INSPECTION PROCEDURE 85420

INSPECTION OF IAEA SAFEGUARDS FOR INSPECTORS AT POWER REACTORS

PROGRAM APPLICABILITY: 2515 and 2525

85420-01 INSPECTION OBJECTIVE

Determine whether the licensee has established, maintained, and followed a system of nuclear material accounting and control in accordance with the Agreement between the United States and the International Atomic Energy Agency (IAEA) for the Application of Safeguards in the United States which meets the applicable requirements specified in 10 CFR 75 and its Facility Attachment (FA) or Transitional Facility Attachment (TFA).

85420-02 INSPECTION REQUIREMENTS

The inspector will determine whether the licensee is in compliance with the requirements of Part 75 of Title 10 of the Code of Federal Regulations (10 CFR 75) and either its FA or TFA. A licensee subject to the Protocol to the Agreement must comply with the requirements for submitting reports and maintaining records as specified in its TFA and 10 CFR 75. A licensee subject to the safeguards requirements of the Agreement must comply with the requirements for submitting reports and maintaining records as specified in its FA and allow the IAEA to inspect its facility.

By inspection determine whether:

02.01 DIQ Submittal and Update

a. The licensee submitted, within the period specified by the NRC, the installation information, i.e. the Design Information Questionnaire (DIQ). [75.11(a), (b), (d), (e), and 75.6]

b. The licensee submitted revisions to the DIQ for any facility modification within the time period required by the regulations. [75.11(c), 75.6, and FA Code 2.2]

c. The licensee submitted, along with the DIQ and promptly after changes are made, supplemental information on:

1. organizational responsibility for material accounting and control, [75.14(a)(1)] and

2. health and safety rules and procedures to be observed by the IAEA inspector when at the facility. [75.14(a)(2) and FA Code 2.2]

02.02 Accounting Records

a. The licensee has established, maintained, and followed written material accounting and control procedures which include provisions for a system of accounting records. These procedures conform to the information presented in the DIQ unless otherwise specified by license condition and to the requirements of the FA or TFA. [75.21(a), (b)(6), and (c) and FA Code 5.1].

b. The licensee submitted inventory change reports on DOE/NRC Form-741, Nuclear Material Transaction Report, and, when appropriate, those reports were accompanied by information submitted on DOE/NRC Form-740M. The reports were prepared in accordance with the printed instructions for completing these forms. The correct key measurement point (KMP) and IAEA material description codes were used. [75.34(a), (b), and FA Codes 3.1.2, 4.1, 6.2.1, and 6.2.2]

c. The licensee has accounting records for each IAEA material balance area consisting of inventory change reports (DOE/NRC Form-741) and material status reports (DOE/NRC Form-742). The records show, for each batch of nuclear material, the material identification, batch data, and source data. [75.33 and 75.22(b)] Records shall include:

1. all inventory changes, so as to permit a determination of the book inventory at any time, that show the date of inventory change and when appropriate: (a) the originating IAEA material balance area, and (b) the receiving IAEA material balance area, and [75.22(a)(1), (c) and FA Codes 5.1.1, 6.1.1, and 6.1.2], and

2. all measurement results (item counting and identification) that are used for the determination of nuclear material quantities on inventory, [75.22(a)(2) and FA Code 5.1.2], and

3. all adjustments and corrections that have been made with respect to inventory changes, book inventories, and physical inventories. [75.22(a)(3) and FA Code 5.1.3]

02.03 Operating Records

a. The licensee has established, maintained, and followed written material accounting and control procedures which include provisions for a system of operating records. These procedures conform to the information presented in the DIQ unless otherwise specified by license condition and to the requirements of the FA or TFA. [75.21(a), (b)(6), and (c) and FA Code 5.2].

The licensee has operating records for each IAEA material balance area which include the data used to establish changes in quantities and composition of nuclear material. [75.23(a), (d) and FA Codes 5.2.1, and 5.2.4] These records include:

1. the location of each fuel assembly at any time and all other nuclear material bearing items (fission detectors, SRMs, IRMs TIPs, etc.).

2. the relevant source data with respect to nuclear loss and production, including (a) the monthly integrated thermal power produced by the reactor, and (b) the estimated burn-up (in MWD/t of uranium) for each fuel assembly,

3. the date and duration of any reactor shutdown,

4. the date and nature of the use of fuel handling and transport equipment,

5. a description of the actions taken to ascertain the magnitude and cause of any accidental or unmeasured loss that might occur, the date(s) that those actions were taken, and the results that were obtained, and

6. the list of any IAEA seals removed by the licensee accidently, under emergency conditions, or with prior IAEA approval.

02.04 Material Status Reports

a. The licensee submitted an initial inventory report within 20 days of the last day of the month in which the licensee was notified by the NRC that the report is required. The report was submitted on DOE/NRC Form-742, Material Balance Report, and was based on the licensee's book inventory. The report was prepared in accordance with the printed instructions for completing those forms. The correct domestic material description codes were used. [75.31, 75.32]

b. The licensee submitted, within 30 days after the start of each physical inventory, a material status report on DOE/NRC Form-742, Material Balance Report, and DOE/NRC Form-742C, Physical Inventory Listing. Also, when appropriate, the report was accompanied by a DOE/NRC Form-740M, Concise Note. The reports were prepared in accordance with the printed instructions for completing those forms. The correct KMP codes and IAEA material description codes are being used after the FA enters into force. [75.35 and FA Codes 3.1.2, 4.2, 6.3.1, 6.3.2, and 6.3.3]

02.05 Physical Inventory

a. The licensee has established, maintained, and followed written material accounting and control procedures which include procedures for taking physical inventories. These procedures conform to the information presented in the DIQ unless otherwise specified by license condition and to the require-

ments of the FA or TFA. [75.21(a), (b)(4), (c) and FA Code 3.1.3] These procedures include:

1. provisions for taking a physical inventory as soon as possible after completion of each refuelling and before the reactor is closed again. In cases of prolonged shutdowns of one year or more, a physical inventory is taken at least every twelve months, and

2. provisions for preparing an itemized list of nuclear material including the identification number, the material description, the quantity of nuclear material, and the location of each item for each inventory KMP.

b. The licensee has operating records for each IAEA material balance area that describe the sequence of actions taken in preparing for, and in taking a physical inventory, to ensure that it is correct and complete. [75.23(c) and FA Code 5.2.3] These records include:

1. the dates and description of the actions taken and the results obtained at all physical inventory KMPs, and

2. an itemized list of nuclear material inventory after completion of the inventory taking by the licensee but before commencement of verification by the IAEA.

02.06 IAEA Inspections

a. The licensee has afforded the IAEA opportunity to verify the DIQ. [75.13]

b. The licensee has verified credentials of IAEA representatives when not accompanied by an NRC employee. [75.7]

c. After being given notice pursuant to 10 CFR 75.41, the licensee affords the IAEA an adequate opportunity to inspect its designated installation, as specified for each type of inspection activity described in 10 CFR 75.42(a) through (h). [75.42 and FA Code 7]

02.07 Special Reports

a. The licensee has submitted special reports to the NRC for those situations described in license conditions. [75.36, 75.6] These situations include:

1. the possibility of loss of nuclear material in excess of the limits specified in the FA, [FA Code 6.4.1(a)] and

2. unexpected changes in containment or surveillance to the extent that unauthorized removal of nuclear material has become possible. [FA Codes 3.2.2 and 6.4.1(b)]

b. The required special reports contain, as appropriate, the following information: [FA Code 6.4.2]

1. the date when the incident occurred or circumstances were established,

2. a description of the actions taken in order to ascertain the cause of the event and to establish the magnitude of any loss of nuclear material,

3. the cause and details of the incident or circumstances, and

4. the estimated amount of nuclear material which has been lost.

c. The licensee has, if requested by the Commission, amplified or clarified any report relevant to the implementation of the US/IAEA Safeguards Agreement. [75.31]

02.08 License Conditions. The licensee has implemented all license amendments issued pursuant to the implementation of the FA or TFA. [75.8(b) and (c)]

02.09 Records Retention. The licensee has retained the records referred to in 10 CFR 75.22 and 75.23 for at least five years. [75.24 and FA Code 5.4]

85420-03 INSPECTION GUIDANCE

General Guidance. The IAEA system is neither intended to, nor able to, prevent diversion. Its main objective is to detect discrepancies and anomalies in inventories and transfers and to deter diversion by providing a timely warning intended to trigger international reaction, including possible sanctions. IAEA safeguards objectives and requirements contain two important quantitative expressions: significant quantity (SQ) and conversion time. A significant quantity is the approximate amount of nuclear material, including allowance for loss, deemed necessary to construct an explosive device. Conversion time is the time required to convert different forms of nuclear material to the metallic components of a nuclear explosive device.

In keeping with the main objective of the IAEA, on-site IAEA inspections focus on uncovering two types of reportable occurrences. These are defined as follows:

Discrepancy - a difference between the quantity of material recorded by the licensee and the quantity of material calculated or measured by the IAEA inspector, or any other inconsistency which can be directly linked to a difference in the material quantity.

Anomaly - an unusual observable condition which might occur in the event of a diversion; such a condition is usually non-quantitative. However, a discrepancy equal to or greater than 0.1 SQ is reported as an anomaly.

In order to coordinate the IAEA inspection effort and to provide prompt attention to discrepancies and avoid possible magnification into anomalies, the NRC has a policy of accompanying IAEA inspectors on inspections where other than routine camera service and book audits are to occur; e.g., physical inventory verifications, spent or fresh fuel measurements, or reestablishment of inventory. By being present at these inspections, NRC representatives can assist and expedite the resolution of discrepancies encountered by the IAEA inspectors. With respect to this effort, the NRC inspector, due to his or her knowledge of the facility, should play an important role in assisting in the resolution of problems when IAEA inspectors are present at the site. In addition, by giving careful consideration to the special needs of the IAEA prior to the arrival of inspectors at the facility, the NRC inspector can probably resolve many potential issues before they become problems and thus provide valuable assistance to the IAEA inspection process.

03.01 Specific Guidance

a. Inspection Requirement 02.01b. Code 2.2 notifications involving changes to the DIQ that require amendment of the FA must be provided at least 70 days before such a modification is scheduled to be completed, unless the Commission approves a shorter period for emergencies or other unforeseen situations. Any other types of modifications that are relevant to the application of IAEA safeguards but do not require a FA amendment must be submitted with the first inventory change report submitted after the modification is completed.

b. Inspection Requirement 02.01c2. As a general rule, IAEA inspectors should be detained no more than half a day for health and safety related activities (i.e., training, whole body scanning, etc.) during their initial visit to the facility. In addition, on subsequent visits, they should not be delayed for more than half an hour for refresher training. If the licensee generally requires more time than this, this issue should be resolved prior to the arrival of IAEA inspectors at the site. If necessary, a letter from the NRC to the licensee should be sent requesting abbreviated and/or expedited action in this area.

c. Inspection Requirements 02.02b&c. Licensees who receive SNM from a foreign source must complete both the supplier's and the receiver's portions of DOE/NRC Form-741, perform independent checks to ensure accurate identification of the material received, and indicate the results of these checks on the receivers part of the form. Guidance and instructions for completing DOE/NRC Form-741 are contained in NUREG/BR-0006, Revision 2, effective March 1, 1985.

   In order to obtain information on the 741 transaction activities of the licensee that will aid in the examination of these records, the inspector can request reports directly from the Nuclear Materials Management and Safeguards System (NMMSS) located in Oak Ridge, Tenn. (FTS 624-8441 or COMMERCIAL 615-574-8441). The report identified as NMMSS

TJ-24 was designed to meet the particular needs of regional inspection personnel for the conduct of such audits. A request for this report may specify any time interval within the history of the NMMSS transaction database; however, for the purposes of this procedure, the time interval relevant to the application of IAEA safeguards requirements should be used. Information is grouped by material type and category of receipt or removal, material quantities are totaled by shipper and receiver for each transfer, and summary totals are printed at one-month, three-month, six-month, or twelve-month intervals as specified by the requestor.

d. Inspection Requirement 02.04. The instructions for completing DOE/NRC Form-742 and DOE/NRC Form-742C are contained in NUREG/BR-0007, effective January 1, 1980, as amended on August 4, 1986.

e. Inspection Requirement 02.06c. With respect to IAEA inspections, cooperation by the licensee is an active role wherein licensee personnel use their understanding of the facility and its operations to help the IAEA identify efficient and effective measures for achieving the inspection objectives, and cooperate with the IAEA inspectors to facilitate the conduct of these measures. Costs and burdens are thus able to be minimized for both the licensee and the IAEA.

Routine IAEA inspections at LWRs have been conducted at two-month intervals involving from one to six man-days. Inspections typically involve a records audit, verification of seals on the reactor pressure vessel, and servicing of the surveillance cameras in the spent-fuel storage area. Verification during the physical inventory verification (PIV) is by item counting, item identification, and nondestructive assay (NDA).

The Neutron Coincidence Collar is an active neutron interrogation instrument used by the IAEA for the quantitative verification of the U-235 content in fresh fuel assemblies. This instrument employs an AmLi neutron source to induce fissions in the fuel assembly and coincidence counting of the resulting neutrons. Coincidence counting eliminates accidental neutron counts. Without the AmLi interrogation source, the passive neutron coincidence rate gives a measure of the U-238 content through the spontaneous fission reactions.

The IAEA currently uses two types of equipment for verification of spent fuel assembly characteristics (i.e., burn-up, cooling time): a Cerenkov glow viewing device and ion chamber measurement devices (ION-1 and ION-2). The Cerenkov glow measurement is a rapid NDA technique for verifying the presence of a gamma ray source distributed within the fuel assembly without introducing any equipment into the pond water.

In order to facilitate the IAEA's use of their NDA instruments, it is important that the licensee make certain equipment and personnel readily available so that the IAEA inspection process is not unnecessarily impeded. The use of overhead cranes, decontamination equipment, and the associated licensee personnel should be anticipated and scheduled by the licensee in advance of the arrival of IAEA inspectors for a PIV so that the setup and use of IAEA NDA instruments will proceed smoothly. In addition, escorts for IAEA inspectors should be provided by the licensee in a manner such that few if any delays are encountered due to the lack of escorts when they are needed. In order to help assure that adequate preparations are indeed made by the licensee prior to the arrival of IAEA inspectors, the NRC inspector should closely monitor the preparatory actions undertaken by the licensee and notify licensee management of any potential problems identified relative to these actions.

f. Inspection Requirement 02.07. This reporting requirement applies only to those licensees subject to the safeguards requirements of the Agreement. It does not apply to those licensees subject to the Protocol to the Agreement.

g. Inspection Requirement 02.07c2. These reports are required in advance, except under emergency situations, for any activity that will interfere with the application of international safeguards, e.g., breaking of IAEA seals, camera movement or disturbance, camera blockage, or extinguishing of lights required for camera surveillance.

The purpose of these notifications is to provide the information necessary for the NRC and the IAEA to arrange for IAEA inspectors to arrive at the facility in time to observe the breach of the containment or surveillance and to assure the integrity of the inventory. The minimum time needed to get an IAEA inspector from the field office in Toronto, Canada, to a U.S. facility is 24 hours. More time is needed if an inspector must travel from IAEA headquarters in Vienna, Austria. Therefore, notification for these events is required at least 24 hours in advance.

The facility point of contact for the NRC and the IAEA is specified in the DIQ and the FA. The points of contact within the NRC are provided in NRC correspondence to the facility. All operational matters, communications, and decisions affecting IAEA safeguards should be coordinated through these specified contacts and documented in writing.

Any activity that would interfere with the application of international safeguards, but does not pose an immediate threat to the health and safety of the public or to the reactor operations staff must be scheduled to provide the IAEA a reasonable opportunity to arrange for an IAEA inspector to travel to the facility in time to witness the activity.

If, for operational reasons, it should become necessary to move or detach IAEA equipment or to turn off lighting

necessary for surveillance, prompt notification to designated staff in the NRC should be made by telephone prior to any such action within the time frame discussed above or, in emergency situations, as soon as possible after the act so that the information can immediately be provided to the IAEA. For such an event, the licensee must also submit a written report to the appropriate NRC office within 72 hours following the event.

Any loss of, or interference with, IAEA surveillance or containment equipment, e.g., broken seals, camera interruption, or loss of surveillance lighting, will require a reinventory of the area where the event occurred, whether or not pre-notification of the event took place, unless an IAEA inspector is present at the time of the event, or continuity of knowledge is maintained by some other means. The NRC inspector can, therefore, help minimize the operational impacts on the facility and the IAEA by maintaining cognizance of the types of activities that might involve interfering with IAEA containment or surveillance equipment and by reminding licensee management of the need, whenever possible, to provide the IAEA with adequate prior notification of such situations.

85420-04 REFERENCES

INFCIRC/153 (Corrected), "The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on Nonproliferation of Nuclear Weapons," June 1972.

"Subsidiary Arrangements and Transitional Subsidiary Arrangements to the Agreement Between the Government of the United States of America and the International Atomic Energy Agency for the Application of Safeguards in the United States of America," June 1978.

IAEA/SG/INF/1, "IAEA Safeguards Glossary," 1980.

IAEA/SG/INF/2, "IAEA Safeguards - Guidelines for State's System of Accounting for and Control of Nuclear Materials," 1980.

IAEA/SG/INF/3, "IAEA Safeguards - An Introduction," 1981.

INFCIRC/288, "Agreement Between the United States of America and the International Atomic Energy Agency," December 1981.

IAEA/SG/INF/4, "IAEA Safeguards - Aims, Limitations, Achievements," 1983.

IAEA/SG/INF/5, "IAEA Safeguards Techniques and Equipment," 1984.

Regulatory Guide X.XX, "Implementing IAEA Safeguards in NRC Licensed Facilities," June 1988.

END