August 26, 2003

MEMORANDUM TO: Suzanne C. Black, Director
Division of Systems Safety and Analysis

THRU: Jared S. Wermiel, Chief *IRA/*
Reactor Systems Branch
Division of Systems Safety and Analysis

FROM: Frank Akstulewicz, Section Chief
PWR Systems & Nuclear Performance Section
Reactor Systems Branch
Division of Systems Safety and Analysis

SUBJECT: FOREIGN TRIP REPORT FOR WORKSHOP ON WEAPONS-GRADE PLUTONIUM FUEL QUALIFICATION WITH THE RUSSIAN REGULATORY AGENCY GOSATOMNADZOR(GAN)

Attached is the required foreign travel report related to the workshop that Undine Shoop and I attended from July 17 through July 24, 2003, related to the plutonium weapons disposition mixed-oxide fuels program. If you have any questions related to this workshop or about the weapons-grade plutonium disposition in commercial power reactors, please contact Undine Shoop (x2063) or myself (x1136).

cc: Gordan Fowler, OIP
Mike Cullingford, NRR
Wilkins Smith, NRR
Mike Johnson, NRR

ACCESSION NUMBER: ML032380594

SRXB:DSSA	SRXB:DSSA	SRXB:DSSA
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NRC FOREIGN TRIP REPORT

SUBJECT

Workshop and meetings between United States and Russian regulators to discuss the regulation of nuclear fuel fabrication (mixed oxide fuels using plutonium from weapons programs) and lead test assembly licensing in the United States and Russia.

Dates of Travel and Countries/Organizations Visited

July 17 - July 24 2003
GAN, Moscow, Russia

Author, Title, and Agency Affiliation

Francis M. Akstulewicz
Section Chief, BWR Systems and Nuclear Performance Section, SRXB
DSSA, NRR
and
Undine Shoop
Reactor Systems Engineer, BWR Systems and Nuclear Performance Section, SRXB
DSSA, NRR

Sensitivity

None

Background/Purpose

The US Department of Energy and the Russian Federation nuclear agency Gosatomnadzor have negotiated a series of workshops and technical exchange meetings in support of the plutonium weapons disposition program. The plutonium disposition program is a bilaterial agreement to eliminate a specific amount of weapons grade plutonium by converting it into usable reactor grade fuel and using it as reactor fuel in commercial reactors. Reactors in neither country are currently licensed to use mixed oxide fuels. The workshops and technical meetings are designed to discussed licensing and technical requirements that must be resolved before weapons-grade plutonium mixed oxide fuels can be safely used in commercial power reactors.

The purpose of this meeting was to present the program in the United States to be used for licensing and fuel qualification of weapons-grade plutonium mixed oxide fuel. We also discussed our specific review requirements for insertion of lead test assemblies into MaGuire and Catawba. GAN also presented the status of their regulatory testing and licensing concerns and what they were proposing for lead test assemblies for their reactors.

Abstract: Summary of Pertinent Points/Issues

Present at the meeting were representatives from the US Department of Energy, US Nuclear Regulatory Commission, Duke-Cogema-Stone&Webster(US fuel manufacturer), GAN, TVEL(Russian utility) and REA (VVER plant operator). Presentations were made by the US

Nuclear Regulatory Commission about its licensing requirements for fuel qualification of mixed oxide fuels and its code capabilities for performing core physics calculations. GAN and TVEL made presentations about its ongoing research with respect to mixed oxide fuels, its computer code capabilities, and its lead test assembly program.

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Discussion

Undine Shoop (NRR), Francis Akstulewicz (NRR), Wilkins Smith (NMSS), and Richard Lee (RES) made presentations on fuel qualification and lead test assembly requirements, quality assurance, and computer code capability respectively. Ms. Shoop described the extensive regulatory requirements for a fuel qualification program and highlighted the specific differences that exist in our requirements for uranium oxide fuel versus weapons-grade plutonium mixed oxide fuels. GAN asked many questions specifically geared to the unique requirements for plutonium and was particularly interested in our research program for mixed oxide fuels and our lead test assembly licensing process. We explained our licensing process for the lead test assemblies and the development of a startup physics testing and post-irradiation testing program to validate the computer codes used in the licensing process. We noted that the testing programs were not complete and were still being developed in conjunction with the licensee and fuel vendor. We also discussed what would need to be demonstrated before full core batch loading of the weapons-grade plutonium mixed oxide fuel would be licensed.

The Russian counterparts made similar presentations. The emphasis of the Russian presentations was to better coordinate the many Russian activities and to evaluate the need for and elimination of activities that would add time and delay the construction, licensing, and ultimate use of weapons-grade plutonium oxide fuels in Russian reactors. The current Russian emphasis appeared to rely extensively on information that would be generated through its own research programs rather than relying on published data in the open literature. Changes in the lead test program were being proposed to accelerate the program without sacrificing reactor safety.

The value of these discussions is that the issue areas with implementation of this type of fuel are well known to both countries. No new issues were identified from these discussions and the comprehensive nature of the US program appears adequate to resolve all potential concerns with weapons-grade plutonium mixed oxide fuel.

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Attachments

None.