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General Electric Company
Attn: Dr. John H. VanNorden, Manager
Nuclear Materials Management
Nuclear Fuels Division
175 Curtner Avenue
San Jose, California 95125

Gentlemen:

We have completed our review of the Safeguards Manual (MSD-14502) and the Fundamental Material Controls submitted for the Midwest Fuel Recovery Plant. We have also considered the additional information contained in MSD-14502-1 and MSD 10173-9.

We propose to incorporate, as conditions of your license, the requirements listed in the enclosure to this letter. The license conditions specify requirements for calculating material balances, limits of error for the balances, certain notification and reporting requirements, and physical protection measures to be applied. We are writing you before the requirements are officially formalized in order to afford opportunity for your comment or other response. We request that your response reach us no later than June 26, 1972.

We will appreciate your submitting a description of the means by which you will meet the physical protection requirements contained in the enclosed license conditions. We request this description to be submitted within 60 days after receipt of this notice.

Also, we will appreciate receiving additional information to aid us in evaluating the resistance of your facility to industrial sabotage. Significant acts of sabotage, which could lead to a radiological hazard to the health and safety of the public, are of primary interest. The saboteur may be either a lone employee familiar with the facility and intent on covert sabotage or an outside group of sufficient size to overwhelm the guard force. The specific target, such as a system, component, or equipment, together with the resources that the saboteur or saboteur group would require, such as tools, explosives, or special equipment, should be considered. Within this context, please provide us the following information:

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1. Discuss the vulnerability of the various systems and components to acts of industrial sabotage which could result in a significant hazard to the public health and safety.
2. For each such target, estimate the resources that the saboteur or saboteur group would require.
3. For each such target, estimate how much time the saboteur or saboteur group would require at the facility.
4. Identify measures you propose to incorporate to protect against significant acts of sabotage which appear credible.

Additional physical protection requirements may be incorporated as license conditions depending on your response to the questions listed above.

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Sincerely,

for R. G. Page, Chief
Materials and Plant Protection
Branch
Directorate of Licensing

Enclosure:
Proposed License Conditions

cc: General Electric Company
ATTN: Mr. Dennis W. Wilson, Manager
Nuclear Materials Management, MTRP
Midwest Fuel Recovery Plant
Route 1, P.O. Box 219-B
Morris, Illinois 60450

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PROPOSED LICENSE CONDITIONS

MIDWEST FUEL RECOVERY PLANT, MORRIS, ILLINOIS

1.0 FACILITY ORGANIZATION

- 1.1 The Plant Manager, Midwest Fuel Recovery Plant (MFRP), shall establish, maintain, and manage a system of controls to safeguard special nuclear material.
- 1.2 Nuclear material control procedures and revision thereto shall be approved by the Plant Manager, MFRP, and by the Manager, Nuclear Materials Management-MFRP (NMM-MFRP).
- 1.3 The Manager, NMM-MFRP, shall maintain the official plant records pertaining to nuclear materials management and safeguards, including a manual containing all current nuclear material control procedures.
- 1.4 The Plant Manager -MFRP shall assure that the nuclear material control procedures are appropriately reflected in process specifications, manufacturing instructions, standard operating procedures, or similar detailed management instructions.
- 1.5 All delegations of safeguards responsibilities shall be in writing.

2.0 FACILITY OPERATION

- 2.1 Material Balance Areas (MBA's) shall be established by the Manager, NMM-MFRP, with the concurrence of the Plant Manager-MFRP. Each MBA shall be an identifiable physical area into and out of which movement of special nuclear material can be measured, and shall be established in such a manner as to identify and appropriately localize losses of special nuclear materials.
- 2.2 The custody of all special nuclear material within a designated MBA shall be the responsibility of a single custodian.

3.0 MEASUREMENTS AND STATISTICAL CONTROLS

- 3.1 The licensee shall measure the content of total uranium, U-234, U-235, U-236, U-238, total plutonium, Pu-238, Pu-239, Pu-240, Pu-241, and Pu-242 in all input solutions and product loadouts. The licensee shall determine total uranium, U-235, total plutonium, and (Pu-239 + Pu-241) content for measured discards and for transfers to Waste Storage Area. The licensee shall make sufficient measurements on a current basis to substantiate each stated quantity and its

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associated limit of error. Limit of error (LE) as used herein means the uncertainty component used in constructing a 95% confidence interval after any recognized bias has been eliminated or accounted for.

3.2 The frequency and quality of the measurements made to comply with the license conditions shall be controlled so that:

- (a) Between drain-down inventories made pursuant to Condition 6.2, the limit of error associated with the material unaccounted for (LEMUF) for the material-balance interval does not exceed the larger of:
 - (i) for plutonium, 200 grams of plutonium or 1.0% of the quantity of plutonium in the measured input for the interval;
 - (ii) for (Pu-239 + Pu-241), 200 grams of (Pu-239 + Pu-241) or 1.0% of the quantity of (Pu-239 + Pu-241) in the measured input for the interval;
 - (iii) for uranium, 200 kilograms of uranium or 0.6% of the quantity of uranium in the measured input for the interval;
 - (iv) for U-235, 2,000 grams of U-235 or 0.7% of the quantity of U-235 in the measured input for the interval.
- (b) Between shutdown inventories made pursuant to Condition 6.1, the LEMUF for the material-balance interval does not exceed the larger of:
 - (i) for plutonium, 200 grams of plutonium or 1.0% of the quantity of plutonium in the measured input for the interval;
 - (ii) for (Pu-239 + Pu-241), 200 grams of (Pu-239 + Pu-241) or 1.0% of the quantity of (Pu-239 + Pu-241) in the measured input for the interval;
 - (iii) for uranium, 200 kilograms of uranium or 0.4% of the quantity of uranium in the measured input for the interval; and

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(iv) for U-235, 2,000 grams of U-235 or 0.5% of the quantity of U-235 in the measured input for the interval.

- 3.3 A measurement quality control program, including calibration of equipment and standardization of analytical methods, shall be established and maintained to provide current measurement data to substantiate the LE's associated with all measurements required for safeguards purposes.
- 3.4 The Manager, NMM-MFRP, shall annually review all measurements required pursuant to this amendment, including a review of the quantitative calculation of the LE's of the measurement system. Data obtained through the measurement quality control program carried out pursuant to Condition 3.3 shall be utilized to monitor performance of the measurement system to assure that calculated LE's are maintained between reviews. Records of reviews, calculations, and the use of calibration data shall be kept by the Manager, NMM-MFRP.
- 3.5 After each physical inventory taken pursuant to Conditions 6.1, 6.2, and 6.3, the material unaccounted for (MUF) and the LEMUF shall be computed within 14 days of the start of the inventory. The LEMUF shall be calculated by statistically combining the LE's determined for beginning process inventory, ending process inventory, measured discards, transfers to Waste Storage Area, and quantities of material dissolved and loaded out for the period since the last inventory.
- 3.6 If (a) the quantity of MUF exceeds its associated LE and 200 grams of plutonium, 200 kilograms of uranium, or 2,000 grams of U-235, or (b) the LEMUF for plutonium, (Pu-239 + Pu-241), uranium, or U-235 exceeds the limit specified in Condition 3.2, the licensee shall promptly notify Directorate of Regulatory Operations, U.S. Atomic Energy Commission, Region III Office, 799 Roosevelt Road, Glen Ellyn, Illinois 60137, and shall take immediate action to investigate the cause for the excessive values. Within thirty days after the initial notice, the licensee shall notify the Region III office of the Directorate of Regulatory Operations in writing of the probable reasons for the excessive values, and the corrective action taken or planned.

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4.0 SHIPPING AND RECEIVING

- 4.1 Receipt of special nuclear material may be provisionally accepted at the MFRP at the amount shown on the nuclear material transfer document. The book inventory and material transfer forms for all fuel in a process lot shall be adjusted to the amounts of special nuclear material measured as input as soon as the processing of the lot has been completed.
- 4.2 All irradiated fuel assemblies and all containers of ruptured or loose assemblies shall be piece-counted and verified by serial number, if any, upon receipt.
- 4.3 All shipping and receiving measurement data and analyses of measurement uncertainties shall be kept by the Manager, NMM-MFRP.
- 4.4 The Manager, NMM-MFRP, shall evaluate all shipper-receiver differences to determine if the differences are statistically significant and/or of sufficient magnitude to warrant investigation. The shipper-receiver difference shall be considered statistically significant when (a) the difference exceeds the combination of the LE's of the shipper's and receiver's measurements, or (b) the difference exceeds twice the LE for the receiver's measurement for the case where the shipper's LE is unknown.
- 4.5 Upon request from the AEC Directorate of Regulatory Operations, the licensee shall retain for AEC use designated samples identical to those taken for his accountability measurements.

5.0 STORAGE AND INTERNAL TRANSFERS

- 5.1 A documented control system over special nuclear material stored and processed within the MFRP shall be maintained that will provide continuous knowledge of the location and quantity of all material contained in discrete, identifiable items or containers and within the process.
- 5.2 All nuclear materials on the MFRP premises shall be assigned to one of three inventory control areas (ICA's) or to the waste

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storage area (WSA). The three inventory control areas shall be the Fuel Receipt and Storage Area (ICA-1), the Processing Area (ICA-2), and the Product Storage and Shipment Area (ICA-3).

- 5.3 An internal transfer document shall be executed each time that special nuclear material is moved from one ICA to another. Each internal transfer document shall show piece identity (if applicable), and quantity and type of material transferred, and shall be signed by the delegated individual. Internal transfer forms will be issued through the MBA custodian and controlled through Nuclear Materials Management.
- 5.4 Permanent records shall be kept of the total quantities of special nuclear material transferred to and contained within each vault of the WSA.

6.0 INVENTORY

- 6.1 A shutdown physical inventory of the processing area (ICA-2) including cleaning and flushing of all process equipment shall be performed at intervals not to exceed twelve months.
- 6.2 A drain-down inventory shall be taken between process lots in accordance with procedures specified in Table 3.7 of the MFRP Safeguards Manual dated April, 1971, at intervals not to exceed the processing of 30 tonnes of fuel or 45 calendar days, whichever occurs first.
- 6.3 A special shutdown inventory of the processing area shall be conducted whenever there is reason to believe that abnormal conditions have adversely affected the expected loss or placement of nuclear materials.
- 6.4 The Manager, NMM-MFRP, shall review and approve procedures for inventorying of nuclear material, and shall audit the actual taking of the inventory for compliance with approved procedures.
- 6.4.1 Materials in the processing area shall be combined in those vessels that facilitate sampling and accounting.
- 6.4.2 Residual quantities of nuclear materials in processing

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equipment that cannot be isolated in vessels for sampling shall be calculated by qualified personnel on the basis of process parameter measurements at the time of the inventory, using approved estimation techniques.

- 6.4.3 Materials that have been inventoried shall, where accessible, be tagged to minimize the possibility of duplicate count and to facilitate internal audit of inventory completeness.
- 6.5 Items of special nuclear material in the Fuel Receipt and Storage Area (ICA-1) shall be inventoried on the basis of piece count and estimated contents as reported by the shipper on Form AEC-741. All such material shall be inventoried for verification of physical presence in its assigned location at intervals of one month.
- 6.6 Items of special nuclear material in the Product Storage and Shipment Area (ICA-3) shall be inventoried on the basis of net weight and chemical and isotopic analysis at the time of inventory, except that previously made measurements may be accepted if the integrity of the measurement has been assured by an approved tamper-indicating device. All such material shall be inventoried for verification of its physical presence in its assigned location, and for verification of intact tamper-indicating devices, at intervals not to exceed seven calendar days.
- 6.7 The book inventory shall be reconciled with and adjusted to the results of each shutdown physical inventory within 14 calendar days after the day the inventory was started.
- 7.0 RECORDS AND REPORTS
- 7.1 The licensee shall establish and maintain a records system that shall contain information pertaining to all receipts, shipments, measured discards, transfers to WSA, inventories, and MUF for each material balance, and shall provide sufficient information to support the material-balance calculation. All entries in the records shall be supported by appropriate documents.
- 7.2 Subsidiary records related to processing and production activities

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of each process lot shall be maintained by plant engineering and plant production for a minimum of three years following completion of processing.

- 7.3 The licensee shall submit Material Status Reports on Form AEC-742, completed in accordance with the printed instructions, as of the last day of each month for all special nuclear material. Separate Material Status Reports shall be submitted for (i) the Inventory Control Areas (ICA-1, ICA-2, and ICA-3), and for (ii) the Waste Storage Area. The reports shall be filed within eight (8) days after the end of the period covered by the report, and shall be filed with the U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tennessee 37830, with a copy to the Region III Office, Directorate of Regulatory Operations, U. S. Atomic Energy Commission, Glen Ellyn, Illinois 60137.
- 7.4 After each inventory, the Manager, NMM-MFRP, shall issue a report including such information as beginning and ending inventory, verified clerical errors, weight or volume discrepancies, required perpetual inventory corrections, and material-balance data. This report shall be issued to the Plant Manager-MFRP and to the Manager, NMM-NFD, with copies to concerned plant organizational components.
- 7.5 Within thirty (30) days after the first anniversary of the issuance of this license, the licensee shall report the results of the review required by Condition 3.4, and an analysis of performance compared with the "pro forma" prediction in the Safeguards Manual, to the Directorate of Licensing, U. S. Atomic Energy Commission, Washington, D.C. 20545, with a copy to the Region III Office of the AEC Directorate of Regulatory Operations.
- 8.0 MANAGEMENT OF MATERIALS CONTROL SYSTEM
- 8.1 Company management, independent of Nuclear Materials Management, shall conduct an internal review of the nuclear materials control system at intervals not to exceed twelve months. Results of the audit shall be documented, and copies of the report shall be sent to the General Manager, Nuclear Fuels Department, and to the Directorate of Regulatory Operations, U. S. Atomic Energy Commission, Washington, D.C. 20545.

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- 8.2 Any unresolved apparent loss of a discrete item after 24 hours or verified loss of a discrete item shall be reported immediately to the General Manager, Nuclear Fuels Department, and to the Directorate of Regulatory Operations, U.S. Atomic Energy Commission, Region III Office, 799 Roosevelt Road, Glen Ellyn, Illinois 60137.

9.0 PHYSICAL PROTECTION REQUIREMENTS

9.1 Definitions applicable to Physical Protection Requirements

- 9.1.1 Except where specifically noted, the requirements contained in these license conditions are in addition to those specified in 10 CFR Part 73. In any case where inconsistencies may appear, the license conditions shall prevail.
- 9.1.2 The following terms shall have the meanings defined in 10 CFR Part 73: authorized individual, guard, lock, physical barrier, protected area, vault, and watchman.
- 9.1.3 "Intrusion alarm" means an electrical, electromechanical, electro-optical, electronic, or similar device capable of detecting intrusion by an individual into a building, protected area, or plutonium access area, and capable of annunciating the intrusion by means of actuated visible and audible signals.
- 9.1.4 "Plutonium access area" means any location (i) within a building which, in turn, is located within a protected area, and (ii) which is enclosed by a second physical barrier or substantial interior partitions, and (iii) which contains plutonium other than plutonium contained in irradiated fuel or in the Waste Storage Area.

9.2 Physical Protection Organization

- 9.2.1 A force of guards, watchmen, and employees shall be established to protect special nuclear material against theft and diversion, and to protect the facility against sabotage which could result in a radiological hazard to the public health and safety.

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- 9.2.2 The command and responsibility structure during both normal and threat situations shall be documented.

9.3 Access Constraints

- 9.3.1 Plutonium shall be stored or processed only in a plutonium access area.
- 9.3.2 The licensee shall establish a separate plutonium access area for each vault or other location used primarily as a plutonium storage area.
- 9.3.3 When manned, a plutonium access area shall be manned by two or more authorized individuals, or the activities of a lone authorized individual shall be observed by another authorized individual. When unmanned, a plutonium access area shall be locked.
- 9.3.4 Access to each plutonium access area shall be under the control of an authorized individual and limited to individuals who require such access to perform their duties.
- 9.3.5 Packages entering a plutonium access area shall be searched for devices that could aid an individual in the theft or diversion of plutonium or in sabotage of a facility.
- 9.3.6 Personnel access to the protected area shall be controlled by a guard or watchman.
- 9.3.7 No personal vehicles shall be permitted within the protected area.
- 9.3.8 The licensee shall register visitors, vendors, and other non-employees entering the protected area, recording name, date, time, purpose of visit, and person visited.
- 9.3.9 Visitors, vendors, and other non-employees shall be escorted by a guard, watchman, or authorized individual while within the protected area.
- 9.3.10 Keys, locks, combinations, and related equipment used in the physical protection system shall be controlled to minimize the possibility of compromise, and shall be

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