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on p. 5

July 16, 2003

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

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

FROM: Andrew Persinko, MOX Project Manager /RA/  
Special Projects Section  
Special Projects and Inspection Branch  
Division of Fuel Cycle Safety  
and Safeguards, NMSS

SUBJECT: MAY 19-30, 2003, MEETING SUMMARY: RUSSIAN PLUTONIUM  
DISPOSITION PROGRAM MEETING

Attached is the trip report for travel to Moscow, Russia during May 19-30, 2003, for a meeting on the Russian Plutonium Disposition Program and for an NRC-Gosatomnadzor workshop on nuclear criticality safety. Participation in the meeting is 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 the Russian Federation Gosatomnadzor associated 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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### Foreign Travel Trip Report

**SUBJECT:** May 19-30, 2003 Meeting Summary: Russian Plutonium Disposition Program

**DATES OF TRAVEL AND COUNTRIES/ORGANIZATIONS VISITED:** The meeting with the Russian Federation Gosatomnadzor (Gosatomnadzor) was held on May 19-30, 2003, at Gosatomnadzor offices in Moscow, Russia.

**AUTHOR/TITLE:** Andrew Persinko, Sr. Project Manager, Office of Nuclear Materials Safety and Safeguards (NMSS).

**SENSITIVITY:** Not applicable

**BACKGROUND/ PURPOSE:** The meeting was 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 the Russian Federation Gosatomnadzor associated with plutonium disposition. The purpose of the meeting held May 19-23 was to discuss federal level regulations developed by Gosatomnadzor regarding mixed oxide (MOX) fuel. The purpose of the meeting held May 26-30 was for NRC to conduct a workshop on nuclear criticality safety as applied to the U.S. MOX fuel facility for Gosatomnadzor. DOE is providing assistance to Gosatomnadzor regarding these activities. DOE funded NRC's attendance at the meeting.

**ABSTRACT/SUMMARY OF PERTINENT POINTS/ISSUES:** On May 19-23, 2003, NMSS staff supported a meeting in Moscow attended by the DOE, the European Union, and the Gosatomnadzor. The purpose of the meeting was to review Gosatomnadzor's proposed resolution of comments on federal draft regulatory documents being developed to support the Russian Federation plutonium disposition program. Gosatomnadzor representatives presented the technical and licensing bases for the proposed resolution of technical comments previously received from other participants. The discussion resulted in agreement on changes in Federal Gosatomnadzor regulatory documents. A consensus on future actions, including ways to improve the Russian Federation regulatory document development process, was also accomplished. Funding for the development of the Russian federal regulations is provided by DOE.

On May 26-30, 2003, NMSS staff conducted a workshop for Gosatomnadzor in Moscow on nuclear criticality safety as it relates to the U.S. Mixed Oxide Fuel Fabrication Facility (MFFF). Criticality-related regulations and guidance documents, results of technical discussions with the MFFF applicant, and the staff's criticality safety conclusions contained in the staff's draft Safety Evaluation Reports were discussed in detail with Gosatomnadzor. The staff fielded technical and regulatory process questions throughout the week. The meeting was well attended by Gosatomnadzor personnel and other Russian specialists from Russian laboratories, including Russian experts in nuclear criticality safety. Upon conclusion of the seminar, Gosatomnadzor personnel complimented the staff on the quality and organization of the seminar. This seminar was the first in a series that the staff intends to conduct for Gosatomnadzor on MFFF-related subjects. DOE requested that NRC conduct these seminars in order to convey information about the staff's review of the domestic MFFF to Gosatomnadzor since Gosatomnadzor has adopted the design of the domestic MFFF for the Russian MFFF.

All costs associated with the review of the Russian regulations and the criticality safety seminar were paid for by DOE through a fully reimbursable agreement with NRC.

DISCUSSION: The meeting was the most recent in a series of meetings with Gosatomnadzor to discuss work associated with DOE's Licensing/Regulatory Infrastructure project.

During the week of May 19-23, 2003, DOE, NRC staff (Andrew Persinko), and members of the European Union (EU) met with Gosatomnadzor personnel to discuss resolution of comments on four federal level regulations developed by Gosatomnadzor for plutonium disposition. The regulations discussed were: 1) "Nuclear Safety Rules for Nuclear Fuel Cycle Facilities," 2) "Weapons Plutonium Conversion Facilities Safety Requirements," 3) "Provisions on Procedures for Investigation and Recording of Events in the Operation of Nuclear Fuel Cycle Facilities," and 4) "Siting of Nuclear Installations of Nuclear Fuel Cycle Facilities - Basic Safety Criteria and Requirements." The regulations were in various stages of development. The staff had previously provided comments on "Nuclear Safety Rules for Nuclear Fuel Cycle Facilities," and "Siting of Nuclear Installations of Nuclear Fuel Cycle Facilities - Basic Safety Criteria and Requirements." The regulation entitled "Nuclear Safety Rules for Nuclear Fuel Cycle Facilities," discusses nuclear criticality safety -- the Russians refer to criticality safety as "nuclear safety." The staff's comments were well-received by Gosatomnadzor. In general, the regulations being developed by Gosatomnadzor contain more detail than NRC regulations.

During the week of May 26-30, 2003, NRC staff (Muffet Chatterton and Christopher Tripp) conducted a nuclear criticality safety workshop for the Russian regulators, their contractors and Russian laboratory personnel. The purpose of the workshop was to review the Nuclear Criticality Safety Issues related to MOX Fuel Fabrication Facility designed by the Duke-Cogema-Stone Webster Consortium for the U.S.

Andrew Persinko opened the workshop with introductory comments and gave a presentation, "NRC Review of the Mixed Oxide Fuel Fabrication Facility Status Update." He told about NRC review of Nuclear Criticality Safety (NCS) issues in the MFFF Construction Authorization Request (CAR): determination of design bases, review of CAR against acceptance criteria in the Standard Review Plan (SRP), NRC questions (screened for relevance to design basis), and additional NRC questions based on responses.

The second presentation from Andrew Persinko was "NRC Review of the Mixed Oxide Fuel Fabrication Facility Introduction." Issues discussed during the presentation included the following: NRC role in regulating mixed oxide fuel, MFFF process, licensing process for MFFF, MFFF regulations and guidance, MFFF industry standards.

Muffet Chatterton and Dr. Christopher Tripp made the presentation "NRC Review of the Mixed Oxide Fuel Fabrication Facility." The presentation covered the following topics: 1) introduction and criticality safety concepts; 2) the NRC regulatory framework regarding criticality safety; 3) a review of criticality safety issues based on the MOX fuel fabrication facility construction authorization request; 4) a discussion of the NRC's review of the nuclear criticality safety code validation report, including the determination of subcritical margin; and 5) the current status of the criticality safety review and anticipated future topics.

Ms. Chatterton gave an introduction to NRC criticality-related regulations. She gave a brief

introduction to key concepts in nuclear criticality safety and discussed issues of nuclear criticality safety basic concepts: analysis procedure, hazards and scenario development, controlled parameters, control types, management measures.

Dr. Christopher Tripp discussed the plutonium chemistry, aspects of plutonium (Pu)/MOX, unique aspects of Pu/MOX processing, effect of Pu/chemistry on process flow, effect of Pu/chemistry on system k-effective, Pu/MOX isotopics (assay) control, fission cross sections Pu physical characteristics. He presented an overview of the aqueous polishing process and MOX process. Dr. Tripp discussed the dominant NCS risks and issues, areas of highest NCS risk, effect of isotopic blending of PuO<sub>2</sub> and UO<sub>2</sub>, meeting performance criteria, criticality code validation. He also discussed the details of the staff's nuclear criticality safety review, including the issues that were sufficiently addressed by DCS as well as those that were not.

Slides used by Mr. Persinko in his presentation can be found in the Agency Document and Management System (ADAMS) (ML 031260612). Slides used by Ms. Chatterton and Dr. Tripp can also be found in ADAMS (ML 031320016).

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Distribution

ATTACHMENTS: The agenda for the May 19-23 meeting is provided as Attachment 1. The attendance list for the nuclear criticality workshop held May 26-30 is provided as Attachment 2.

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## Agenda

**Meeting of Representatives of the Federal Authority for  
Nuclear and Radiation Safety of Russia (GOSATOMNADZOR),  
the U.S. DOE/ National Nuclear Security Administration (NNSA),  
the E.U. (CEA, DSIN, ISPN), MINATOM and Regulation Developers from  
GOSATOMNADZOR-SEC and IBRAE  
May 19-22, 2003**

### **U.S./Russian Federation (R.F.) Plutonium Disposition Program Licensing/Regulatory Infrastructure Project**

**Monday, May 19, 2003**

- 10:00 – 10:30 Introductions and Opening Remarks US/RF/European Safety Authorities
- 10:30 – 17:00 Discussion of First Draft Regulation, Review Comments, and Responses to  
Comments for "Nuclear Safety Rules for Nuclear Fuel Cycle Facilities", RD –  
2, PNNL Task Order 5

**Tuesday, May 20, 2003**

- 10:00 – 17:00 Discussion of First Draft Regulation, Review Comments, and Responses to  
Comments for "Weapons Plutonium Conversion Facilities Safety  
Requirements", RD – 3, PNNL Task Order 6

**Wednesday, May 21, 2003**

- 10:00– 17:00 Discussion of Second and Final Draft Regulation, Review Comments, and  
Responses to Comments for "Provisions on Procedures for Investigation and  
Recording of Events in the Operation of Nuclear Fuel Cycle Facilities", RD –  
6, PNNL Task Order 9

**Thursday, May 22, 2003**

- 10:00 – 16:00 Discussion of Second and Final Draft Regulation, Review Comments, and  
Responses to Comments for "Siting of Nuclear Installations of Nuclear Fuel  
Cycle Facilities-Basic Safety Criteria and Requirements", RD – 1, U.S. Task  
Order 4
- 16:00– 17:00 Development and Signing of Record of Meeting

Attachment 1

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**Minatom - VNIPIET**

Vladimir Kulikov

**Minatom - IPPE**

Victor Sviridov

**Minatom - OKBM**

Anatoly Pychugin

Attachment 2

**Minatom - RIAR**

Andrey Valeev

**The Russian Academy of Sciences / Nuclear Safety Institute (IBRAE)**

Alexander Polishchuk

**The U.S. Nuclear Regulatory Commission (U.S. NRC)**Andrew Persinko     Margaret Chatterton  
Christopher Tripp**The U.S. National Nuclear Security Administration (NNSA)**Sotirios (Sam) Thomas, DOE – NNSA     Elena Malofeeva, Interpreter  
Bryan Gore, PNNL     Olga Tikush, Interpreter  
Alexander Kolesnikov, Booz Allen Hamilton     Vova Khavkin, Interpreter  
Anna Koudriavtseva, Booz Allen Hamilton  
Pavel Matveev, Booz Allen Hamilton  
Elena Krivopusk, Booz Allen Hamilton  
Elena Barakhta, Booz Allen Hamilton