

memorandum

Carlsbad Area Office
Carlsbad, New Mexico 88221




DATE: September 29, 1998
REPLY TO: CAO:OWDO:MRB 98-1421 / UFC 1100
ATTN OF:
SUBJECT: Review of Final MURR WIPP-Eligibility Document

TO: Carol Irvine, DOE/OAK

The Carlsbad Area Office (CAO) has reviewed the document, *WIPP Eligibility Determination of TRUMP-S Wastes*, and the associated attachments provided in your September 11, 1998 memorandum. This document was prepared to support the position that the transuranic (TRU) waste generated at the University of Missouri Research Reactor (MURR) during the TRUMP-S (TRU Management through Pyropartitioning Separation) project activities was generated in support of defense program activities.

Based on our review of this document and comparison of this document to the guidance contained in the *Carlsbad Area Office Interim Guidance for Ensuring That Waste Qualifies for Disposal at the Waste Isolation Pilot Plant* (dated February 13, 1997), the CAO concurs with the determination that the MURR TRU waste is eligible for WIPP disposal.

If you have any questions concerning this determination, please contact me at (505) 234-7476.


Michael R. Brown
Waste Characterization Manager
Carlsbad Area Office

cc:
K. Hunter, CAO
R Stroud, CAO
K. Quintoriano, DOE/OAK
J. Harvill, CTAC



WIPP Eligibility Determination of TRUMP-S Wastes

1.0 TRUMP-S Overview

The TRUMP-S (TRansUranic Management through Pyropartitioning Separation) project was a series of experiments designed to demonstrate the feasibility of a new process for separating actinides from PUREX process residue. The experiments were performed at the Missouri University Research Reactor (MURR), contracted by Boeing North American (formerly Rockwell International). Most of the funding for the project was provided by Japanese entities, the Central Research Institute for the Electric Power Industries of Japan (CRIEPI) and Kawasaki Heavy Industries (KHI). The Department of Energy (DOE) generated a Private Sector Initiative contract with Boeing, under which DOE provided transuranic materials and a limited amount of funding and agreed to dispose of the resulting mixed low level and mixed transuranic wastes in exchange for complete reporting on, and the right to use, the results.^{1, 2, 3, 4}

The ultimate goal of the TRUMP-S technology was to achieve high-efficiency separation of long-lived actinides from high-level wastes; the technology had promise for improved resource utilization and significant reduction in the volume of defense waste requiring disposal. The separated actinides could be used as reactor fuel, generating power while transmuting the actinides to noble metals.⁵ The remaining wastes would be short-lived, with smaller volumes, simplifying repository needs. There were several separation methods being researched at the same time as TRUMP-S, but none that directly addressed converting PUREX waste to reactor fuel.⁶ One of the features that made this process attractive was that it could be used to treat existing and future PUREX wastes from Defense and commercial reprocessing activities.

The TRUMP-S experiments have now ended, and there are currently no plans to continue the research. All parties involved decided not to pursue the work into the engineering scale demonstration at this time. On the part of the U.S. parties, this was primarily due to changing national policies for nuclear waste management. The main approach for disposal of high-level waste is vitrification/encapsulation without separation of long-lived actinides. The major benefits of using the TRUMP-S process for large-scale waste management depended on the availability of liquid metal reactors, which are not likely to be built anytime in the near future.

The alpha laboratory at MURR, where the experiments took place, has been decontaminated. The experiments and the decontamination effort generated seven fifty-five gallon drums of Mixed Transuranic Waste (MTRU). The plan is for the MTRU to be disposed of at the Waste Isolation Pilot Plant (WIPP), after it has been demonstrated that it can meet the requirements of the WIPP Land Withdrawal Act of 1992 (LWA) and the WIPP Waste Acceptance Criteria (WAC).

¹ Nakahara, D.N., Letter to Mr. Vernon Schaubert, Rockwell International Corporation, "Wastes from the Private Sector Initiative Program", January 4, 1989.

² DOE-03-94SF16893, Contract between DOE and Rockwell International, Mod A016, September 20, 1994.

³ U.S. Department of Energy, "Environmental Assessment: TRU Management by Pyroprocessing Separation (TRUMP-S) Program," DOE/EA-0430, February, 1990, p. 6.

⁴ Brush, P.N., Memorandum to Mr. William H. Young, "Finding of No Significant Impact, Environmental Assessment for the TRU Management by Pyroprocessing Separation (TRUMP-S) Program at the University of Missouri-Columbia", July 19, 1990, p.3.

⁵ Grimmett, D.L., et al., "Separation of Actinides from Lanthanides Utilizing Molten Salt Electrorefining," Light Metals, 1996: Proceedings of the Technical Sessions Presented by the TMS Light Metals Committee at the 125th TMS annual Meeting, Wayne Hale, ed., Anaheim, CA: The Minerals, Metals & Materials Society, February 4-8, 1996, pp. 1215 - 1220.

⁶ U.S. Department of Energy, "Environmental Assessment", p. 3.

The remainder of this document is devoted to demonstrating that this waste meets one of the fundamental requirements of the LWA, that it was generated by an "atomic energy defense activity." The source of some of the materials used in the experiments, which is interspersed through all of the waste, came from Defense programs. In addition, although this project was managed through DOE's Office of Nuclear Energy Programs (NE), the experiments performed had dual applications in the defense and commercial sectors. The potential applicability of the TRUMP-S process to the treatment of DOE's defense wastes was a factor in DOE's decisions to get involved in this project originally, and to redirect some of its materials from defense programs to the TRUMP-S project.

2.0 Defense Programs Involvement in TRUMP-S

DOE provided the actinide materials for the TRUMP-S Project. The Neptunium and Americium used in the experiments were transferred to the TRUMP-S project out of Defense projects. The Neptunium-237 metal (four grams) used in the TRUMP-S experiments was transferred out of project #A-GB-0103-011, which was a general project number for activities associated with Defense Programs Research and Advanced Technology.⁷⁻⁸ The Americium-241 metal (two grams) was transferred from project #F-GE0381054, which is a project number for activities associated with Defense Programs Material Support.⁹⁻¹⁰

The Plutonium (five grams) was also in metal form and came from DOE's New Brunswick Laboratory.¹¹ The initial generation of the Plutonium source was sponsored and funded by the USAEC Office of Safeguards and Materials Management in 1971 as part of an atomic energy defense activity, under the function of "defense nuclear materials security and safeguards and security investigations"..¹² In 1973, the Los Alamos National Laboratory (LANL) prepared the Plutonium as a Standard Reference Material (SRM 945) for the National Bureau of Standards (NBS). In 1989, the plutonium was transferred to the TRUMP-S program through the DOE New Brunswick Laboratory.¹² It should be noted that the TRUMP-S experiments did not use actual PUREX waste or high level waste.

The experiments at MURR began in April 1991 and concluded in September 1997. The experiments generated one fifty-five gallon drum of Mixed Transuranic Waste (MTRU) and six fifty-five gallon drums of MTRU were generated during decontamination activities. All waste bags in the MTRU drums contain actinides from defense program sources.¹³ The experiments and the decontamination effort also generated some low-level radioactive waste, which has been sent to a commercial disposal facility.

⁷Inlow, R.O., Memorandum to C.L. Sohn, "Authorization to Ship Four Grams of Neptunium," March 29, 1989.

⁸ Budget and Reporting Classification Description, GB0000 - GB9999 Weapons Activities, Revision 96-01, page GB-001. Note: Revision 96-01 for Fiscal Year 1996 does not contain the BNR description for GB-0103-011 since that BNR was deleted in 1995.

⁹ Hargrove, J. T., Nuclear Material Transaction Report, April 18, 1990.

¹⁰ Budget and Reporting Classification Description, GE0000 - GE9999 Material Support, Revision 96-01, page GE-013.

¹¹ Sickela J., Nuclear Material Transaction Report, May 12, 1989.

¹² Bingham, C.D., New Brunswick Laboratory Certified Reference Materials Certificate of Analysis, CRM 127, October 1, 1987.

¹³ University of Missouri-Columbia, Missouri University Research Reactor, "Assignment of MTRU Waste Bags to Shipping Drums", Appendix E, Table 1 of the MURR MTRU Waste Management Plan, September 1998

When DOE first became involved with this project, it was envisioned as part of a larger program that included processing defense waste to simplify nuclear waste management.¹⁴ This proposed Actinide Burning Program was outlined in a formal program plan in draft form, but never was finalized.¹⁵ This plan and notes from discussions at the time clearly show that both commercial and defense interests were being considered in parallel. The use of the TRUMP-S technology for processing defense wastes, especially defense waste from the PUREX process was presented to various groups at HQ, to private industry, and to the laboratories. A meeting was held by EM-50 to investigate several separation processes for a total system of defense waste management. Presentations were made to Los Alamos National Laboratory on the status of the TRUMP-S experiments, and to propose continuing the TRUMP-S experiments at an increased scale. In addition, several presentations were made on the applicability of the TRUMP-S technology for processing Hanford sludge.¹⁶ ¹⁷ Los Alamos National Laboratory was willing to provide assistance if Rocketdyne succeeded in developing a program to continue the TRUMP-S program.¹⁸ The treatment now planned for most high-level defense waste is vitrification/encapsulation without processing to separate the long-lived actinides.¹⁹ ²⁰ For high level waste (HLW), DOE is proceeding with plans to treat HLW by vitrification, followed by disposal of the canisters of vitrified waste in a geologic repository.²¹

3.0 Conclusion

As stated in the *Carlsbad Area Office Interim Guidance for Ensuring That Waste Qualifies for Disposal at the Waste Isolation Pilot Plant*, February 13, 1997, TRU waste is eligible for disposal at WIPP if it has been generated in whole or part by one or more of the activities listed in section 10101(3) of the Nuclear Waste Policy Act of 1982 as an "atomic energy defense activity". All of the initial TRU materials used in the TRUMP-S experiments can be shown to be derived from defense program sources, from one of the functions listed, including 'defense nuclear waste and materials by-products management', 'defense nuclear materials security and safeguards and security investigations', and 'defense research and development'. The MURR MTRU waste is derived by use of these sources, is thus considered defense TRU waste, and is therefore eligible for disposal at WIPP.

As stated in the referenced TRUMP-S Environmental Assessment (Reference 3), one of the objectives of the TRUMP-S program is "The use of such processes could simplify nuclear waste management." Since one function of the TRUMP-S project was to address the management of waste generated by the defense programs PUREX process, this function further confirms the eligibility for disposal of these TRU wastes at WIPP.

¹⁴ U.S. Department of Energy, "Environmental Assessment", p. 1.

¹⁵ Rockwell International, Handouts titled "Review of RI Actinide Waste Burner Activities", Meeting on January 10-11, 1989.

¹⁶ Fusselman, S.P., Letter to Ken Quitarano, "Presentations Made by Rocketdyne Personnel Regarding the TRUMP-S Project", September 5, 1997.

¹⁷ Gabler M., Letter to Ken Quitarano, "Relevance of TRUMP-S Technology to Defense Programs", April 26, 1994.

¹⁸ Avers L.R., Letter to Dr. R. L. Gay of Rocketdyne, Los Alamos Assistance, January 30, 1996.

¹⁹ Horgan, H., "Trying Transmutation, Experts debate practicality of a nuclear waste scheme," *Scientific American*, May 1992, pages 36,53.

²⁰ Bureau of National Affairs Environment Reporter, "Radioactive Waste, New Separation, Transmutation Techniques will not replace Repositories, DOE Official Says", January 17, 1992.

²¹ DOE/EIS-0200-F, "Final Waste Management Programmatic Environmental Impact Statement," U.S. Department of Energy, Washington, D.C.: May 1997, Summary, p. 13.

DOE/EA-0430

ENVIRONMENTAL ASSESSMENT

TRU MANAGEMENT BY PYROPROCESSING SEPARATION (TRUMP-5) PROGRAM

U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

FEBRUARY 1990

ENVIRONMENTAL ASSESSMENT

DESCRIPTION OF PROPOSED ACTION

The proposed action is to approve the TRU Management by Pyroprocessing - Separation (TRUMP-S) program that is to perform research and development studies on transuranic (TRU) elements at the University of Missouri-Columbia (MU).

PURPOSE AND NEED

The initial objective of the TRUMP-S program is to develop fundamental chemical, electrochemical and separation data for rare earths and actinides in molten salt/cadmium systems. The goal of the TRUMP-S is to develop a practical process to separate TRU materials from fuel reprocessing waste. The process may also have direct applicability to pyrochemical recycle of a variety of spent reactor fuels (i.e., those from Light Water Reactors, High Temperature Gas-Cooled Reactors and Liquid Metal Reactors). The use of such processes could simplify nuclear waste management by minimizing the long-lived radioisotope content and volume of materials to be disposed of in a geological repository. This technology has worldwide implications, especially in nuclear nations without land suitable for a high level waste repository.

The program is a cooperative effort among Japan, Rockwell International (RI), MU and the Department of Energy (DOE) with Japan providing most of the funding (about \$5,000,000), RI and MU conducting the research and development of the separation process, and DOE providing for the use of some materials and the disposal of the TRU waste. Results of the program will be available to all participants.

The proposed work involves gram-scale experiments with TRU materials. The studies will include some materials (cadmium and silver) which can create Extraction Process hazardous waste as defined in the Resource Conservation and Recovery Act (RCRA). A process is under development which may ensure that all waste will be non-hazardous. Depending upon results from extraction and process development tests, TRUMP-S may generate no mixed waste. Some TRU and low specific activity (LSA) waste will be generated.

Stages I and II of the TRUMP-S program are planned to be completed by March 31, 1994, and will generate less than 60 cu. ft. (eight 55-gallon drums) of TRU and possibly TRU-mixed waste, 60 cu. ft. (eight 55-gallon drums) of low specific activity (LSA) and possibly LSA-mixed waste from operations, and 195 cubic feet (twenty-six 55-gallon drums) of LSA soft waste (laboratory coats, shoe covers and the like) from operations.

ALTERNATIVES CONSIDERED

Alternatives to determining the chemical, electrochemical and separations properties of actinides and rare earths are:

Conduct the program at MU

Conduct the program at another U.S. university

Conduct the program at a national laboratory; e.g. Argonne National Laboratory-West (ANL-West)

Conduct the program at an industrial contractor's facility

Conduct the program at a non-USA facility

Not to conduct the program

CONDUCT PROGRAM AT MU

The program can be conducted at MU with relatively minor facility modifications. The experimental set up, the measurements to be made, and the approach to data analysis have all been demonstrated. A trained staff is available to perform the experimental work, and reduce and analyze data. Suitable waste-handling and storage facilities exist at MU.

This program brings to the university an opportunity to expand the educational base of the school by providing a fundamental research program in the area of high temperature molten salt electrochemistry and an opportunity to contribute to solving a long-term environmental concern.

CONDUCT THE PROGRAM AT ANOTHER U.S. UNIVERSITY

An extensive survey was made of other U.S. universities that might be suitable sites for conducting this research. These included the University of Florida, Texas A&M, and the University of Michigan. Based on selection criteria including capability of the university staff to support the program, interest of the university, availability of facilities, cost and schedule, MU was the clear choice.

CONDUCT THE PROGRAM AT A NATIONAL LABORATORY

ANL-West could conduct the program at their facilities in Idaho. ANL-West, however, has neither the staff nor the facilities available at present or in the foreseeable future to perform this work. Similarly, other national laboratories have neither staff nor facilities to perform this program at present.

CONDUCT THE PROGRAM AT AN INDUSTRIAL CONTRACTOR'S FACILITY

No industrial contractor's facility has been identified that would be suitable for this work. The work was originally to be done at RI's hot laboratory but RI elected not to renew its Nuclear Regulatory Commission (NRC) license.

CONDUCT PROGRAM AT A NON-USA FACILITY

This alternative may remove the requirement for DOE to dispose of the TRU wastes, however, international agreements would have to be developed so that the foreign government would accept responsibility for the waste. The use of a non-USA facility might result in the loss to the United States of the results from this research project.

NOT TO CONDUCT THE PROGRAM

No similar studies are being conducted in the United States. Studies at ANL are like in character to those of TRUMP-S except that they are directed at Integral Fast Reactor (IFR) fuel. The IFR fuel studies have significantly different requirements (e.g., composition and need for rare earth separation); therefore, they do not fill the information gap relating to fuel reprocessing waste and spent fuel recycle.

A literature search by RI established that the knowledge in separating actinides from nuclear waste is limited and in some cases inconsistent. The importance of this program mandates that this work be performed to provide the fundamental information for process evaluation, both nationally and internationally. The information from this research project is vital to US interests in the possibility of simplifying nuclear waste management. The alternative of not conducting this program is therefore not a viable one.

The preferred alternative for the TRUMP-S program is to conduct the program at MU. This alternative provides for meeting all environmental regulations dealing with packaging, storing and monitoring of the waste before shipment to the Waste Isolation Pilot Plant or a temporary off-site storage location, and for the shipment itself.

MU will conduct the TRUMP-S program at its University of Missouri Research Reactor (MURR) facility. Operations will be conducted under licenses from NRC. TRU and LSA waste will be packaged, stored, monitored, and ultimately shipped in accordance with local, State, Federal, and applicable repository requirements.

A test plan 1/, test procedure 2/ and Special Nuclear Material Control Program 3/ have been prepared for this work that describe how the effort would be conducted at Santa Susana Field Laboratory (SSFL). These documents will be modified as appropriate for the MU program. Procedures for material transfer and waste handling are still to be prepared. Suitable glove boxes exist; therefore, no new facilities are required outside of those furnished by the TRUMP-S program. Current NRC licenses will be amended to permit the receipt, possession, use and storage of the quantities of actinides required for the tests. Health Physics programs are in place. Effluent and environmental monitoring programs are continuing programs for MURR and the areas surrounding MURR. No new waste management requirements are created by TRUMP-S.

MURR is a 10 megawatt research reactor located at the Research Park in Columbia, Missouri. The Research Park is a university owned, low population density, 550-acre tract of land. The nearest residence to MURR is approximately 1/2 mile away and the working population of the Research Park area immediately surrounding MURR is about 370. The population within 5 miles of MURR is approximately 77,000 (a 1990 projection based on the 1980 U.S. Census provided by the City of Columbia Department of Planning and Development and the Boone County Department of Planning and Zoning).

POTENTIAL IMPACTS

Operations with TRU materials will be conducted in an inerted glove box in an atmospherically controlled room in MURR. TRU will be processed with the maximum amount of TRU material in process at one time of approximately 1 gram. TRU materials to be processed are neptunium, plutonium and americium. The total quantities of actinide material to be procured for this program are: 75 grams depleted uranium, 5 grams plutonium, 4 grams neptunium and 4 grams americium. TRUs will be stored in their shipping containers in the MURR fuel vault until required for test, and then stored in the MURR TRUMP-S Alpha Laboratory immediately prior to use. Materials to be used in more than one test will be stored either in the Alpha Laboratory or in a shielded, isolated sample storage area.

Effluents from the experimental and sample preparation glove boxes will be triply filtered before release to the atmosphere. No radioactive gases will be formed during TRUMP-S tests; therefore, special gas cleanup systems are not required. Using similar High Efficiency Particulate Aerosol (HEPA) filtering systems, effluents from the Rockwell International Hot

1/ L.F. Grantham, "Test Plan for TRUMP-S Electrochemical Cell Tests in Bldg. T020." 190TP000003.

2/ L.F. Grantham, J.P. Ampaaya, "Test Procedure for the TRUMP-S Electrochemical System in Bldg. T020." 190DTP000003.

3/ "Special Nuclear Material Control Program for Actinide Burner Program (TRUMP-S)." RI/RD86-190 Supplement 1.

Laboratory (RIHL) at SSFL in the past, during which multikilogram quantities of radioactive material have been handled, have been consistently a factor of 10,000 below Environmental Protection Agency (EPA) limits. The process for this research is less dispersive and uses much less material than previous operations in the RIHL. The TRUMP-S Alpha Laboratory at MURR will contain both the glove boxes and the chemical analysis unit. Approximately 100 milligram samples of salt and cadmium will be transferred from the experimental glove box to the sample preparation glove box. Ten milliliter aliquots of solutions containing TRU material (< 1 microcurie each) will be transferred from the sample preparation glove box to the chemical analysis unit glove box. All actinide-containing material operations will then be done within this one room. Effluents from the chemical analysis equipment will be doubly filtered prior to release to the building exhaust.

Planning of the experiment will be such as to ensure exposure of workers meeting the As Low As Reasonably Achievable criterion. The MURR Health Physics staff includes two certified Health Physicists, a Senior Health Physics Technician and a Health Physics Technician, each with extensive experience in monitoring hot laboratory processes. (Two additional Health Physics Technicians are planned to be on staff before beginning the TRUMP-S processing). The number and activity levels of the radioactive material shipments from MURR provide an indication of the Health Physics monitoring requirement for handling and processing of material at MURR. For FY88, approximately 1,000 shipments of radioactive materials were made to other licenses, involving over 8,600 curies of 66 different isotopes.

A program to monitor individual radiation exposures is in place. Currently the Health Physics group at MURR, on a monthly basis, issues, tracks and maintains records for the following permanent personnel dosimetry: 240 film badges, 125 ring badges, and 75 pocket chambers. The individual and group exposures anticipated during the course of this work will be below State and Federal regulations. It is anticipated the group dose will be less than two person-rem. Exposure to the public will be insignificant.

The annual average exposure due to releases of TRUs through the two sets of HEPA filters at MURR would be, at most, 0.001 millirem per year committed effective dose equivalent (lung) at the point of maximum public exposure. This is only a minor increase to the conservatively estimated annual dose due to existing argon - 41 releases from MURR of 8.4 millirem per year (effective immersion dose).

In summary, the extremely small release of TRU materials, low individual and group exposures of workers, and insignificant public exposures will mitigate any basis for concern of the people working at and living near MU.

The project will be subject to NRC inspection as part of the license for Special Nuclear Material, the Broad Scope Materials License, and the Reactor (R-103) license. The contractor (RI) will perform a safety analysis and walk through of the facility. Procedures, training and the accountability system for the project will also be reviewed by the contractor.

The Isotope Use Subcommittee of the MURR Reactor Advisory Committee will also review the safety analysis. This subcommittee is charged with ensuring the safe handling and use of radioisotopes within MURR and determining that such use is within NRC license limitations.

The tests proposed for the glove box in the MURR are essentially identical to those tests conducted in 8/023 using non-radioactive rare earth elements. All conventional safety issues (e.g., thermal burns, electric shock, and the like) have been resolved in preparation for the non-radioactive work with rare earths.

Accidental criticality will not be a concern for the TRUMP-S program - quantities of plutonium will be too small. Even if the entire process quantity of plutonium would be accidentally dispersed to the atmosphere, without filtration, the maximum offsite 50 year dose commitment would be only 5 rem (lung), well within NRC standards for accidental exposures.

Operations have been reviewed to minimize waste generation. The glove boxes will be frequently cleaned and operated in a mode to minimize waste generation. (Past experience has shown that frequent cleaning indeed reduces waste generation.) Clean up at the end of the program will also be directed toward waste minimization.

Cadmium and silver will be used in the tests; these materials can lead to wastes identified as Extraction Process hazardous under RCRA. Results from extraction tests have indicated a cadmium and silver waste can be prepared that is non-hazardous. The process is not fully developed, therefore the possibility exists that some mixed waste may be generated. At most eight 55 gallon drums of LSA and possibly mixed LSA-hazardous and at most twenty six 55 gallon drums of LSA soft waste will be generated during the four year program. If required, it is planned to use steel shadow shielding during americium tests and for the disposal of americium waste. However, restrictions may require the use of lead as the shielding material; this lead would be disposed of with the TRU-mixed or LSA-mixed waste, as appropriate.

The anticipated disposal site for the TRU waste is the Waste Isolation Pilot Plant. Until the waste can be shipped off-site, the TRU waste will be stored at MURR. The requirements for packaging, storage and monitoring of TRU waste for temporary storage are clearly documented and can be met by MU.

MU has in place a mixed waste management program based upon the Joint EPA/NRC "Guidance on the Definition and Identification of Commercial Mixed Low Level Radioactive and Hazardous Wastes" (January 8, 1987, Office of Solid Waste and Emergency Response, EPA, Directive number 9432.00-2). The university established this waste program early in 1988 through the University Office of Environmental Health and Safety to meet the NRC and EPA requirements for managing and disposing of mixed wastes. The experience that the MURR Operations and Health Physics staffs have in handling and shipping waste (including spent fuel shipments and Class B waste shipments of irradiated metal hardware), combined with the mixed waste experience provided by the Office of Environmental Health and Safety, will provide sufficient expertise to safely and effectively manage the mixed waste stream from this project, if generated.

Because of the small quantity of TRU waste produced on this program, there should not be a significant cumulative effect on the geologic repository for TRU waste. LSA waste will be shipped to Washington State or South Carolina for disposal. Mixed-LSA waste will be stored in permitted storage

at MURR until either Hanford or Nevada Test Site are approved to receive this waste.

MURR supports a broad range of nationally and internationally significant research programs in the areas of neutron scattering, neutron activation analysis, radioisotope applications and radiation effects.

The community appreciation and support for the significance of MURR's diverse research accomplishments during its history as the highest flux, highest steady-state power, university owned research reactor were demonstrated during the 20th anniversary celebration of MURR on October 11, 1986. Certificates of Commendation were addressed to MURR from the City of Columbia and from the State of Missouri Legislature for its years of service to the city, State and Nation.

More specific to this project, letters of support were received for the joint RI-MU TRUMP-S project from the Missouri State Governor, both U.S. Senators from Missouri, the U.S. Representative and both State Representatives from the District which includes the University of Missouri - Columbia campus, the Mayor of the City of Columbia, the Columbia Chamber of Commerce, and the Office of Regional Economic Development, Inc. This support, as well as the support of the University System administration, recognizes the significant opportunity for MU to contribute to solving a problem of international significance.

MURR is amending its NRC license for the receipt, possession, use and storage of the quantities of actinides to be used in the TRUMP-S program. It is not anticipated that further amendment of the license will be required for this program.

The TRUMP-S work to be conducted at MURR will be done under materials licenses issued by NRC. The NRC National Environmental Policy Act procedures that would apply to this project are contained in Title 10, Part 51 of the Code of Federal Regulations (10CFR51). In 10CFR51, NRC has defined categories of actions that do not individually or cumulatively have a significant effect on the human environment and for which, therefore, neither an environmental assessment nor an environmental impact statement is required by the NRC (see "Categorical Exclusion", 10CFR51.14). Section 10CFR51.22 provides the criterion for categorical exclusion and identifies licensing and regulatory actions that are eligible for categorical exclusion or do otherwise not require environmental review.

Since the TRUMP-S project at MU would be performed under the auspices of materials licenses issued and amended pursuant to 10CFR Parts 30, 31, 32, 33, 34, 35, 40, or 70, the categorical exclusion defined in 10CFR51.223(c)(14)(v) would apply to this project. This categorical exclusion is provided for materials licenses that authorize the use of radioactive materials for research and development and educational purposes.

Analyses performed in support of this program have demonstrated that the environmental impacts associated with expected operations and potential accidents would not be significant. There would be no significant irreversible or irretrievable commitments of resources associated with this small scale program.


memorandum

DATE: July 19, 1990

REPLY TO
ATTN OF: EH-25SUBJECT: Environmental Assessment for the TRU Management by
Pyroprocessing Separation (TRUMP-S) Program at the University
of Missouri-ColumbiaTO: William H. Young
Assistant Secretary
for Nuclear Energy

We have reviewed the subject EA (DOE/EA-0430), which was submitted to the State of Missouri for pre-approval review on May 21, 1990, and a draft Finding of No Significant Impact (FONSI). We note from your memorandum of June 19, 1990, that the State of Missouri has completed its review of the pre-approval EA and that they offered no comment. Therefore, based on the EA, and after consultation with the Office of General Counsel, I have determined that the proposed action will not have a significant effect on the human environment, within the meaning of the National Environmental Policy Act (NEPA). Therefore, the preparation of an environmental impact statement is not required.

It is not necessary to have the FONSI published in the Federal Register since the project is not an action with effects of national concern. However, the local public should be notified of the availability of the EA and FONSI in accordance with paragraph 1506.6(b)(3) of the Council on Environmental Quality NEPA regulations. Please send five copies of the EA to the Office of NEPA Oversight along with a record of distribution of the EA and FONSI.


Peter N. Brush
Acting Assistant Secretary
Environment, Safety and Health

Attachment

cc: Donald W. Pearman, Jr.
Manager
San Francisco Operations Office

FINDING OF NO SIGNIFICANT IMPACT,
TRU MANAGEMENT BY PYROPROCESSING SEPARATION (TRUMP-S)
PROGRAM UNIVERSITY OF MISSOURI-COLUMBIA (MU)

AGENCY: U.S. Department of Energy

ACTION: Finding of No Significant Impact

SUMMARY: The Department of Energy has prepared an Environmental Assessment (EA) for research and development studies of transuranic (TRU) elements at the University of Missouri-Columbia (MU). The initial objective of the research is to develop fundamental chemical and electrochemical data for rare earths and actinides in molten salt/cadmium systems. The ultimate goal of the program is to develop a practical process to separate TRU materials from fuel reprocessing waste. The process may also have direct applicability to pyrochemical recycle of a variety of spent reactor fuels (i.e., those from Light Water Reactors, High Temperature Gas-Cooled Reactors, and Liquid Metal Reactors).

The program, TRU management by pyroprocessing separation (TRUMP-S), will be conducted at the University of Missouri Research Reactor (MURR) facility. Operations will be conducted under licenses from the Nuclear Regulatory Commission (NRC). All wastes will be packaged, stored, monitored, and ultimately shipped in accordance with local, State, and Federal

requirements. The individual and group exposure anticipated during the course of this work are well below State and Federal regulations. Exposure of the public will be insignificant.

Based upon the analyses in the EA, the Department of Energy has determined that the proposed action does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. Therefore, preparation of an environmental impact statement is not required and the Department is issuing this Finding of No Significant Impact.

SINGLE COPIES OF THE ENVIRONMENTAL ASSESSMENT ARE AVAILABLE FROM:

Ken Quitoriano
U.S. Department of Energy
San Francisco Operations Office
1333 Broadway
Oakland, California 94612
(415-273-6150)

FOR FURTHER INFORMATION CONTACT:

Carol M. Borgstrom, Director
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(202) 586-4600

PROPOSED ACTION: The proposed work involves gram-scale experiments with Transuranic (TRU) materials which will be

conducted in an inerted glove box in an atmospherically controlled room at the MURR facility. The quantity of TRU material in process at one time will not exceed approximately 1 gram. TRU materials to be processed are neptunium, plutonium, and americium. The total quantities of actinide material to be procured for this program are: 75 grams depleted uranium, 5 grams plutonium, 4 grams neptunium, and 4 grams americium. TRU materials will be stored in their shipping containers prior to use. The studies will also include some materials (cadmium and silver) defined as hazardous under the Resource Conservation and Recovery Act and, therefore, may generate small quantities of mixed waste.

BACKGROUND: The program is a cooperative effort among Japan, MU, and DOE with Japan providing most of the funding (about \$5,000,000), MU will be conducting the research and development of the separation process, and DOE will provide some actinide materials and be responsible for the disposal of the TRU waste.

MURR is a 10 megawatt research reactor located at the Research Park in Columbia, Missouri. The Research Park is a University owned, low population density, 550-acre tract of land. The nearest residence to MURR is approximately 1/2 mile away, and the working population of the Research Park area immediately surrounding MURR is about 370. The population within 5 miles of MURR is approximately 77,000.

ALTERNATIVES CONSIDERED: The Department considered the following alternatives to the proposed action: conduct the program at another university; conduct the program at the Rockwell International Hot Laboratory; conduct the program at a national laboratory (e.g., Argonne National Laboratory-West); conduct the program at another industrial contractor's facility; conduct the program at a non-USA facility; and a No Action alternative. Alternative sites lacked either available qualified staff, facilities or adequate licenses. The no action alternative was dismissed because the information to be gained from the proposed action is vital to U.S. interests in simplifying nuclear waste management.

ENVIRONMENTAL IMPACTS: The TRUMP-S program, planned to be completed by March 31, 1994, will generate less than 60 cubic feet (eight 55-gallon drums) of TRU-mixed waste, 60 cubic feet (eight 55 gallon drums) of low specific activity (LSA)-mixed waste and 195 cubic feet (twenty-six 55 gallon drums) of LSA soft waste (e.g., laboratory coats and shoes covers). Effluents from experimental and sample preparation glove boxes are triply filtered via High Efficiency Particulate Aerosol filters before release to the atmosphere. No radioactive gases will be produced during TRUMP-S tests, therefore, special gas cleanup systems are not required. Planning of the experiment will be such as to ensure that exposure to workers meets the As Low As Reasonably Achievable (ALARA) criterion. The program to monitor individual

radiation exposure is in place. The individual and group exposure anticipated during the course of this work are well below State and Federal regulations. Exposure of the public will be insignificant.

The TRUMP-S Program will involve a maximum of 5 grams of plutonium. Accidental criticality will not be a concern for the TRUMP-S program - quantities of plutonium will be too small. Even if the entire process limit quantity of plutonium (1 gram) would be accidentally dispersed to the atmosphere, without filtration, the maximum offsite 50 year dose commitment would be 5 rem (lung), well within NRC guidelines (10 CFR 100.11) for accidental exposures. Operations have been reviewed to minimize waste generation. The glove boxes will be frequently cleaned and operated in a mode to minimize waste generation. The program goal is to recover TRU materials and return them to the National Laboratories for further use. If, however, all actinide materials are not recovered the anticipated disposal site for the TRU waste is the Waste Isolation Pilot Plant. Until the waste can be shipped, TRU waste will be stored at MU. The requirements for packaging, storage, and monitoring of TRU wastes for temporary storage are clearly documented and can be met by MU. LSA waste will be shipped to a commercial disposal site, either U.S. Ecology in Washington, or Barnwell in South Carolina. Mixed waste, if generated, will be stored at the MURR until either Hanford or the Nevada Test Site are approved to receive this

waste. Although storage of mixed wastes at MURR is not regulated by the State of Missouri or the Environmental Protection Agency, it will be managed in accordance with procedures consistent with current Federal requirements. The University will comply with applicable Federal or State mixed waste requirements promulgated during the course of the project.

Current NRC licenses will be amended to permit the receipt, possession, use, and storage of the quantities of actinides required for the tests. Health physics programs are in place. Effluent and environmental monitoring programs are continuing programs for MURR and the areas surrounding MURR. No new waste management requirements are created by TRUMP-S.

DETERMINATION: The proposed TRU research and development program at MURR does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq. Therefore, no environmental impact statement is required.

Issued this 19th day of July, 1990.


Peter N. Brush
Acting Assistant Secretary
Environment, Safety and Health