UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

August 11, 1986

MEMORANDUM FOR: Thomas T. Murley, Regional Administrator, Region I
J. Nelson Grace, Regional Administrator, Region II
James G. Keppler, Regional Administrator, Region III
Robert D. Martin, Regional Administrator, Region IV
John B. Martin, Regional Administrator, Region V

FROM: James M. Taylor, Director
Office of Inspection and Enforcement

SUBJECT: TEMPORARY INSTRUCTION, TI 2600/1, INSPECTION OF PLANT OPERATIONS AT URANIUM FUEL FABRICATION AND CONVERSION FACILITIES

The enclosed Temporary Instruction (TI) is being issued to require in-depth team inspections of operational safety effectiveness at the twelve major fuel facilities and to identify specific deficiencies related to the lessons learned from the accident at the Sequoyah Fuels Corporation facility. Because of the importance of this issue, I am asking that these inspections be completed and reported by February 28, 1987. The results of the inspections and the lessons learned will be considered for incorporation into facility licenses as appropriate, and will determine the future ongoing inspection program. Each region is requested to submit a schedule for these inspections by August 22, 1986. Except for two criticality safety inspections at enriched uranium processing facilities, the inspections required by this TI have priority over routine inspections required by MC 2600 and fulfill the annual inspection requirements for these facilities.

These inspections should be conducted by experienced teams made up of 4 - 6 members specifically chosen for technical expertise in evaluating the areas related to operational safety at the facilities and use of headquarters personnel is encouraged. Because the results are important to future licensing and inspection programs, it is requested that IE and/or NMSS representatives be part of the teams either as observers or working members. These inspections and the TI incorporating regional comments were discussed with regional representatives at the September 30 Inter-Office Working Group meeting at headquarters.

One of the lessons learned from the Sequoyah accident was the need for coordination with other federal agencies in operational safety. We should establish contact with and formally invite appropriate OSHA and EPA regional offices to accompany the inspection team to the extent practical.

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The results of the inspections should be documented in the standard inspection report format and appropriate enforcement actions taken; in addition, a separate letter following each inspection should be sent to Glen L. Sjoblom, Chief, Safeguards and Materials Programs Branch, IE on the lessons of the inspection process itself so that these can be shared with other regions and factored into subsequent inspections.

James M. Taylor, Director
Office of Inspection and Enforcement, IE

Contact: Glen L. Sjoblom, IE
492-4935

Enclosure:
As stated

cc: J. G. Davis, NMSS
R. E. Cunningham, NMSS
T. T. Martin, RI
J. P. Stohr, RII
J. S. Hind, RIII
R. L Bangart, RIV
R. A. Scarano, RV

TEMPORARY INSTRUCTION 2600/1

INSPECTION OF PLANT OPERATIONS AT URANIUM FUEL FABRICATION AND CONVERSION FACILITIES

2600/1-01 PURPOSE

To incorporate important lessons learned from the Sequoyah Fuels Corporation UF_6 release and the incident at the Allied/Signal Corporation into the NRC inspection program for the 12 major fuel facilities being regulated by the NRC. The inspections required by this temporary instruction (TI) are to be completed and reports written by February 28, 1987.

2600/1-02 OBJECTIVES

The objectives of the inspections required by this temporary instruction are:

02.01 To identify those plant operating conditions and those specific parts of the conversion and fuel fabrication processes where increased inspection effort should be focused as a result of experience with the Sequoyah Fuels and Allied/Signal incidents.

02.02 To determine whether fuel facility licensees are complying with requirements in the license dealing with the establishment of licensee-approved procedures for operation of the plant, formal revision and periodic updating of those procedures, formal training of plant operators, and whether plant personnel follow approved operating procedures in their activities.

02.03 To determine if fuel facilities contingency planning meets the requirements of the 1981 order requiring such planning and that adequate routine management audits of plant operations are performed.

02.04 To make regional, IE and NMSS management aware of any situation observed in a plant that may involve a previously unevaluated accident potential or an accident potential for which current NRC requirements do not appear adequate.

02.05 To provide information based on onsite observations by NRC inspectors that will be useful in the development of improvements to the fuel facility inspection program.

2600-03 FACILITIES COVERED BY THIS TEMPORARY INSTRUCTION

The facilities covered by this TI include the following:

United Nuclear Corporation, Uncasville, Connecticut
Combustion Engineering, Hematite, Missouri
Combustion Engineering, Windsor, Connecticut
Babcock and Wilcox, Lynchburg, Virginia - Navy plant
Babcock and Wilcox, Lynchburg, Virginia - commercial plant
General Electric, Wilmington, North Carolina
Westinghouse, Columbia, South Carolina
Nuclear Fuel Services, Erwin, Tennessee
Allied Chemical, Metropolis, Illinois
Sequoyah Fuels Corporation, Gore, Oklahoma
Exxon Nuclear, Richland, Washington
GA Technologies, Inc., San Diego, California

2600/1-04 RESPONSIBILITIES

04.01 Director, Division of Inspection Programs, IE. Ensures that lessons learned from the Sequoyah Fuels Corporation UF_6 accident and the incident at Allied/Signal are incorporated into the NRC inspection program, as appropriate; oversees the regional performance of new or revised inspection policies and procedures resulting from these changes; and evaluates information obtained during inspections to determine whether additional program improvements are needed.

04.02 Directors, Division of Radiation Safety and Safeguards, Regional Offices. Ensure that the inspections required by this instruction are carried out, the results of the inspections are documented in a reasonably prompt manner and communicated to IE and NMSS, and that negative findings are acted upon by the regions or transmitted to the appropriate headquarters office for action.

2600/1-05 BACKGROUND

The fatal accident at the Sequoyah Fuels Corporation plant and the overfilled cylinder incident at Allied/Signal pointed out the importance of adequate procedures for operating the NRC-regulated processes in the plant, for training of operators in those procedures, and for ensuring that the procedures are adhered to in the workplace. The two events also demonstrated the need for the NRC inspection program to clearly identify those parts of the regulated processes and associated operating conditions that could pose the most serious threat to worker health and safety and to focus inspection effort on these potentially more hazardous aspects of the process.

The accident at Sequoyah Fuels raised the important question of the extent to which the NRC is responsible for regulating the chemical hazards associated with the radioactive material it regulates in uranium fuel conversion and fabrication plants. By its testimony in Congressman Synar's hearing on the Sequoyah Fuels accident, NRC management demonstrated its belief that NRC did have the responsibility for chemically toxic hydrofluoric acid that is one of the reaction products when uranium hexafluoride reacts with the water vapor in the air.

There are other lessons to be learned from the Sequoyah accident either directly or by implication. For example, control of process variables may be important at certain stages, to prevent an over-pressurization accident or accumulation of a critical mass of enriched uranium. Although not directly involved in Sequoyah, there are external events such as a fire or explosion that could cause a release of a significant quantity of radioactive material. Thus, it is important to identify those critical process areas and conditions and to focus increased inspection attention on them. Finally, the events that took place during the Sequoyah accident indicate that increased effort must be focused on emergency contingency planning and management audit oversight at these facilities.

2600/1-06 BASIC REQUIREMENTS

Currently there are a number of tasks underway within NRC that consider various questions and insights arising from the Sequoyah Fuels accident. As a result of these considerations, there may be significant modifications to the inspection program for uranium fuel fabrication and conversion plants. However, it is not prudent to wait until all these efforts are completed and the reports written and evaluated before taking needed action. The inspection work described in this TI is really an early effort to determine whether there are other serious accident potential situations such as the two events at the conversion plants but not necessarily identical to those two events. We do not expect that these required inspections will produce the final and definitive conclusion regarding questions that can be raised about the NRC inspection program. However, these inspections will serve to identify any fairly obvious problems.

06.01 Identification of Potentially Hazardous Conditions. Based on direct observations in the plant and on the insight gained from available safety evaluations, identify those parts of the NRC-regulated processes and associated conditions that could produce a significant release of radioactive material or a nuclear criticality accident. In determining the significance of a potential release, the region should take into account the chemical toxicity of the radioactive material as well as the radiation hazard. In particular, the inspections should include identifying:

a. Conditions that could result in a fire or explosion affecting an NRC-regulated plant process that could produce a large release of radioactive material.

b. Parts of the plant processes where overheating or overpressurization from any source might cause a process component or confinement barrier to fail with subsequent release of a significant quantity of radioactive material.

c. Electrical failures or equipment malfunctions that could result in loss of control of the process and that could produce the potential for a significant release of radioactive material or a nuclear criticality accident.

d. Critical valves, pressure or temperature sensors, and flow and volume control instrumentation that are important to safe operation of the process and whose failure could result in a possible large release of radioactive material or a possible nuclear criticality accident.

Attachment A is a listing of "special process commitments" that have been added to the Sequoyah Fuels license as a result of the UF_6 release. These have resulted from a comprehensive review of the Sequoyah circuit and are an example of the types of items that may need attention at similar facilities. The teams also may draw upon licensee hazard analysis of their plants and NMSS safety evaluations of process circuits to help in inspection evaluations.

During conduct of inspections required by 06.02 below, the region should focus effort on identified problems or potential problems. Some of the identified problems may not be the subject of an existing regulatory requirement. Those cases, if significant, should be referred to NMSS or IE for resolution, depending on the nature of the problem and the region's recommended course of action.

06.02 Plant Operations. By inspection determine whether:

a. The licensee has a program for establishing plant operating procedures, for revising those procedures, and for management approval of new and revised procedures.

b. There is a formal licensee program for training operators in the use of plant operating procedures and whether that training program is being followed; that is, do all operators receive the training needed for performance of their job responsibilities? Is operator retraining part of the program?

c. Work activities are being performed in accordance with the approved operating and maintenance procedures and that those procedures adequately deal with potentially unsafe process conditions.

d. The licensee has implemented adequate contingency planning for emergencies (both radiological and chemical) and that training is provided for employees and others designated to act under these plans.

e. The licensee has a management oversight (audit) program for all phases of plant operation and that the findings of the audits are promptly resolved.

The finding concerning item c above should be based on direct observation of selected work activities. Special emphasis should be placed on those activities that might potentially create a condition where a large release of radioactive material or where a nuclear criticality accident could credibly take place under adverse process conditions.

Based on the inspections in each of the above areas, a judgment should be made by the team on the effectiveness of the procedures, training, work control, contingency planning, and overall management controls at preventing accidents which could produce a significant release of radioactive material or significant threat to worker health and safety.

06.03 Inspection Priority. The inspection activities required by this TI have a priority over other routine inspections defined in IE MC 2600 except for the requirement to make a minimum of two nuclear criticality safety inspections per year at each plant (excluding Sequoyah Fuels and Allied/Signal (UF_6 plants).

06.04 Credit For Prior Inspection Activity. To the extent that the items addressed in this TI have been adequately examined in prior inspections during the last 6 months, the region may take credit for having completed that part of the work required by this TI. There also exists the possibility of a multioffice team inspection during the 90-day period at one or two fuel fabrication facilities. To the extent that topics addressed in the team inspection relate to the work required by this TI, the region need not conduct additional inspections to cover the items.

06.05 Team Inspection Approach. It is recognized that the TI requires technical expertise in a number of areas not normally inspected in-depth by the presently assigned fuel facility inspectors. For this reason, it is recommended that each region select a team of 4 to 6 inspectors with the proper technical expertise to cover the broad scope of these inspections. Inter-regional participation is encouraged if necessary. Consideration also should be given to including headquarters IE and NMSS participants. The onsite team inspection effort would be expected to be completed in 5 working days.

06.06 EPA and OSHA Interface. OSHA and EPA have agreed to consider accompanying the NRC on these inspections to help establish a clearer understanding of their agencies interface with the NRC at these facilities. OSHA and EPA should be invited to participate in the inspection visit at the regional office level.

2600/1-07 REPORTING REQUIREMENTS

The results of these inspections should be documented in regular inspection reports. For significant items identified by these inspections and not covered by current NRC requirements, the regional division director should point these out in a memo addressed to either the Director, Division of Fuel Cycle and Materials Safety, NMSS, or the Director, Division of Inspection Programs, IE, as appropriate, with a copy to the other program office division directors.

2600/1-08 EXPIRATION

The TI is effective for 6 months from the date of its receipt, or until each region has completed the required inspection work and the documentation of that work. However, this TI is not to exceed 12 months from the issue date.

2600/1-09 CONTACT

Questions about this TI should be addressed to D. K. Sly, (301) 492-4783.

2600/1-10 STATISTICAL DATA REPORTING

All direct inspection effort expended as a result of this TI should be recorded as inspection module 88020, Operations Review.

END

SPECIAL PROCESS COMMITMENTS

This listing outlines the special conditions required in the Sequoyah Fuels operation to ensure radiological, chemical, and fire safety at the facility. Most of the items listed are included in automated control systems with interlocking arrangements to prevent operating mishaps, but are included here to provide special emphasis.

1. The nitric acid recovery system shall be in operation and functioning properly to provide negative pressure to all systems producing nitrogen oxides.

2. Scrubber pumps shall be in operation for digestion feed screws to operate.

3. A nitrogen blanket shall be maintained in the hexane storage tank.

4. The foam deluge system shall be maintained continuously operable in the solvent extraction building. In the event the system is down, a fire watch will be posted to operate the system manually. To assure operability, annual inspections and water flow tests shall be conducted by the fire and casualty insurers. The foam chemical shall be analyzed annually for proper activity by the vendor of the chemical and replaced upon recommendation of the vendor. Recommendations of the insurance inspectors shall be followed as soon as possible.

5. The gas seals provided for isolation of the reduction system, the hydrofluorination system, and the fluorination system shall be maintained at all times.

6. The off-gas burners shall be in operation before startup and during operation of reduction, hydorfluorination, and fluorination.

7. The HF off-gas scrubber shall be in operation prior to startup and and during operation of the hydrofluorination, and fluorination systems.

8. The cold trap refrigeration system shall be operable prior to start-up and during operation of the fluorination system.

9. Valve protectors shall be installed on UF_6 cylinders prior to shipment.

10. The entire safety interlock system (Q circuit) in the fluorine production system shall be maintained fully operational. The process instrumentation, alarms, and interlocks are periodically checked and calibrated at the end of each operating month as production schedules permit. The periodic checks incorporate simulation of malfunctions at various points in the system whereby functional reliability can be determined and established.

11. The main plant and the sampling plant dust collection systems shall be operable when the respective areas are in operation except for short outages required for normal preventive maintenance.

12. Filled UF_6 cylinders shall not be heated in steam chests unless the over-pressure sensor/steam interlock shutoff systems inoperable.

13. No process procedures shall be used if they have not been reviewed, approved, and training completed. Should process events require use of a one-time emergency procedure it shall be implemented only after review and authorization by the General Manager, Sequoyah facility.

14. The UF_6 cylinder loading scales shall be checked for accuracy by using two test-weight cylinders after any scale maintenance or cleaning or whenever a weight discrepancy is suspected. When operation is resumed, a weight calibration shall be done daily for the first week, weekly for the next month, and then monthly thereafter.

15. In the case of deviation from expected weights of one of the two scales, loading station and cylinder cart, the accountability scale shall be used for backup until the suspect scale has been repaired and recalibrated.

16. Cylinder filling procedures shall establish a maximum fill limit above which heating cannot be done without special case-by-case analysis and approval by the Managers of Health, Safety, and Environmental and operations, General Manager, Sequoyah facility and General Manager, Sequoyah operations.

17. An employee shall not be allowed to carry out process operational duties unless he has completed the proper training and has passed required tests on the training material. The employee shall work under the direct supervision of the shift supervisor until on-the-job training and module certification is completed.