

DOE LAB-TO-LAB MPC&A WORKSHOP FOR COOPERATIVE TASKS WITH
RUSSIAN INSTITUTES:
FOCUS ON CRITICAL ASSEMBLIES AND ITEM FACILITIES*

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ABSTRACT

Seventeen Russian scientists and engineers representing five different institutes participated in a Workshop on material control and accounting as part of the US-Russian Lab-to-Lab Cooperative Program in Nuclear Materials Protection, Control, and Accounting (MPC&A).

In addition to presentations and discussions, the Workshop included an exercise at Brookhaven National Laboratory (BNL) and demonstrations at the Zero Power Physics Reactor (critical-assembly facility) of Argonne National Laboratory-West (ANL-W). The Workshop particularly emphasized procedures for physical inventory-taking at critical assemblies and item facilities, with associated supporting techniques and methods.

By learning these topics and applying the methods and experience at their own institutes, the Russian scientists and engineers will be able to determine and verify nuclear material inventories based on sound procedures, including measurements. This will constitute a significant enhancement to MPC&A at the Russian institutes.

I. INTRODUCTION

Seventeen Russian scientists and engineers representing five different institutes participated from April 24 through May 2, 1995 in the DOE Lab-To-Lab MPC&A Workshop for Cooperative Tasks With Russian Institutes: Focus on Critical Assemblies and Item Facilities. This Workshop was part of the US-Russian Laboratory-to-Laboratory Cooperative Program in Nuclear Materials Protection, Control, and Accounting

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(MPC&A)¹, sponsored by the US Department of Energy. BNL coordinated the Workshop on behalf of the Lab-to-Lab Program.

II. OBJECTIVES

The objective of the US-Russian Lab-to-Lab Cooperative Program in Nuclear Materials Protection, Control, and Accounting (MPC&A) is to make rapid improvements in the protection, control, and accounting of nuclear materials, especially weapons-usable materials (separated plutonium and highly enriched uranium), by working directly and cooperatively with Russian laboratories and institutes. The method for meeting this objective is through tasks with Russian institutes to improve their MPC&A. Of particular significance in the planning of the Workshop were tasks with the Institute of Physics and Power Engineering in Obninsk.²

By learning the Workshop topics and applying the methods and experience at their own institutes, the Russian scientists and engineers will be able to determine and verify nuclear material inventories based on sound procedures, including measurements. This will constitute a significant enhancement to MPC&A at the Russian institutes; indeed, this is already in progress.³

III. ACTIVITIES

A. General

The Workshop was divided into two segments, the first at BNL and the second at ANL-W. Staff members from the five Russian institutes (Table 1) and from six US national laboratories (Table 2) contributed to the presentations and discussions. The contributions from speakers with safeguards experience at operating nuclear facilities were particularly valuable. The topics and activities for each segment appear in Tables 3 and 4 respectively. In addition to hearing presentations about material control and accounting in the US, the Russian scientists and engineers discussed MPC&A at their institutes. (Appendix 1 lists the speakers.)

Lively discussions about the presentations took place. Little encouragement was needed, because the Russian scientists and engineers are actively at work on tasks to improve MPC&A at their own institutes and seek detailed understanding of MPC&A requirements and practices elsewhere.

The Workshop written materials were translated into Russian for ease of use by the Russian participants. There were simultaneous interpretations of the oral presentations and discussions at BNL, and consecutive interpretations of the presentations and discussions at ANL-W.

Highlights of the Workshop were the tour and demonstration at the ZPPR critical facility of ANL-W, the physical-inventory-taking (PIT) exercise at BNL, and descriptions of PIT experiences at other operating facilities.

B. Highlights at Brookhaven

One major facility at BNL is the High Flux Beam Reactor (HFBR), heavily used for research and development. Fuel for the HFBR, as well as other special nuclear material items at BNL, are subject to MPC&A. Thus, some aspects of MPC&A as conducted at BNL were presented at the Workshop.

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Table 1. Russian Institutes Participating in the Workshop

IPPE--Institute of Physics and Power Engineering, Obninsk

KI RRC--Russian Research Center "Kurchatov Institute", Moscow

**VNIIEF--Russian Federal Nuclear Center Institute of Experimental Physics, Kremlev
(Arzamas-16)**

**VNIINM--Bochvar All Russian Scientific Research Institute of Inorganic Materials,
Moscow**

**VNIITF--Russian Federal Nuclear Center Institute of Technical Physics, Snezhinsk
(Chelyabinsk-70)**

Table 2. US National Laboratories Participating in the Workshop

ANL-W--Argonne National Laboratory-West, Idaho Falls, Idaho

BNL--Brookhaven National Laboratory, Upton, New York

LANL--Los Alamos National Laboratory, Los Alamos, New Mexico

LLNL--Lawrence Livermore National Laboratory, Livermore, California

ORNL--Oak Ridge National Laboratory, Oak Ridge, Tennessee

PNL--Pacific Northwest Laboratory, Hanford, Washington

Table 3. Workshop Topics At BNL

Overview of US Domestic Safeguards
Special Nuclear Material and Detection Goals
Presentations by Russian Institutes
Tour of BNL Facilities
Material Accounting Basic Concepts
Measurements
Physical Inventory Taking
Statistical Aspects of Material Accounting
Inventory-Taking and Measurement Control Exercise
Introduction To Zero Power Physics Reactor at ANL-W
Material Protection, Control & Accounting Effectiveness Evaluation
Discussion, Review, & Summary

Table 4. Workshop Topics At ANL-W

ANL-W Safeguards and Security
ANL-W Safeguards Organization
Material Protection, Control & Accounting at ANL-W
Tour of Zero Power Physics Reactor (ZPPR)
ZPPR Inventory Process: Movie and Demonstration
Discussions and Review

Table 5. Speakers

ANL-W

John I. Sackett
Bruce W. Meppen
Roger D. Haga
R. David Moore
Daniel Garcia
Kelly R. Moedl
Jerry A. Weber
David N. Olsen

BNL

Alan M. Bieber, Jr.
Kris S. Dahms
Leslie G. Fishbone
Walter R. Kane
Walter Y. Kato
C. Ruth Kempf
Raymond J. Parsick
Jonathan B. Sanborn
Otto W. Lazareth
Sylvester C. Suda

IPPE

Valeri Y. Poplavko
Igor P. Matveenko

KI

Alexandre N. Roumiantsev

LANL

Lawrence A. Bruckner
Norbert Ensslin
Richard Morgado
Rena Whiteson

LLNL

Michael P. O'Brien
Wayne D. Ruhter

ORNL (Y-12)

William H. Hopwood, Jr.

PNL

Steven C. Schlegel

VNIIEF

Sergei F. Razinkov

VNIINM

Vladimir F. Kositsyn

VNIITF

Alvetin M. Karpov

