect" at the facility where administrative actions are taken against those who have reported problems (G7)
- the personnel record of this facility is dismal (G6) and the MURR continues to be plagued with significant personnel problems (B7, I5)
- the departure of the key players and trouble the licensee has finding qualified employees is a safety issue; facility has high turnover rate (B7, D10, G23, L6)
- NRC must determine if MURR has capable staff on hand to operate this facility, and if not, ascertain what the plans are to acquire such personnel (G24)
- there should be an annual assessment for the need of research nuclear reactor facilities (H1)
- there should be an annual review of operation procedures and staffing (H1)
- a stakeholder advisory panel should be formed (H3)
- management problems certainly increase the chance of a serious accident at the reactor and increase the danger to the surrounding community (J15)
- there is a dire need for strict standards concerning the operation of MURR (K1)

Comments with regard to specific past events include:

- two violations in the refueling area (E12, J11)
- two preventable accidents that could have caused great harm to persons and the environment (B4)
- serious violations, in conjunction with the multiple personnel issues at the reactor, require careful attention from the NRC (E16)
- employees have reported issues directly related to releases-potential or real-of radioactive emissions to the environment (G8)
- the incident of June 12, 2000, where a control blade was removed from the reactor without first removing two fuel elements from the core seems to be a good example of personnel weakness (A19)

- the incident of April 12, 2000, where a fuel element was placed in the wrong storage location creating a 400 rem/hour radiation field at a location where primary shielding was removed to inspect the pool liner also points to inadequate staffing (A20)

One commenter stated that the NRC must take into account the past record of operations of this facility (G9). Another asked "to what extent will the NRC evaluate recent operating problems at the plant in determining whether to issue a 5-year extension of the operating license? For example, is it of concern to the NRC that two separate violations occurred in the critically important refueling area within just two months --- one on April 12, and one on June 12, 2000? Is it of concern that allegations of discrimination and retaliation were filed by a reactor employee who had raised safety concerns; that other former employees have raised concerns about the level of commercial activity and about related conflicts of interest at MURR; and that a defamation lawsuit, filed on June 25 by the immediate past director, is pending against two retired MURR scientists (Missouri Lawyers Weekly, 7/9/01) (A17)?"

Response: These comments are related to the operation of the reactor and other issues not related to NRC's EA. These comments do not provide new information related to the EA and finding of no significant impact. The NRC will address these comments in a separate document. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

8. Financial Issues

Comment: Six commenters brought up financial issues related to MURR:

- the facility itself is engaged in commercial operations of uncertain ethical standards and practices (G4)
- employees have raised concerns about the level of commercial activity and related conflicts of interest (E14)
- the facility stays open due to its commercial ventures, the University of Missouri-Columbia could not afford to provide the necessary financial support to maintain this operation (G11)
- commercial operations are the basis of problems at the facility (G12)
- commercial ventures need to have distinct timetables when projects are expected to be completed (G13)
- the NRC must determine whether MURR is a “private” or “public” reactor, and whether its mission as a “research reactor” is compromised by commercial contracts (G14)
- the NRC must determine if the commercial ventures of MURR are appropriate for a research facility, in light of the difficulties caused by the commercial ventures (G15)
- the citizens of Missouri must pay the bill for this reactor now and in case of accidents and widespread contamination (D11)
- there are safety and cost concerns (which are prompting closures of research reactors at other Universities) (L5)
- currently MURR has become a commercial facility raising questions of conflict of interest (J13)

One commenter asked whether it is of concern that other former employees have raised concerns about the level of commercial activity and about related conflicts of interest at MURR (A17)?

A commenter asked “is the University, as a nonprofit educational institution, required to post a bond to cover the costs of decommissioning the reactor (as per 10 CFR 140)? If not, what federal or state agency would be held responsible for those costs? Has the University provided the NRC with a decommissioning plan (A33)?”

A commenter asked “has the University of Missouri-Columbia been required to submit to the NRC a financial analysis of its ability to operate and maintain the reactor safely during the proposed five-year license extension? If so, to what extent does it rely upon the State Legislature to appropriate funds (A32)?”

One commenter asked “if Congress fails to renew the Price-Anderson Act this year or reduces the amount of the federal insurance subsidy, will that affect the University? Does the University pay annually for insurance to cover the liability of an accident at MURR? What are the estimated costs of a major accident (A34)?” A commenter asked would Missouri tax-payers be liable if an accident were to occur during the transport of MURR wastes (A11)?

Response: These comments are related to the operation of the reactor and other issues not related to NRC’s EA. These comments do not provide new information related to the EA and finding of no significant impact. The NRC will address these comments in a separate document. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

9. Alternatives to the Proposed Action

Comment: One commenter stated that we should build safe alternatives such as solar powered installations (L13).

Response: There is no solar powered alternative to a non-power reactor. This comment does not provide new information related to the NRC's EA and finding of no significant impact. Therefore, no further evaluation was required, and no changes to the EA were made as a result of this comment.

10. Facility Location Issues

Comment: Five letters commented that MURR is located in a large growing urban area (B8, G16, I4, J1, L12). One letter stated that three hospitals and the campus and dormitories are in close proximity (J1). In addition, a commenter points out that on football weekends there are as many as 60,000 additional persons within ½ mile of MURR (G17).

Response: These comments are not related to NRC's EA. These comments do not provide new information related to the EA and finding of no significant impact. The NRC will address these comments in a separate document. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

11. Health Physics Issues

Comment: Two commenters had a general concern about airborne and liquid effluents from the facility (B13, J5).

Response: Airborne and liquid effluents from the facility are limited by the regulations and/or technical specifications. The licensee reports information concerning these effluent releases to the NRC in their annual report. The NRC inspection program reviews release data to ensure that it meets the requirements of the regulations and the facility license. In addition, release procedures, equipment used for the release of effluents, equipment and procedures used to measure releases, and environmental monitoring are reviewed as part of the inspection program. Also, during facility inspections, NRC inspectors confirm that unmonitored release paths to the environment do not exist. These comments do not provide new information related to the NRC's EA and finding of no significant impact. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

Comment: A commenter asked "what are the consequences of contamination from regular operation or of accidental releases to the air and water (J6)."

Response: The consequences of MURR operation are well within the regulatory limits (i.e., 10 CFR 20.1201 for workers, and 10 CFR 20.1301 for members of the public). Accident consequences have been reviewed by the NRC staff and were found to be within regulatory limits. This comment does not provide new information related to the NRC's EA and finding of no significant impact. Therefore, no further evaluation was required, and no changes to the EA were made as a result of this comment.

Comment: A commenter asked "is the licensee claiming that argon-41 is the only radioactive gas present in significant quantities in the building's atmosphere --- that is, that virtually no tritium or noble gases escape from the reactor vessel and the open pool into the building? Does the NRC find it surprising that only a tiny percent of the tritium (radioactive hydrogen) created as a tertiary fission product in the reactor fuel or generated in the coolant would have escaped from the reactor into the building, and on into the environment (A13)?" On the average, how frequently are gases vented to the environment and for what duration (A16)?" A commenter asked "is it correct that MURR's liquid wastes are discharged only to the sanitary sewers --- that none drains or is released into nearby Hinkson Creek (A30)?"

Response: Although other radionuclides are present in the air of non-power reactor buildings, argon-41 represents the principal radionuclide produced by neutron interaction with the air.

The amount of argon-41 and other radioactive gases released by MURR discussed in the EA is within regulatory limits. The NRC inspection program considers the licensee's control of effluents including measurement equipment, procedures, environmental monitoring and pathways to the environment. MURR's performance in this area has been acceptable. The EA will be modified to clarify that the airborne effluent released from MURR is characteristic for operation of such a research reactor.

The ventilation system continually exhausts, monitors and controls air from the containment building as well as from the various laboratories in other portions of the support building. Alarm

levels are set and automatic actions are taken upon the detection of above normal radiation in the exhaust.

All radioactive liquid effluents from MURR are discharged into the sanitary sewer. The EA will be modified to clarify this point. The radioactive material content of all liquid effluent releases is determined prior to release to the sanitary sewer and are within acceptable regulating limits.

The two clarifications discussed above will be made to the EA. The other comments do not provide new information related to the NRC's EA and finding of no significant impact. Therefore, no further evaluation was required, and no additional changes to the EA were made as a result of the other comments.

Comment: A commenter asked "is tritium created as a byproduct of MURR research on boron neutron capture therapy (A14)?" The commenter also asked "what, briefly, is the design of the equipment installed in 1995 that is used to detect and sample the continuous flow of gases in the gas channel of the exhaust stack, during the venting of the gases to the environment? Is the continuous flow of tritium and noble gases detected by this new equipment (A15)?" A commenter asked "are the University's personnel training and radiation protection programs adequate, including personnel oversight, the use of equipment and instrumentation, and the control of licensed materials (A18)?"

A commenter asked "how many reactor or contractual employees participate in a typical refueling (A21)? What was the highest radiation dose to which an employee was exposed during the past year as the result of the refuelings (A22)? To what extent does the NRC oversee the amount of radiation to which MURR employees are exposed during the weekly refueling operations (A23)? What is the average duration during which MURR irradiated fuel is stored on site before it is shipped to a DOE storage facility, in South Carolina or Idaho? Are reactor personnel exposed to the stored fuel (A24)? Because the reactor has been operating for 36 years, have radioactive corrosion products (which emit highly penetrating gamma radiation) accumulated in and on the piping and other components? If so, has this increased the radiation dose of the maintenance personnel? Are chelating agents used at MURR to dissolve the corrosion products (A25)?"

Response: These comments are related to the operation of the reactor and other issues not related to NRC's EA. These comments do not provide new information related to the EA and finding of no significant impact. The NRC will address these comments in a separate document. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

12. Issues With High Level Waste

Comment: Eight commenters were concerned about high level waste (B10, D6, E2, E8, F4, G19, J7, K3, L4). It was stated that there is no safe place on earth to store radioactive waste for the extremely long periods of time in which the material remains hazardous to human health (G19). Several commenters referred to discussions between the State of Missouri and the Department of Energy (DOE) that resulted in spent fuel shipments from MURR to DOE being postponed (A27, G18, J8). A commenter asked “what are the consequences to MURR and Columbia if in the future South Carolina refuses to accept MURR’s waste (J9).” One asked “what assurances can the NRC provide to the State of Missouri that the University will be permitted to continue sending its irradiated fuel plates to a federally licensed storage facility? Or is it conceivable that these wastes would have to remain in Missouri for an indefinite period (A27)?”

Response: The fuel used at university non-power reactors is provided by and is owned by DOE. DOE has informed the NRC (letter from R.L. Morgan of DOE to H. Denton of NRC dated May 3, 1983) that DOE has determined that universities and other government agencies operating non-power reactors have entered into contracts with DOE providing that the DOE retains title to fuel and is obligated to take the spent fuel and/or high-level waste for storage or reprocessing. Final disposition of the fuel and/or high level waste would be an action taken by DOE. The timing of shipments is a matter between DOE and the licensee and this is beyond the scope of the proposed license amendment. The storage of fuel on site must meet the requirements of the regulations and the facility license, including special nuclear material possession limits. These requirements have established an acceptable safe storage and use capability at MURR. The licensee has not requested any changes in special nuclear material possession limits or in the use of reactor fuel. If spent fuel shipments were delayed from MURR for some reason, the licensee would still be required to adhere to their license. Changes in special nuclear material possession limits would require the licensee to apply for a license amendment. The EA will be modified to clarify the number of fuel shipments made in the past. No significant change in the number of fuel shipments are predicted to occur during the recapture period.

The clarification discussed above will be made to the EA. The other comments do not provide new information related to the NRC’s EA and finding of no significant impact. Therefore, no further evaluation was required, and no additional changes to the EA were made as a result of these other comments.

13. Issues With Low Level Waste (LLW)

Comment: Three commenters raised a concern that MURR might be required to store low level radioactive waste on site for many years because of the closure of commercial waste burial sites (B11, D4, L4). Two commenters expressed general concern about the problems posed by radioactive waste (E2, K3). One commenter asked “since no low-level waste burial facility has yet to be built or even sited for the disposal of ‘low-level’ radioactive wastes generated in the Midwest Compact states, what fall-back position does the University have for the disposal of its low-level wastes when the Barnwell, South Carolina, facility no longer accepts wastes from states outside the Southeastern Compact (A28)?” The commenter also asked “if the Barnwell facility were to be closed to MURR’s irradiated and surface-contaminated low-level wastes, is it possible the NRC or other Federal agency would mandate that a storage or disposal site would have to be established in Missouri (A29)?”

Response: The licensee normally ships low level radioactive waste to a third party that processes and consolidates the waste and then ships it to a burial site for final disposal. Waste from MURR is disposed of at Envirocare in Utah and the Barnwell facility in South Carolina.

South Carolina recently joined the Atlantic Compact (with New Jersey and Connecticut) and plans to gradually phase out waste disposal from out-of-compact States. After 2008, no out-of-compact waste will be accepted. Envirocare in Utah accepts waste from generators in all States, but is currently authorized to only accept Class A waste. Thus, MURR is able to dispose of all of the waste that it generates today, and will be able to continue to ship all or most of its LLW to Envirocare in the future. Envirocare is expected to remain open indefinitely. Therefore, it is reasonable to assume that the University of Missouri will be able to dispose of low level radioactive waste in the future.

Whether or not the licensee would be required to store radioactive waste on site in response to some future action by outside parties is not within the scope of this amendment. In addition, the availability (or lack thereof) of a site for the disposal of radioactive waste is not within the scope of the requested amendment. However, even if, for unforeseen reasons, MURR could not dispose of its waste in the future, the impacts would be insignificant. The storage of any radioactive material at the University of Missouri would need to meet the requirements of the license and regulations. These requirements establish and acceptably ensure safe storage conditions at MURR. Interim storage of LLW is performed by MURR now prior to shipment to disposal sites, and LLW is only a small part of all of the radioactive materials that fall under the scope of the license and that require control to ensure that doses to workers and members of the public are within the limits in the regulations.

With respect to NRC or another Federal agency mandating that a storage or disposal facility be established in Missouri, if Barnwell were to close, Federal agencies do not have that authority. It rests with the Central Interstate Low-Level Radioactive Waste Compact, in accordance with the Low-Level Radioactive Waste Policy Act. NRC staff is not aware of any plans by Congress to change the existing law.

These comments do not provide new information related to the NRC’s EA and finding of no significant impact. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

14. Issues With the Use of Graphite

Comment: Five letters contained comments about the use of graphite in the MURR (B12, E11, F7, G21, L8). A concern expressed was that graphite is combustible (B12, F7, G21). It was stated that graphite fires are difficult to extinguish (B12). One commenter asked if the graphite could burn and once burning if it would be hard to extinguish (D2)?

A commenter asked “has the University or the NRC tested the graphite in MURR to measure any potential Wigner energy, in calories per gram? What analyses have been performed of potential rise in graphite temperature due to Wigner energy release, and the potential for graphite ignition and contribution to fuel melting, particularly in a loss-of-coolant accident (A10)?”

One commenter stated that the problems associated with the use of graphite in the MURR reactor have not been sufficiently investigated by NRC (E11). A commenter asked “what lessons were learned regarding the potential of a graphite fire as the result of the April 26, 1986, Chernobyl explosion in the Soviet Union and the 1957 Windscale reactor fire in England? To what extent are these lessons relevant to MURR (A8)?”

A commenter asked if the graphite shield at MURR is similar to the one at the Chernobyl plant (D3)? A commenter asked “does the licensee intend to continue to use graphite in MURR, both as a neutron reflector and in the thermal column (A7)?”

Response: These comments are related to the operation of the reactor and other issues not related to NRC’s EA. These comments do not provide new information related to the EA and finding of no significant impact. The NRC will address these comments in a separate document. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

15. Issues Concerning the Transportation of Waste

Comment: Six commenters were concerned about the transportation of radioactive waste (B14, D5, E9, G18, J10, L9). There were concerns that transportation poses risk for the release of radioactivity (B14). One commenter stated that the NRC must thoroughly characterize the risks associated with the transport of additional waste during the proposed extension period (E10).

Response: The proposed license amendment request would not significantly change the amount or types of waste produced at or transported from MURR. Wastes are transported in accordance with NRC and Department of Transportation requirements. The NRC inspection program considers transportation of radioactive materials by reviewing records of shipments and licensee procedures. Inspectors also observe shipments in progress during inspections. MURR has not had any recent problems in this area. Emergency plans are in place to respond to a transportation incident. These comments do not provide new information related to the NRC's EA and finding of no significant impact. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

16. Emergency Planning Issues

Comments: Two commenters raised general concerns about the ability of MURR to handle emergency situations (F9, L10). One commenter asked “in the event of a radiological accident at MURR, does the University medical complex have isolated rooms dedicated to radioactively contaminated patients? If so, for how many patients (A26)?” Other commenters indicated that the local hospitals and medical facilities are not equipped to handle a large number of irradiated patients (B9, L10). One commenter was concerned that a proper evacuation of the facility could not be conducted in a timely manner. Another commenter was not aware that MURR has any fire response and evaluation plan on file with NRC specifically regarding the hazards associated with the use of graphite (G22). One commenter asked “does MURR have a current, NRC - approved fire response plan and evacuation plan for a graphite fire that adequately reflects the facts that if water or carbon dioxide were to be used to fight a graphite fire, combustible gases (such as carbon monoxide or hydrogen) could cause an explosion, and that graphite fires are notoriously difficult to extinguish? Does the response plan identify which materials are to be used to suppress the fire without increasing the risk of an explosion (A9)?”

Response: These comments are related to the operation of the reactor and other issues not related to NRC’s EA. These comments do not provide new information related to the EA and finding of no significant impact. The NRC will address these comments in a separate document. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.

17. Other Comments

Comment: A commenter asked if UMC is communicating with the NRC about the possibility of tripling the size of MURR (A31)? Another asked what this increase in size will mean for the city of Columbia which surrounds this facility (J16)?

One commenter asked “have MURR irradiated fuel plates ever been tested in a hot-cell laboratory to assess the integrity of the aluminum cladding --- for example, to determine to what extent pin-hole leaks may exist through which particulate and gaseous fission products may escape? If such tests have been performed, when did the most recent one occur, at which laboratory, and with what results (A12)?”

Response: These comments are related to the operation of the reactor and other issues not related to NRC’s EA. These comments do not provide new information related to the EA and finding of no significant impact. The NRC will address these comments in a separate document. Therefore, no further evaluation was required, and no changes to the EA were made as a result of these comments.