



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

September 4, 2003

MEMORANDUM TO: Martin J. Virgilio, Director
Office of Nuclear Material Safety
and Safeguards

THROUGH: Robert C. Pierson, Director /RA/
Division of Fuel Cycle Safety
and Safeguards, NMSS

FROM: Wilkins R. Smith, Quality Assurance Scientist /RA/
Special Projects Section
Special Projects and Inspection Branch
Division of Fuel Cycle Safety
and Safeguards, NMSS

SUBJECT: July 21 - August 1, 2003, TRIP REPORT ON RUSSIAN PLUTONIUM
DISPOSITION PROGRAM WORKSHOPS AND MEETINGS

Attached is the trip report for travel to Moscow, Russia during July 21- August 1, 2003, for meetings on the Russian Plutonium Disposition Program and for U.S. Nuclear Regulatory Commission (NRC) and the Russian Federation Gosatomnadzor (GAN) workshop presentations on Mixed Oxide (MOX) fuel qualification, electrical systems, instrumentation and control systems, human factors engineering, and software quality control. Participation in these activities is part of the continuing cooperation between NRC and the U.S. Department of Energy in providing regulatory/licensing support to GAN with plutonium disposition in Russia.

The Division of Fuel Cycle Safety and Safeguards believes that the content of this report is not likely to be of interest to the Commission.

Attachment: Foreign travel trip report with attachments.

cc:
J. Craig, OEDO
J. Dunn Lee, OIP
T. Rothschild, OGC
L. Silvious, NSIR/INFOSEC
T. Sherr, NMSS

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OFC	SPIB*	E	SPIB*	SPIB*	SPIB*	FCSS
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DATE	9/3 /03		9/3 /03	9/3 /03	9/3 /03	9/4 /03

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Foreign Travel Trip Report

SUBJECT: July 21- August 1, 2003 Workshops and Meetings Summary: Russian Plutonium Disposition Program

DATES OF TRAVEL AND COUNTRIES/ORGANIZATIONS VISITED:

July 17 - August 2, 2003
R F Gosatomnadzor (GAN), Moscow, Russia

AUTHOR/TITLE Wilkins R. Smith, Quality Assurance Scientist, Office of Nuclear Materials Safety and Safeguards (NMSS).

SENSITIVITY: Not applicable

BACKGROUND/PURPOSE: The workshops and meetings were part of the continuing cooperation between the U.S. Nuclear Regulatory Commission (NRC) and the U.S. Department of Energy (DOE) in providing regulatory/licensing support to GAN associated with plutonium disposition. The July 21-24 workshop was to present and discuss U.S. and Russian plans and regulatory licensing requirements for mixed oxide (MOX) fuel qualification and lead test assemblies. The purpose of the meeting held July 24-25 was to discuss U.S. and Russian licensing processes and programs regarding the respective MOX fuel fabrication facilities currently being planned. The meeting held July 28 - August 1 was for NRC to conduct a workshop on electrical systems, instrumentation and control (I&C) systems, human factors engineering, software quality control, and related safety issues as applied to the U.S. MOX fuel facility for GAN. DOE is providing assistance to GAN regarding these activities for the Russian MOX Fuel Fabrication Facility (MFFF). DOE funded NRC's attendance at the workshops and meetings.

ABSTRACT/SUMMARY OF PERTINENT POINTS/ISSUES:

During July 21-23, 2003, NRC staff from the Offices of Nuclear Material Safety and Safeguards (NMSS), Nuclear Reactor Regulation (NRR), and Nuclear Regulatory Research (RES) participated in a GAN workshop in Moscow to discuss MOX fuel qualification topics related to the U.S. and Russian regulatory requirements and technical plans, examinations, and reviews for the lead test assemblies. Russian participants included TVEL (Russian fuel fabricator), GSPI (Russian facility designer), and REA (Russian nuclear plant operator). Presentations and discussions included U.S. and Russian MOX fuel licensing requirements, testing, fuel qualification lead test assemblies, and U.S. neutronics methods for MOX. Upon conclusion of the seminar, GAN personnel complimented the staff on the quality and organization of their presentations.

On July 24-25, 2003, at the request of DOE, NMSS staff participated in meetings to discuss the regulatory safety and environmental impact assessment requirements, licensing processes, and license application planning for the Russian and U.S. MFFFs. In addition to DOE, GAN, and Duke Cogema Stone and Webster (DCS), participants included representatives from Minatom, the Russian Federation Ministry of Natural Resources, TVEL, and GSPI.

On July 28-August 1, 2003, NRC staff conducted a seminar for GAN in Moscow on the U.S. MFFF regulations and guidance documents, safety reviews, and conclusions in the following areas: MFFF project review, fuel fabrication and licensing processes; electrical systems; I&C systems; software quality assurance issues; and human factors engineering. The staff fielded

technical and regulatory process questions throughout the week. The meeting was attended by GAN personnel and other Russian specialists from Russian laboratories, including Russian experts in the regulatory and technical presentation areas. Upon conclusion of the seminar, GAN personnel complimented the staff on the quality and organization of the seminar. This seminar was the second in a series of training workshops that the staff intends to conduct for GAN on MFFF-related subjects. DOE requested that NRC conduct these seminars to convey information about the staff's review of the domestic MFFF to GAN, since Russia has adopted the design of the domestic MFFF for the Russian MFFF.

On August 1, 2003, NMSS staff supported a DOE meeting with GAN management in Moscow to discuss the DOE and NRC MFFF support activities and the technical bases and licensing process for the Russian MFFF. The regulatory requirements and roles and responsibilities of the various Russian organizations were reviewed.

All costs associated with the workshops and meetings were paid for by DOE through a fully reimbursable agreement with NRC.

DISCUSSION: The workshops and meetings were the most recent in a series with GAN to discuss the DOE plutonium disposition program and work associated with DOE's Licensing/Regulatory Infrastructure project.

During the week of July 21-23, 2003, NRC staff participated in a GAN workshop in Moscow to discuss MOX fuel qualification topics and plans and issues related to the U.S. and Russian MFFF. The purpose of the workshop was to review the regulatory process, technical requirements, and plans for qualification of new MOX fuel designs, including lead test assemblies utilizing material from the U.S. and Russian plutonium disposition programs.

Andrei Kislov, GAN, opened the workshop with introductory remarks. Representatives from REA, GSPI, and TVEL discussed their plans for lead test assemblies. GAN staff presented the Russian Federation law, regulatory requirements, and licensing process. Richard Lee, RES, gave a presentation, "The U.S. NRC Neutronics Methods for MOX Applications." Activities and issues presented were a TRITON code overview, PARCS code modifications for MOX applications, TRITON and PARCS code verification and validation plans, and MOX transient benchmarks.

Wilkins Smith, NMSS, gave a presentation, "NRC Review of the Mixed Oxide Fuel Fabrication Facility Introduction." He discussed the following: NRC regulatory and organizational roles and responsibilities for MOX fuel by NMSS and NRR, the MFFF processes, and the licensing processes for MFFF fuel qualification, transportation containers, and facility construction and operation. Frank Akstulewicz and Undine Shoop, NRR, gave a presentation, "NRC Review of the Mixed Oxide Fuel Fabrication Facility MOX Fuel Licensing and Qualification in the U.S." This presentation included the following: NRC fuel licensing requirements and process for MFFF fuel qualification, fuel system design requirements and design bases, thermal and hydraulic design requirements, final safety analysis accidents, startup physics testing, and poolside and hot cell examination requirements for lead test assemblies.

The staff fielded technical and regulatory process questions throughout the workshop. The meeting was attended by a large number of GAN personnel and other specialists from Russian

laboratories, GAN and Minatom contractors, including experts in MOX fuel design, fabrication, licensing and quality assurance. Upon conclusion of the seminar, GAN management and other attendees complimented the staff on the workshop presentations and content.

On July 24-25, 2003, at the request of DOE, NMSS staff participated in meetings to discuss the regulatory safety and environmental impact assessment requirements, licensing processes, and license application planning for the Russian and U.S. MFFFs. DCS presented summaries of the DCS licensing management and program plans and the licensing process for the U.S. MFFF. Representatives from TVEL, GSPI, GAN, and the Russian Federation Ministry of Natural Resources made presentations on the Russian regulatory requirements and processes. At the request of Sam Thomas, DOE project manager, Wilkins Smith gave an overview of the NRC regulatory process, requirements, and responsibilities. Major discussion topics were the various Russian regulatory authorities' definitions for "basis of design," "design bases," and "complete design," and the extent of design information that would be needed at various stages during the licensing process.

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On July 28-August 1, 2003, NRC staff conducted a seminar workshop for GAN in Moscow on the U.S. MFFF regulations and guidance documents, safety reviews, and conclusions in the following areas: MFFF project, fuel fabrication, and licensing processes; electrical systems; I&C systems; software quality assurance issues; and human factors engineering. Wilkins Smith gave a presentation, "NRC Review of the Mixed Oxide Fuel Fabrication Facility Introduction." He discussed the regulatory requirements and licensing process for the workshop presentation areas. These included the NRC organizational roles and responsibilities, the MFFF polishing and fuel fabrication processes, and the licensing process for MFFF facility construction and operation. Mr. Smith also gave the presentation, "NRC Review of the Mixed Oxide Fuel Fabrication Facility Electrical Systems," for Fred Burrows, NMSS, who had prepared the presentation materials, but was unable to travel to Moscow. Paul Loeser, NRR, gave the presentation, "NRC Review of the Mixed Oxide Fuel Fabrication Facility Instrumentation and Control Systems." Joel Kramer gave the presentation, "NRC Review of the Mixed Oxide Fuel Fabrication Facility Human Factors Engineering." Wilkins Smith and Paul Loeser gave the presentation, "NRC Review of the Mixed Oxide Fuel Fabrication Facility Software Quality Control." Each of these presentations addressed the regulatory structure and requirements, the regulatory guidance in the standard review plan and industry standards, and the NRC review activities and status of issues. The NRC review process of the applicant's submittal and safety evaluation report preparation was presented. Resolutions of technical issues, lessons learned, and future review and inspection activities were outlined as well.

The staff fielded technical and regulatory process questions throughout the week. The meeting was attended by a limited number of GAN personnel and other specialists from Russian laboratories, including Russian experts in the regulatory and technical presentation areas. Upon conclusion of the seminar, GAN personnel complimented the staff on the quality and organization of the seminar. This seminar was the second in a series of training workshops that the staff intends to conduct for GAN on MFFF-related subjects. DOE requested that NRC conduct these seminars to convey information about the staff's review of the domestic MFFF to GAN, since Russia has adopted the design of the domestic MFFF for the Russian MFFF.

Slides used for the workshop presentations, including introductions, electrical systems, I&C systems, human factors engineering, and software quality control can be found in the Agency Document and Management System (ADAMS) (ML031910699). Trip reports for the NRR and RES fuel qualification presentations can also be found in ADAMS (ML032380594 for NRR and ML032300375 for RES).

On August 1, 2003, NMSS staff supported a DOE meeting with GAN management in Moscow to discuss the DOE and NRC MFFF support activities and the technical bases and licensing process for the Russian MFFF. The workshop presentations of the previous two weeks were discussed and the schedule for future workshops and project meetings reviewed. GAN management expressed their thanks and appreciation for the workshop presentations to date, and stated that new information and vision had been provided which would result in regulatory additions and improvements. Some of the presentations, including configuration management and fuel qualification, contained novel thoughts in areas where GAN will plan to pay more attention on the MOX projects. It was agreed that continuing emphasis will be placed on assuring workshop attendance by all of the interested Russian organizations.

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The regulatory requirements, licensing processes, and roles and responsibilities of the various Russian organizations were discussed. Additional information is needed to clarify the various Russian regulatory authorities' needs during the licensing process for "basis of design," "design bases," and "complete design."

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ATTACHMENTS: The agenda for the July 21-23 workshop, the July 24-25 meeting, and the July 28- August 1 workshop are provided as Attachment 1, 2, and 3, respectively.

**JULY 21-23, 2003
WORKSHOP MEETING AGENDA**

July 21, 2003

- 10:00-10:15 Opening remarks (Russian Federation (RF), USA).
- 10:15-10:30 Introduction: Regulating nuclear fuel fabrication in Russia. (RF GAN, Dept.3)
- 10:30-13:00 Presentation from REA; concern on the order of, and requirements to loading subassemblies with new fuel/LTAs into VVER and BN 600 reactor cores.
- 13:00-13:30 Commentaries to the above presentations.
- 13:30-14:30 Lunch
- 14:30-16:00 Presentation: Safety requirements to U-Pu oxide (MOX) Fuel.
Discussion
- 16:00-16:30 Coffee Break
- 16:30-18:00 Presentation: U.S. NRC Neutronics Methods for MOX Applications.
Discussion

July 22, 2003

- 10:00-11:30 Introduction: NRC review of the MOX Fabrication Facility.
- 11:30-12:00 Coffee Break
- 12:00-13:30 Presentation: NRC review of MOX Fabrication Facility. Licensing and Evaluation of MOX in the USA.
Discussion
- 13:30-14:30 Lunch
- 14:30-15:30 Presentation: Current regulatory basis, procedures for development and qualification of U fuel and their suitability for MOX development and qualification. (Gidropress)-VVER designer, core design.
- 15:30-16:30 Presentation: Quality Assurance in fabricating fuel for VVERs (TVEL).

**JULY 21-23, 2003
WORKSHOP MEETING AGENDA**

16:30-17:00 Coffee Break

17:00-18:00 Discussion: Optimization of the "Three LTAs Program", major changes, status of development and implementation (TVEL).
Presentation from Bochvar Institute on "Testing New Fuel and Transitioning to Fabrication."
Discussion

July 23, 2003

Discussion: Issues related to new fuel qualification, its testing, transitioning to fabrication and loading in the core reactor.

Developing and signing ROM.

**AGENDA FOR THE TVEL/DCS
LICENSING MEETING
JULY 24-25, 2003**

Thursday July 24

- 10:00-10:15 Introduction and welcome
- 10:15-11:00 DCS presents a summary of management and program plans
- Regulatory Management Plan
 - Safety Program Plan
 - Chemical Safety Management Plan
 - Environmental Permitting Plan
- 11:00-13:00 DCS presents a summary of the U.S. process
- Introduction to U.S. regulations
 - Possession and use of Special Nuclear Material License
 - Licensing milestones
 - Environmental permitting and other regulations
- 13:00-14:30 Lunch
- 14:30-15:30 Presentation by SCC
- Procedure of getting preliminary agreement of local authorities for MFFF-R siting at SCC and permit to perform site geotechnical studies.
- 15:30-16:30 Presentation by SCC/GSPI
- Organization and schedule of works on getting agreement for MFFF-R siting at SCC.
- 16:30-17:30 Presentation by GAN
- GAN procedure of giving out to the applicant of the license for the MFFF-R siting.
- 17:30 Adjourn for the day

**AGENDA FOR THE TVEL/DCS
LICENSING MEETING
JULY 24-25, 2003**

Friday July 25

- 10:00-11:00 Presentation of GSPI
• Organization and schedule of works on getting GAN license for siting.
- 11:00-11:30 Presentation of GAN/GSPI
• Structure of the documentation directed by the applicant to GAN for getting step-by-step construction license for MFFF-R.
- 11:30-12:00 Presentation of GSPI
• Organization and schedule of works on development of the documentation required for getting license for the first construction step.
- 12:00-13:00 Presentation of GSPI/Ministry of Nature
• Procedure of ecological examination of the design.
- 13:00-1430 Lunch
- 14:30-1530 Presentation of GSPI
• Structure of the Environmental Impact Assessment Report. Organization and schedule of works on its development.
- 15:30-17:00 Develop record of meeting
- 17:00 Adjourn for the day

**GOSATOMNADZOR
ELECTRICAL INSTRUMENTATION
& CONTROL SYSTEMS AND HUMAN FACTORS
AGENDA**

- | | |
|--------------|---|
| Day 1 | Introduction

•Electrical |
| Day 2 | Electrical |
| Day 3 | Instrumentation and Control (I&C) |
| Day 4 | I&C

•Human Factors |
| Day 5 | Human Factors

•Software Quality Assurance |