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The U.S. Support Program to IAEA Safeguards - 2008

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Abstract

The U.S. Support Program to IAEA Safeguards (USSP) was established in 1977 to provide technical assistance to the IAEA Department of Safeguards. Since that time the U.S. Department of State has provided funding of over \$200 million and over 900 tasks have been completed by USSP contractors on behalf of the IAEA. The USSP is directed by a U.S. interagency subcommittee known as the Subgroup on Safeguards Technical Support (SSTS) and is managed by the International Safeguards Project Office (ISPO) at Brookhaven National Laboratory. In recent years, the SSTS and ISPO have identified priorities to guide the process of determining which IAEA requests are aligned with U.S. policy and will be funded. The USSP priorities are reviewed and updated prior to the USSP Annual Review Meeting which is hosted by the International Atomic Energy Agency (IAEA) each spring in Vienna, Austria. This paper will report on the 2008 USSP priorities and be an introduction for a session which will consist of four papers on USSP priorities and four other papers related to USSP activities.

Introduction

The U.S. Support Program to IAEA Safeguards (USSP) was established in January 1977 and January 2007 marked its thirtieth anniversary. The program was established to respond to identified, urgent needs of the IAEA Department of Safeguards more quickly than could be met through IAEA administrative procedures. Although it was originally intended as a short-term program, the program has continued because it has been successful transferring technology from the U.S. national laboratories and commercial equipment suppliers. Since 1977 the USSP has contributed funding in excess of \$200 million and has funded over 900 tasks. The tasks are generally categorized as nondestructive and destructive analysis instrumentation, procedures and training, system studies, information technology, containment and surveillance, and management support.

Management of the USSP

In 1993, the United States formed an organization of interagency committees that address various aspects of the IAEA's mission (Fig. 1). The IAEA Steering Committee provides direction to the subcommittees and subgroups. The Subcommittee on International Safeguards and Monitoring (SISM) provides policy oversight of two subgroups: the Subgroup on the Implementation of Safeguards in the United States (SISUS) and the Subgroup on Safeguards Technical Support (SSTS).

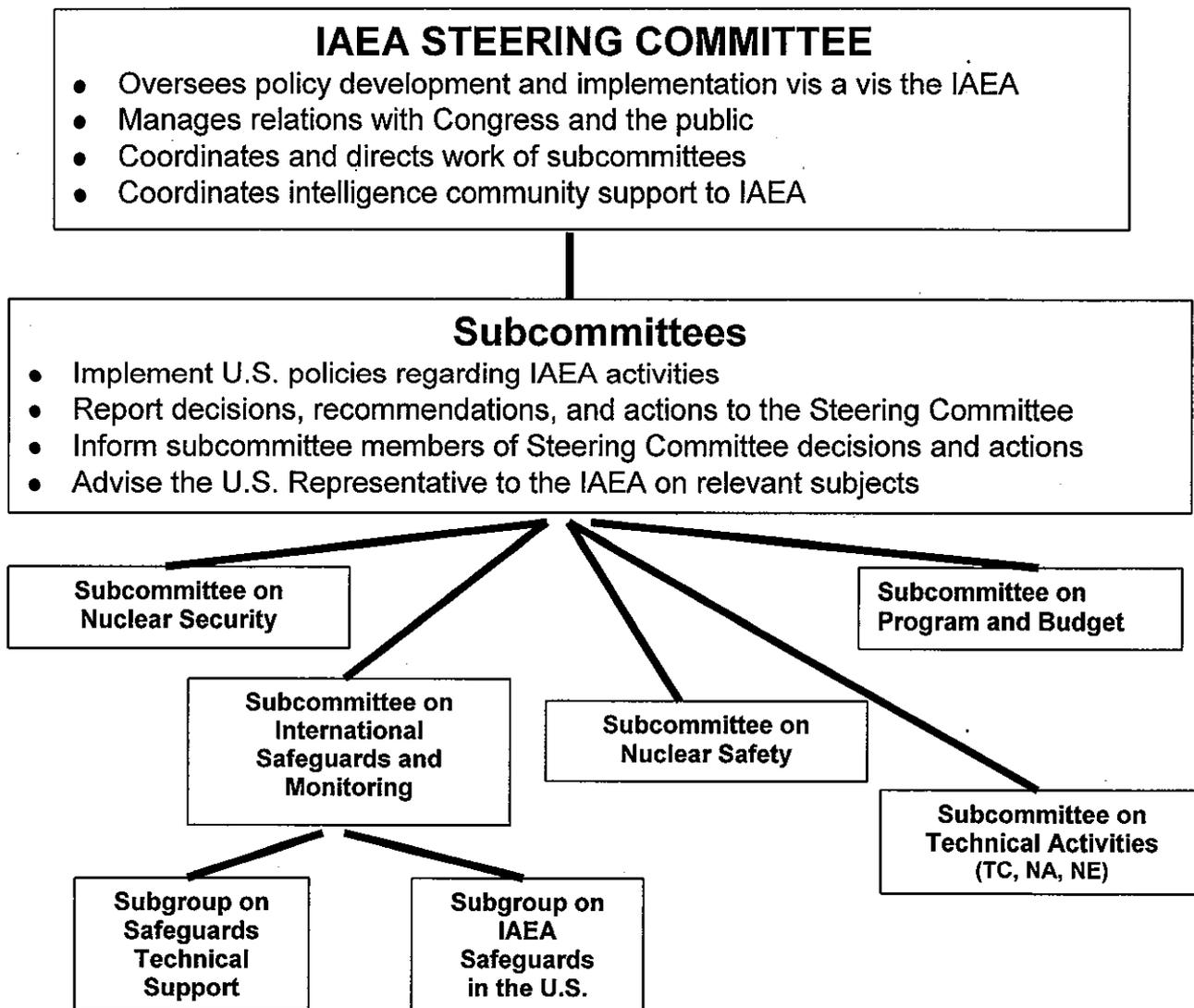


Figure 1: IAEA Steering Committee Structure

The SSTS provides programmatic oversight of the USSP and is responsible for the approval of funding for its activities. The SSTS is composed of representatives from the Department of Energy, the Department of State, the Department of Defense, and the Nuclear Regulatory Commission. The SSTS is chaired by the representative from the Department of Energy. Funding is provided primarily through the U.S. Voluntary Contribution to the IAEA under the Program of Technical Assistance to IAEA Safeguards (POTAS), but the represented agencies sometimes provide funding for specific tasks. In 2007 and 2008, the funding for POTAS was \$14.4 million each year.

The International Safeguards Project Office (ISPO) at Brookhaven National Laboratory (BNL) has provided technical and administrative management of the USSSP since the establishment of the program. ISPO also maintains an office within the U.S. Mission to International Organizations in Vienna where the ISPO Liaison Officer is posted. The Liaison Officer receives official requests from the IAEA for USSSP support and works closely with the IAEA to transfer information and to ensure that USSSP activities are meeting the IAEA's safeguards needs. The ISPO staff at BNL includes four technical monitors who review the IAEA's requests, formulate strategies for providing the technical support needed, identify appropriate contractors if appropriate, solicit proposals, and present the information to the SSTS along with a funding recommendation.

Priorities

The USSSP has generally been able to respond to all IAEA requests that are consistent with U.S. government policy. However, to ensure that funding is available to meet all high priority needs, the SSTS and ISPO meet annually to define the USSSP's priorities and funding profiles for the larger, multi-year tasks. The priorities were last reviewed and updated in May 2008 in preparation for the 2008 USSSP Annual Review Meeting. The priorities include:

- Quality Management
- Human Resources and Training
- Analysis and Evaluation of Inspection Samples
- Nondestructive Analysis
- Containment and Surveillance
- Information Technology, Collection and Analysis
- Safeguards Concepts and Implementation

The priorities are not listed in any particular order and no priority is more important to the USSSP than the others. The priorities also are not exclusive; the fact that a technical subject is not addressed by the priorities does not indicate that it will not be funded. The 2008 USSSP Priorities are the subject of four other presentations during the 2008 INMM Annual Meeting [1,2,3,4].

The USSSP only addresses the IAEA's safeguards needs. Requests from other departments of the IAEA cannot be funded with POTAS funds. Also, in most cases, the USSSP responds to formally transmitted requests from the IAEA; the only exceptions to this policy are projects that the SSTS strongly believes should be undertaken to improve the quality and effectiveness of the USSSP or international safeguards.

USSP Contributions

As mentioned above, the USSSP has a long history of support to IAEA Safeguards. The following sections provide information about significant past contributions as well as current activities of the USSSP in the six traditional areas of support.

Material Control and Accountability

To provide an historical perspective, early contributions in the area of nondestructive analysis included the HM-4, a hand-held gamma radiation detector, which was developed at BNL by Martin Zucker with funding provided by the USSSP under the name of Brookhaven Survey Assay Meter. The HM-4 improved the IAEA's ability to detect uranium. The Portable Multi-Channel Analyzer (PMCA) was developed by Los Alamos National Laboratory (LANL) and was commercialized by Davidson. The development of this instrument was aided by the advent of faster computing. These two instruments, or their descendants, are still in use at the IAEA today.

For the last decade, the USSSP has assisted the IAEA with the integration of nondestructive analysis and surveillance instruments into unattended monitoring systems (UMS). These systems allow the IAEA to collect data in the absence of inspectors to increase the IAEA's efficiency. Two cost free experts (CFEs) have worked with the IAEA Division of Safeguards Technical Services to strengthen the IAEA's remote monitoring capabilities in several countries. The IAEA has UMS in numerous countries and the IAEA's recent reorganization resulted in the formation of the Remote Monitoring Unit in the Division of Safeguards Technical Support (SGTS).

Containment and Surveillance

The USSSP contributed to the development of the paper and loop seals, such as the metal, Cobra and VACOSS seals. The USSSP also funded seal readers and the integration of seals into UMS. Beginning with sponsorship and participation in the 2004 Coordinated Technical Meeting on Future Sealing and Containment Verification Techniques and Methods aimed at modernizing IAEA seals and improving seal performance, the USSSP has been assisting the IAEA with seal upgrades, vulnerability assessments and investigation of new sealing technologies.

The USSSP has assisted with the development of several surveillance systems. Sandia National Laboratories (SNL) designed the first surveillance system – STAR. SNL also designed the Modular Integrated Video System (MIVS) which was commercialized by Aquila Technologies Group, now known as Canberra Albuquerque. In the 1990s, the USSSP funded the development by Aquila of the Gemini surveillance system. When the IAEA chose the German-designed DCM-14-based surveillance system for implementation, the USSSP provided funding for procurement of the systems and upgrades. Since 2004, the USSSP has been collaborating with the German Support Program to development the Next Generation Surveillance System [2,7]. Testing of this system is scheduled to begin in 2009.

Training

The USSSP funded a training cost free expert, Gene Bates, in 1979. Mr. Bates is credited with starting the Safeguards Training Section, and he remained with the IAEA as the section head for Safeguards Training until 1995. The USSSP continues to sponsor and host training courses for new and experienced safeguards inspectors and other safeguards staff. Courses include nondestructive analysis (NDA) of nuclear materials at LANL, Advanced Plutonium Verification Techniques at

LANL, pyroprocessing at Idaho National Laboratory, Radiation Review Software delivered by LANL and Sonalysts, Inc., at IAEA Headquarters, observational and communication skills delivered by Sonalysts, Inc., at IAEA Headquarters, Enrichment Plant Safeguards delivered by Oak Ridge National Laboratory at IAEA Headquarters, and complementary access at BNL [1].

System Studies

The Technical Support Organization at BNL, now the Nonproliferation and National Security Department, had traditionally been the primary source of expertise in system studies. BNL assisted with the development of safeguards approaches, in particular the mailbox approach. Cost free expert John Jaech provided assistance to the IAEA in statistical analysis of inspection data, determination of surveillance intervals and optimization of sampling protocols.

Information Technology

One of the USSP's first contributions to IAEA Safeguards was a cash contribution for the procurement of an IBM 370/158. The USSP provided funding for a lease that started in 1977; the IAEA took over the lease in 1978. This computer was used to manage the data provided in the Member States' safeguards declarations. The USSP also provided funding for a Xerox 7000 reducing copy machine that the IAEA used for reproduction of safeguards confidential computer printouts. These contributions demonstrate the basic needs the IAEA had at the beginning of the USSP.

Two of the USSP's first cost free experts were assigned to the Division of Safeguards Information Treatment (SGIT). John Oakberg, who retired in 2007 after 25 years, was responsible for member state declarations. Joseph Nardi retired in 1995 as the section head of what is now the Declared and Statistical Information Analysis Section, which was responsible for the receipt and processing of the information contained in the member states' declarations. Many CFEs were assigned to SGIT for software and database development and administration.

The USSP now provides support to many complex initiatives in what is now the Division of Safeguards Information Management (SGIM). The USSP sponsors cost free experts, Junior Professional Officers, and consultants who support open source information collection and analysis, expertise and equipment for satellite imagery analysis, expertise in environmental sampling and sample analysis, and software and database development. The USSP has contributed 50% of the extrabudgetary portion of the IAEA's Safeguards Information System Re-engineering Project. This multi-year project, which has an estimated cost of \$35 million and is being supported by multiple Member State Support Programs, is being developed by CapGemini and is due to be complete in 2010. The USSP has provided support to related software development projects including the Support Program Information Computer System 2.0 (SPRICS 2.0) and the State Level Follow Up Action System [3].

Special Tasks

The USSP has included under its management a series of tasks that were, in one way or another, considered outside the main focus of the program. These include tasks that were funded by sources other than POTAS, such as the equipment funding that the Department of State provides under the U.S. Voluntary Contribution or the Nonproliferation and Disarmament Fund, attendance at IAEA experts or consultant group meetings, and tasks that are not specifically requested by the IAEA but are considered by the SSTS to be important for improving the quality and effectiveness of the USSP or international safeguards.

Since 1994, the USSP has provided over \$50 million for the procurement of commercially available safeguards equipment. The USSP began providing this funding in recognition of the impact of the Agency's zero real growth budget. The IAEA used this funding to purchase virtually all surveillance equipment installed since 1998, personal computers and laptops, seals, remote monitoring instrumentation, and destructive analysis equipment.

Topical Workshops

In 1999, ISPO began a series of topical workshops. Each workshop was planned to address a specific issue facing the IAEA at the time of the workshop. ISPO invited experts from a variety of sectors to attend the workshops; some attendees who were invited to attend did not have any previous experience working with the IAEA or in international safeguards. Over time, ISPO adopted a "gaming" format in which participants were presented with scenarios that summarized particular problems that the IAEA wanted to solve. The participants are encouraged to brainstorm potential solutions to the problems. The workshops are discussed in detail in a separate paper [5], but a list is provided in Table 1 for information. Most of these workshops were primarily organized by ISPO, usually with IAEA cooperation, and others were organized by the IAEA; they are included in Table 1 if the USSP hosted the workshop or provided professional facilitation.

Process Statements

Since 1993 when the USSP was reorganized, the SSTS has developed a set of eight process statements that guide the activities of the USSP. These statements, which formalize the various processes required by the USSP, will be addressed in another paper [6], but they are listed in Table 2 for reference. These statements can be accessed on ISPO's web site at www.bnl.gov/ispo.

Summary

In its thirty-one year history, the USSP has supported the IAEA Department of Safeguards by transferring technology available in the United States that would otherwise be unavailable to the IAEA due to budgetary or organizational obstacles. The USSP is structured to ensure that there is appropriate oversight by the U.S. interagency and there is day-to-day technical and administrative management of the program. This structure ensures that the IAEA is getting the products that it needs in a reasonable timeframe. Since 1977, the USSP has contributed over \$200 million and