Removal of TRU Waste from the Missouri University Research Reactor
Final Closeout Report

Background

The TRUMP-S (Transuranic Management Through Pyropartitioning Separation) project at the Missouri University Research Reactor (MURR) evaluated the feasibility of electrolytic separation of actinides from simulated spent nuclear fuel and PUREX waste. This work ended in September 1997. Kawasaki-CRIEPI (Central Research Institute of the Electric Power Industry), a Japanese venture, funded this research as well as the consequent decontamination. MURR had completed decontamination and properly disposed all but the TRU waste by late 1998. In exchange for information, DOE supplied the requisite actinides and agreed to accept the radioactive and TRU waste. NE funded disposal of the non-TRU waste at Envirocare, near Clive, Utah.

It became EM's task to dispose of the TRU waste at WIPP. Towards that end, Carol Irvine (OAK) submitted a defense waste justification and acceptable knowledge package to DOE Carlsbad (CAO). On September 29, 1998, Michael Brown (CAO) determined that this TRU waste is eligible (as defense waste) for disposal at WIPP. On December 29, 1998, that waste was repacked into seven drums of contact-handled *mixed* TRU waste to comply with the WIPP WAC. Taken together, they contain about 1400 g cadmium, 0.8 g silver, 2.41 g Am^{241}, 1.47 g Pu^{239}, 3.55 g Np^{237}, and 5.52 g U^{238}. These radioisotopes have been apportioned among the drums to yield decay heats (primarily from Am^{241}) that range from 0.0356 to 0.0438 watts/drum. WIPP limits decay heat to <0.047 watts/drum.

All seven drums remained at MURR, while DOE sought a way to re-characterize them to verify their acceptability for disposal in WIPP. To mobilize for certification at MURR for only 7 drums would be far too costly. To relocate these 7 drums of *mixed* TRU waste to a DOE site until certification could be arranged would first require that site to modify its RCRA permit to accept mixed (i.e. RCRA) waste from out-of-state – a politically costly request. And there matters lay, despite several DOE working groups that blossomed, then withered in the face of State objections, first over INEEL, then over Hanford.

The impasse eased after WIPP began emplacing waste. In February 2002, yet another working group proposed re-characterizing the MURR drums at Argonne National Laboratory (ANL-E) in Argonne, Illinois because a Centralized Characterization Project was underway there. EM-1 approved that approach on 4/8/02. On 6/12/02, ANL applied to amend its RCRA permit so that it could receive the MURR mixed TRU waste and hold it for up to 6 months. Illinois approved the modification on 11/8/02.

Although the MURR TRU waste was thought to be very well characterized and fully compliant with the WIPP WAC, it was conceivable that the re-characterization process at ANL-E could find one or more of the drums non-compliant. If ANL-E could not fix the discrepancy, DOE/OAK agreed to remove the drum within the timeframe specified in

ANL's modified RCRA permit. Ralph Butler's letter of 12/19/02, wherein MURR agreed to the return of any such drum, backed up OAK's commitment.

Approval of the Centralized Characterization Project deployed at ANL-E then lay on the critical path. The CCP was declared adequate by the State on New Mexico on 5/8/03 and by the US EPA on 5/13/03. On 5/15/03, the drums left MURR for ANL-E. They left Argonne for WIPP on July 24, 2003, and were emplaced in WIPP on July 28, 2003. This completed all physical work, removed the threat of a drum returning to MURR, and allowed DOE to request closure of the MURR Federal Facilities Agreement (FFA). In a letter dated 8/20/03, Missouri Department of Natural Resources agreed that no further action is required from the DOE for compliance with their Administrative Order. This closed the FFA for MURR.

All told, DOE/EM paid MURR $66, 884 to store these drums and help with the transfer to Argonne. Carlsbad covered the costs of trucking to Argonne, the Central Characterization Project at Argonne, trucking to WIPP, and emplacement in WIPP; those costs are included in the cost of processing Argonne's debris waste emplacing it in WIPP.

Closure Status

The final purchase order with the University of Missouri (UM) was closed and the remaining funds deobligated by 5/20 /04. The contract file will be stored together with the MURR project files in an Office of Legacy Management repository.

UM has asked Missouri to close its RCRA Part B permit, which had been maintained solely for these 7 mixed TRU drums. As of this date, the Missouri DNR was still reviewing the University's submission. DOE has no obligation to the University respecting this permit.

The University and DOE co-signed a brief agreement documenting project closure on 5/17/04 and 5/27/04, respectively. LM has no obligation to UM from TRUMP-S.

WIPP retains the records of the waste composition, packaging, and burial location.

Lessons Learned

Missouri officials remained helpfully tolerant after they realized that we were pursuing a viable approach to removing the waste. Periodic candid conference calls helped sustain their attitude. They were particularly willing to forbear when the obstacle lay with another state government. Thus, while we were careful not to raise false hopes, they patiently accepted repeated delays before approval of the CCP at ANL-E, which first had to be acceptable to New Mexico. They likewise accepted the (albeit low-probability) risk of unacceptable drums returning to MURR, since they recognized that Missouri had a greater obligation to take them than did another state, such as Illinois or Washington.

Submitted by: William R. Holman 9/16/04

William R. Holman
Project Manager, Oakland Environmental Programs

Completion of the TRUMP-S Project at MURR

Now that the mixed TRU waste from the TRUMP-S project has been removed from the Missouri University Research Reactor (MURR) and then approved for disposal at the Waste Isolation Pilot Plant, the obligations of MURR to the U.S. Department of Energy (DOE) for the return of DOE nuclear materials, the decommissioning and decontamination of the TRUMP-S work area, and disposal of radioactive and transuranic waste from the TRUMP-S project have been met. The obligations of DOE to MURR with respect to this same work have likewise been met. Therefore, it is mutually agreed that the TRUMP-S project at MURR has been completed.

Agreed:

For the U.S. Department of Energy

Henry De Graca 5/17/04

Henry De Graca Date

For the University of Missouri

Michael J. Warnock 5/27/04

Michael Warnock Date

STATE OF MISSOURI
Bob Holden, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.state.mo.us

August 20, 2003

Mr. William Holman
U.S. Department of Energy
National Nuclear Security Administration
Oakland Office
1301 Clay Street
Suite N-700
Oakland, CA 94612-5208

Dear Mr. Holman:

I am responding to your letter dated July 29, 2003 (copy enclosed), concerning termination of the Abatement Order on Consent (#95-HW-011) for the University of Missouri Research Reactor in Columbia, Missouri, as noted in the enclosure. Based on materials you have submitted, the Department of Energy has satisfied the conditions for termination of the Administrative Order on Consent. We agree that no further action is required from the Department of Energy for compliance with that Order.

If you have any questions concerning this letter, please contact Thomas M. Judge, RG, of my staff at (573) 751-2032 or P.O. Box 176, Jefferson City, Missouri 65102-0176.

Sincerely,

HAZARDOUS WASTE PROGRAM

Edward Galbraith
Director

EG:tjh

Enclosure

c: Northeast Regional Office
Shelley A. Woods, Esq., Attorney General's Office

Department of Energy
National Nuclear Security Administration
Service Center

National Nuclear Security Administration

JUL 29 2003

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HAZARDOUS WASTE PROGRAM
MO DEPT OF NATURAL RESOURCES

Mr. Edward Galbraith
Director, Hazardous Waste Program
State of Missouri
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176

Subject: Fulfillment and Termination of Federal Facilities Compliance Act Site Treatment Plan for the University of Missouri Research Reactor

Dear Mr. Galbraith:

I am pleased to report that the final waste stream in the subject Plan was removed from the University of Missouri Research Reactor (MURR) on May 15, 2003. It was Waste Stream # MU-W002, TRUMP-S Analytical Wastes and Equipment Debris Contaminated with Cadmium and Silver (MTRU) waste. On May 15, it was trucked to Argonne National Laboratory in Illinois for analysis and review to certify its acceptability for disposal at the Waste Isolation Pilot Plant near Carlsbad, New Mexico. It has been so certified and all seven drums of MU-W002 left Argonne for WIPP on the evening of July 24, 2003. Because of the remote possibility that this review would uncover a major problem and some waste then be returned to MURR for temporary storage, I have deferred this notification until that possibility was foreclosed. It has been. At last, we are done.

We are truly grateful for the understanding and patience of your staff.

You are hereby notified that no TRUMP-S mixed waste remains at MURR and the provisions of the MURR FFCA Compliance Plan have been fulfilled in their entirety. It is therefore terminated. Pursuant to Section 2.7.3 of the MURR Site Treatment Plan, the Missouri Department of Natural Resources (NDNR) is to respond in writing within 30 days, indicating either agreement or the invocation of a dispute.

It is my understanding the University of Missouri will separately contact MDNR regarding the closure of its RCRA Part B permit.

Sincerely,

William Holman

William Holman
Project Manager

cc: Robert Geller, MDNR
John Ernst, MURR

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