

Y-12 Oak Ridge  
Y-12 Plant

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Lessons Learned in Implementing IAEA Safeguards  
on U.S. Excess Fissile Materials  
Oak Ridge Y12 Plant

J. M. Whitaker  
National Security Program Office

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LESSONS LEARNED  
IN IMPLEMENTING IAEA SAFEGUARDS  
ON U.S. EXCESS FISSILE MATERIAL  
OAK RIDGE Y-12 PLANT

Summary of presentation by  
Michael Whitaker  
Oak Ridge National Security Program Office

Highly enriched uranium (HEU) at the Oak Ridge Y-12 Plant was the initial U.S. excess fissile material to be placed under International Atomic Energy Agency (IAEA) safeguards. This presentation describes the setting in which the U. S. offer was made and five lessons learned from that experience.

Several significant obstacles had to be overcome by the U.S. Department of Energy (DOE) to make the offering a reality:

- (1) Neither specific materials nor specific facilities were identified when the President announced on September 27, 1993, that the United States would make HEU and Plutonium no longer needed for the U.S. deterrent subject to IAEA safeguards.
- (2) The initial allotment of excess HEU located at the Y-12 Plant was commingled with non-excess materials, and the material-handling activities required to separate the two had not been envisioned, much less budgeted for and prioritized.
- (3) The Y-12 Plant has a national defense mission and many Site activities and operations are of direct national security significance. Thus, a facility to store the excess HEU had to be identified and isolated from the rest of the plant operations.
- (4) Nearly a decade had elapsed since the IAEA had selected a DOE facility for the application of IAEA safeguards. During this time period, DOE was reorganized, the U.S. interagency process changed, the IAEA began to strengthen the implementation of international safeguards following the Gulf War, and most of the individuals involved in the implementation process in the mid-1980s had assumed different responsibilities.

#### Lesson 1: Things May Happen Quickly

Within two months of the Presidential announcement, DOE identified specific material and a facility at the Oak Ridge Y-12 Plant and the Site hosted a visit by IAEA officials for a familiarization briefing and orientation tour. DOE authorized Y-12 to proceed with preparations in April 1994, and the State Department notified Congress in July of its intent to add a Y-12 storage facility to the list of U.S. facilities eligible for IAEA safeguards. The United States notified the IAEA that the facility was eligible on September 5, 1994. The IAEA selected the facility three days later and the verification of the design information and the initial inventory were completed by September 16. Thus, in less than a year from conception, the initial offering of U.S. excess fissile material successfully became subject to IAEA safeguards.

## Lesson 2: Facility and Supporting Areas Must Provide for Needs of the IAEA to Perform their Inspection Activities.

Providing for the needs of the IAEA to conduct their inspection activities at Y-12 posed significant logistical difficulties because the eligible facility was located in the heart of a plant with a national defense mission. The Site had to develop a strategy for protecting sensitive U.S. information while providing the IAEA access to the excess HEU. In order for the IAEA to independently verify the inventory, nondestructive assay measurement stations and a glove box had to be installed in an adjacent supporting area. Finally, provisions were necessary for the IAEA to apply independent containment and surveillance measures to provide them with continuity of knowledge between inspections.

## Lesson 3: Familiarize Site Personnel with IAEA Safeguards

Initially, few Site personnel were knowledgeable of international safeguards. Safeguards tutorials should be conducted to familiarize personnel with the structure and mission of the IAEA and to describe the safeguards implementation process. Working groups comprised of representatives of each potentially affected discipline should be established. The Site should conduct mock inspections or table-top exercises to identify all regulatory requirements (badging, training, etc.) and to identify methods for expediting the process.

## Lesson 4: Prepare for the Initial Inventory Verification

The initial inventory is a time-consuming and labor-intensive activity. A number of specific activities should be completed as early as possible to prevent lengthy and costly delays. Equipment and instrumentation provided by the IAEA must be received and processed into the area. Calibration standards provided by the plant should be identified, fabricated, and certified well in advance of the verification. Site escorts and support personnel have to be identified and undergo extensive training. If possible, the measurement capabilities of specific IAEA instruments should be established prior to the start of the physical inventory - this may reduce the number of items that have to be handled during the verification.

## Lesson 5: Prepare for Inspections

Many separate Site functions are required to support inspections: badging, operations, nuclear material control and accountability, physical protection, health physics, safety, etc. Anticipated schedules should be prepared and distributed to ensure that all Site functions are prepared to respond when needed. A few golden rules that apply to all situations are (1) don't assume anything, (2) put it in writing, (3) maintain continuous dialogue, and (4) allow extra time.

Making the initial portion of U.S. excess fissile material available for IAEA safeguards was a significant accomplishment for the DOE. The actions taken by the Y-12 Plant to prepare for the inspection activities ensured timely and successful implementation of international safeguards for excess HEU at the Site. The IAEA has stated that "never before had so much material, of such high strategic significance been verified so fast with such a high degree of confidence."