IAEA Domestic Inspections in the US

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Abstract

The Voluntary Offer Agreement between the United States and the International Atomic Energy Agency (IAEA) for the implementation of IAEA safeguards in the United States, INFCIRC/288, entered into force in 1980. Under this agreement, the United States provides the IAEA with an Eligible Facilities List, which includes facilities eligible for IAEA inspection and verification of compliance through either a reporting-only process or for full-scope safeguards (to include inspections). Approximately 300 facilities are currently listed on the Eligible Facilities List. Since 1981, the IAEA has conducted over 700 inspections at about 20 of these facilities. Currently, four US Nuclear Regulatory Commission-licensed facilities have been selected under the Initial (Reporting) Protocol, and one Department of Energy facility, K-Area Material Storage at the Savannah River Site, has been selected for full-scope safeguards. These IAEA inspections are documented in the ID/288 database managed by staff at Oak Ridge National Laboratory and the Y-12 National Security Complex for the National Nuclear Security Administration Office of Nonproliferation and Arms Control. This database also maintains records of US-designated inspectors, the status of indices checks, and inspection schedules. The database was most recently updated in fiscal year 2014 to include information related to the IAEA visit to Urenco USA in New Mexico and will be upgraded again via proposal in fiscal year 2017 to include the Small Quantities Protocol inspections in the US Caribbean territories, which are associated with INFCIRC/366. During the fiscal year 2017 upgrade, the system will also be overhauled to allow for quicker updates and to improve performance using a modern software package.

ID/288 - Background

The ID/288 system is a web-based system designed to provide the capability to store and retrieve information related to IAEA inspections in the United States. The system provides information including but not limited to inspection schedules, post-inspection reporting, maintenance of the IAEA inspector information and information on each facility eligible and selected for inspection.

The system has many users, with two levels of access – either read-only or read-write access. The users span many different organizations including the US Department of State, Department of Energy/National Nuclear Security Administration, Defense Threat Reduction Agency, and employees of the national laboratories including Oak Ridge National Laboratory (ORNL) and Pacific Northwest National Laboratory (PNNL) as well as Y-12 National Security Complex (Y-12).

The need for the ID/288 system comes from the agreement between the United States and the IAEA for the implementation of IAEA safeguards in the United States (INFCIRC/288). The agreement was signed in 1977 and entered into force in 1980. Under the INFCIRC/288, the US voluntarily provides the IAEA a list of facilities eligible for IAEA inspection. As of 2017 there are approximately 300 facilities on the Eligible Facility List (EFL). Because the U.S. is recognized as a Nuclear Weapons State under the Treat on the Nonproliferation of Nuclear Weapons, they are not obligated to have a Comprehensive Safeguards Agreement and the IAEA cannot inspect any nuclear facility in the United States – because only some of the facilities are on the list. Any site that has a direct national security significance is excluded from the eligible facility list.

Safeguards at Nuclear Regulatory Commission (NRC) Facilities

Since 1980, over 265 facilities licensed by the NRC have been placed on the list of US facilities eligible for IAEA safeguards reporting and inspection. Four NRC-licensed facilities are currently selected for application of safeguards and inspection by the IAEA and are therefore submitting nuclear material accounting data to the IAEA. The four sites are AREVA NP Inc. in Richland, Washington; Westinghouse Electric Company, LLC in Columbia, South Carolina; and Global Nuclear Fuel-Americas, LLC in Wilmington, North Carolina, and Louisiana Energy Services, also referred to as URENCO USA, in Eunice, New Mexico.

The NRC has approximately 250 facilities on the EFL, with a mix of operating commercial nuclear power reactors, commercial nuclear reactors under construction with an application for an operating license, commercial nuclear reactors under application status, research reactors and critical assemblies, conversion plants, fuel fabrication and processing plants, separation stage facilities, enrichment facilities, source material, and other nuclear facilities.

Although there are far more sites on the NRC side of the EFL, the DOE facilities still make up more than 10% of the overall number, and currently there is only one DOE site that is visited regularly.

Safeguards at DOE Facilities

DOE lists 29 facilities on the EFL which includes six Reactors and Critical Assemblies, two Conversion Facilities, one Fuel Fabrication Facility and twenty Other facilities. Various national labs also have sites on the DOE-EFL. For example, ORNL has four sites on the EFL – the Irradiated Fuels Examination Facility, the Radiochemical Engineering Development Center (REDC), buildings 7930 and 3019, and the High Flux Isotope Reactor (HFIR).

Eligible Facility List

When updated, the Eligible Facility List is submitted for Congressional review by the Secretary of State. Per 10 CRF 75.4, a copy of the Eligible Facility List (EFL) is available at www.nrc.gov. A facility can be kept off the EFL if the facility has direct national security significance. When a site is considered for the EFL the US agrees to permit the application of the provisions for each treaty excluding only instances where its application would result in granting access by the IAEA to activities with direct national security significance to the U.S. or to locations or information associated with such activities.

History of Safeguards Inspections in the US

The first IAEA inspections of US facilities began in 1962. The IAEA inspected three research reactors and a power reactor "to test its procedures on plants of differing designs and function." Following the entry of the ID/288 into force, several different sets of inspections have occurred in the United States. Between 1981 and 1990, a total of 209 inspections were conducted at 14 different facilities, including six nuclear power stations, six fuel fabrication plants, one storage location, and one gas centrifuge enrichment plant.

In 1994, DOE initiated the process of making facilities containing materials that were declared excess to US defense needs (i.e., highly enriched uranium and plutonium) available for the application of IAEA safeguards. Specific storage vaults at the Hanford Site, in Richland, Washington; the Rocky Flats Environmental Technology Site (RFETS) near Denver, Colorado; the Y-12 in Oak Ridge, Tennessee; and the BWXT Naval Nuclear Fuel Division (BWXT-NNFD) in Lynchburg, Virginia, were subject to inspection.

The plutonium placed under safeguards at RFETS was subsequently transferred to K-Area Material Storage (KAMS) at the Savannah River Site. On December 2, 2002, the last material transfer took place. Afterward, the site was closed and RFETS was removed from the EFL and KAMS was added. Currently, the only DOE site selected for inspection is KAMS.

On June 15, 2006, the project to downblend 50 MT of highly enriched uranium at BWXT-NNFD was completed and the facility was removed from the EFL. Plutonium at Hanford was also transferred to KAMS. The last IAEA inspection at Hanford was conducted on September 24, 2007. The facility was deselected for inspection by the IAEA in 2009 and was removed from the EFL in 2010. The last Y-12 inspection was conducted on April 15, 2009. The facility was deselected for inspection by the IAEA in 2009 and was removed from the EFL in 2010.

After the agreement came into force in 1980, inspections began in 1981. Since 1981, between 700 and 1000 inspections have been conducted under the agreement. From 1981 to 1990, a total of 209 inspections were conducted at 14 different facilities. Since the first DOE inspection in 1994, over 600 inspections have been conducted at five DOE facilities. In 2014 and 2015, the IAEA also did inspections at Louisiana Enrichment Services in New Mexico.

System Architecture

Oak Ridge National Laboratory maintains the ID/288 inspection notification and reporting database. The US Mission to International Organizations in Vienna notifies ORNL electronically of the monthly inspection dates, locations and inspectors for the KAMS site. ORNL notifies the stakeholders, and alerts the inspection site, confirms the inspector's designation and that verifies that his or her indices are current. ORNL collects the post-inspection reports (loaded by the inspection site) and produces an annual report on IAEA inspections in the US.

Currently there are approximately 20 users with various levels of access. There is one webmaster, two administrative members, and a mix of read-only and read-write access split between the rest of the user group. The people with access vary from State Department, DOE/NNSA, contractors, national lab employees, NRC, DTRA, and Y-12 staff.

The system has seven icons on the main screen, and top row includes three icons. The first icon is the *inspection schedule*. The inspection schedule is sent from the IAEA to the U.S. mission and then onto the ORNL staff. Once the inspection notice has been distributed to the stakeholders, it is loaded into the database. The ID-288 system administrators check the indices of the inspector to ensure quick entry to the site, and confirm that he/she has the designation of a US inspector. The second icon on the screen is the *Add/Edit/View Post Inspection Report* icon. When using this item on the menu, the ID/288 system administrators can mark the inspection as "remote," and the point of contact at the inspection site can input the Post-Inspection Report which includes details relating to the inspection and documents the hours worked by all involved. The third icon, *IAEA Personnel File*, has a list of all inspectors and past inspectors (those that are inactive are designated so) and a quick link to their indices. Indices are typically updated quarterly, by the US DOE.

The bottom row of the main menu has four icons. The first is *reports*. Reports can be selected from a pulldown menu, each includes filters for dates, inspector or material balance area. The filters allow the user to more quickly identify the data needed. The second icon is the *review/approve post inspection reports*. This is used by the POC at the inspection site to upload the report once it has been reviewed by the cognizant federal employee. The third icon is a *search* utility for quick finds, like an inspector's name. The fourth icon contains *eligible facility information*, both past and present. The system includes information relating to the location of the site, when it was added to the EFL (and the date removed if relevant), the date of the initial Physical Inventory Verification, any changes to the Design Information Questionnaire, the type of material at the site and the site identification code.

The system also has a location to store reference documents. Some of the documents currently included are the ID/288 users guide, the US-IAEA Safeguards Agreement, INFCIRCs 140 (NPT), 225 (CPPNM), 288 (Agreement Between the United States of America and the Agency for the Application of Safeguards in the United States of America), and 540 (Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards).

Small Quantities Protocol (SQP)

Beginning in 2005, the IAEA developed a new reporting and inspection regime (the modified Small Quantities Protocol) for countries with limited nuclear infrastructure (i.e., without facilities) and limited quantities of nuclear material (to include source and special nuclear material, and extending to nuclear materials in non-nuclear end uses (e.g., depleted uranium in shielding). Although the United States is categorized as a Nuclear Weapons State, there are 25 NRC entities that will be required to report under the SQP located in Puerto Rico and the USVI. Following adoption and entrance into force of the modified SQP by the US in March 2017, the US will be required to report information to the IAEA on source and special nuclear material and permit IAEA inspection access to declared locations in the US Caribbean Territories that possess source or special nuclear material. Discussions between the NRC and the ID/288 team determined that the ID/288 database would be a logical location to store these documents.

System Updates

The system has undergone several updates over the years including but not limited to the inclusion of multiple inspections on an interim inventory verification, adding a second event during a month (an update as well as an inspection), and more explicitly differentiating between the DOE and NRC inspections more explicitly.

When Urenco USA was selected for IAEA safeguards, the NRC layer was added to the ID/288 online system to ensure a secure location for the various documents needed for the inspections the IAEA would do in New Mexico. The current system was a logical place for this addition, since many of the other components needed (inspector lists with indices) would be easily accessible – a one-stop shop. The system did not have many changes that could be seen cosmetically, but it was necessary to add the ability to load multiple inspections in the month. Since the upgrade in 2014, the IAEA conducted two inspections at Urenco USA – one in 2014 and one in 2015. During the inspections in New Mexico, the NRC became more integrated in the system, as several members of their staff attended the inspections alongside the IAEA.

During the summer of 2016, negotiations began between the NRC and ORNL to add an additional layer to the ID/288 to host the inspections falling under the modified SQP in the US territories. Several other discussions occurred, and culminated with a face-to-face meeting at NRC headquarters in Maryland in 2017. The new layer will include the new locations, and the team must determine how to differentiate between the sites, because all of the Caribbean territories are under one material balance area. There are currently RIS codes for nine locations and the others will be assigned later. Although the NRC is currently involved in the inspections at Urenco USA, there will be additional information uploads (e.g., paperwork), that will be done by NRC staff. There are some concerns about the level of security needed for certain documents, but the NRC and State Department will confirm.

As mentioned above, the team has been discussing an overhaul to the system to facilitate knowledge transfer. To further keep up with Y-12's security requirements, the team also determined it was time to migrate to a new server. The current software, ColdFusion, is not

familiar to younger coders, and there are potential sources of errors that could be limited with simple upgrades. Thus, the decision was made to migrate to SQL server. For instance, the date fields used to select the dates for the inspection are currently text fields, rather than date fields, which could lead to a keystroke error, including the wrong date, or a finish date earlier than the start date, etc. The upgrade will also include an automated email system to send out the inspection notice, as well as any further updates (for instance, notice of remote inspection). There will also be additional controls to differentiate the employees of the various agencies. Since the indices are also kept in the database, an automated check will be added that the team is notified of any expiring indices, which would avoid any close calls. According to the webmaster, the reliability and performance of the site should improve following the upgrades as well.

Conclusion

In closing, the ID/288 has been in force for over 30 years and allows for IAEA inspections in the United States. To maintain information on the inspections, the ID/288 database was built and is being maintained by ORNL and Y-12 staff. Currently, unofficial inspection notices are distributed via ORNL and Y-12 channels. The database not only contains the inspection notice, but it also contains the inspector lists, inspector indices, and designations, the reports submitted by the site following inspection, and facility information. Although the database was augmented to include the NRC inspections, the team has determined that for compliance reasons, it is time to overhaul the system for streamlining and modernization. During the update, the webmaster will also add an additional section to host the NRC's inspections that fall under the modified SQP in the US territories.

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