March 13, 1997

FOR: The Commissioners

FROM: L. Joseph Callan /s/
Executive Director for Operations

SUBJECT: REMOVAL OF TEXAS INSTRUMENTS, INC. FROM SITE DECOMMISSIONING MANAGEMENT PLAN

PURPOSE:

To inform the Commission that remedial action has been completed at the Texas Instruments, Inc. (TI) site in Attleboro, Massachusetts. The staff plans to approve release of the site for unrestricted use, terminate the current Nuclear Regulatory Commission license, and remove the site from the Site Decommissioning Management Plan (SDMP).

SUMMARY:

TI conducted uranium operations from 1952 to 1981. The licensee has now satisfactorily remediated the site. Based on the actions taken by the licensee, staff review of the surveys performed, and the results of the confirmatory survey, the staff plans to terminate the license before Massachusetts becomes an Agreement State on March 21, 1997. A representative of the Commonwealth of Massachusetts, Department of Public Health - Radiation Control Program accompanied and assisted Region I staff during the final confirmatory survey. Massachusetts representatives indicate they have no unresolved concerns about the NRC-regulated radiological material at the site and have confirmed in a letter to Region I that documentation provided by the licensee is sufficient to demonstrate compliance with Massachusetts' requirements for release of the site.

BACKGROUND:

In SECY-90-121, the original SDMP, and in subsequent revisions to the SDMP (SECY-91-096, -92-200, -93-179, -95-209, and 96-207), the staff identified approximately 50 sites that warranted special NRC oversight, to ensure timely and safe remediation of residual radioactive material in excess of the current NRC criteria for release for unrestricted use. One of these sites is the Texas Instruments, Inc., facility in Attleboro, Massachusetts. The staff added this site to the SDMP list because on-site disposals had been made, and the location and extent of the disposals were not well-known.

The TI facility is located in Attleboro, Massachusetts, approximately 16 kilometers (10 miles) northeast of Providence, Rhode Island and 48 kilometers (30 miles) southwest of Boston. The site currently comprises eighteen buildings owned by TI on approximately 40 hectares (100 acres). Operations with radioactive materials began at the site in 1952 when Metals and Controls, Inc., began to fabricate enriched uranium foils. Metals and Controls, Inc., merged with TI in 1959 and eventually was operated as a corporate division of TI. From 1952 through 1965, Metals and Controls (and later TI), under a variety of Government contracts, fabricated enriched uranium fuel elements for the U.S. Naval Reactors Program, Air Force, other U.S. Government-funded research, and a few commercial customers. From 1965 through 1981, TI fabricated fuel for the High Flux Isotope Reactor at Oak Ridge National Laboratory and other Government-owned research reactors. Depleted uranium and processed natural uranium were also used at the facility for research and development. The facility remains operational in a variety of metallurgical production activities; however, radioactive material is no longer used in the company's manufacturing operations.

Operations with radioactive materials were initially conducted in portions of what is now Building 4, with very limited operations conducted in Building 3. In 1956, Metals and Controls constructed Building 10 on the site to house all manufacturing work with radioactive materials. By 1957, all manufacturing operations with radioactive material were moved to Building 10. Waste handling, processing of scrap metal and residues, and treatment of waste acids and water were conducted in Building 5 and outside Building 5 in areas known as the Metals Recovery Area and the Stockade. A waste evaporator and an incinerator were operated in Building 5 and the adjacent Metals Recovery Area. Scrap and waste generated in the manufacturing processes were returned to the U.S. Government; however, some materials contaminated with low levels of radioactivity were disposed in an on-site burial adjacent to Building 11.

Following cessation of fuel fabrication operations in 1981, TI initiated remediation of uranium contamination in the buildings and surrounding exterior locations. Remediation and final surveys of contaminated portions of Buildings 4 and 10 were completed in 1985, and the NRC staff approved release of these buildings for unrestricted use. Residual radioactive contamination remained in the burial area east of Building 11 and west of the relatively recently constructed Building 12. In 1990, NRC listed the TI facility on the NRC SDMP because of the presence of the residual contamination in the burial area. Region I staff approved a remediation plan for the burial area in 1992 and initial remediation was completed in December 1992. A confirmatory survey conducted by the Oak Ridge Institute for Science and Education (ORISE) in December 1992 identified some remaining contamination on the walls of the excavation. In July 1993, the licensee completed additional remediation activities. An ORISE confirmatory survey in December 1993 did not identify any remaining residual contamination in this burial area in excess of the NRC criteria for release for unrestricted use.

After completion of the remediation and survey of the burial area, TI identified soil contamination in three locations within the Metals Recovery Area. Remediation and sampling in this area during 1994 led to the determination that the three distinct contaminated areas were actually part of a single, larger contaminated area. Remediation of this area was completed in November 1994. After identification of the additional contamination in the Metals Recovery Area, Region I staff requested that TI perform a comprehensive radiological survey of all potentially affected areas on the site. These comprehensive radiological surveys, performed in 1994 and 1995, and discussions with long-term employees, led to the identification of additional areas of contaminated soil, primarily in the Stockade and Building 12 south lawn areas. The contamination in the Stockade Area was likely due to the past handling and storage operations in the area. Contamination on the lawn of Building 12 was likely the result of intrusion into the burial area and the

spread of contamination during final grading around the building. Residual contamination was also identified in Buildings 4, 5, and 10, primarily where unclad uranium operations had been conducted. This contamination was generally limited to cracks and joints in the concrete floor, areas around equipment installed in the concrete floor, and drain lines buried in or beneath the concrete floor. Remediation was performed in accordance with the 1992 plan for remediation of the burial area and a 1994 addendum.

Also, in approximately 1978, NRC confirmed the presence of radioactive contamination at the Shpack landfill in nearby Norton, Massachusetts. The source of this contamination may have been the result of work performed at the TI Attleboro facility, but the company has not acknowledged that its facility was the source of the material in the landfill. Although some residual radioactive material was removed from the closed landfill, further remediation for both radiological and chemical contaminants may still be required. In 1980, the landfill was listed on the U.S. Department of Energy (DOE) Formerly Utilized Site Remedial Action Program (FUSRAP), which will manage any remediation of radioactive materials. In addition, TI and several other companies have entered into a consent order with the U.S. Environmental Protection Agency (EPA EXIT) regarding the landfill.

DISCUSSION:

In response to the staff's request, TI performed comprehensive radiological surveys of all potentially affected areas on the site. These surveys, performed in 1994 and 1995, included a 100 percent walkover survey of both affected and unaffected areas using a sodium iodide detector, and systematic surface and sub-surface soil sampling with a split-spoon sampling apparatus and drill rig. Sampling was conducted at 1600 locations resulting in the collection of 5865 surface and sub-surface soil samples. Sample locations in affected areas were defined on a 10 meter x 10 meter (100 m^2) grid plan to ensure complete coverage of the affected area. Sampling in the Stockade Area was complicated by the presence of numerous underground electrical, communication, and water utilities and concrete supports for overhead structures. Designated sample points within some of the grid cells were moved short distances to avoid these obstacles. Unaffected areas were not sampled on a defined grid; however, 30 random sub-surface samples were collected in the unaffected areas. All soil samples were evaluated for total uranium concentrations. The soil sampling in the affected area identified eighty-five 100 m^2 grid cells where soil contamination exceeded NRC guidelines for release for unrestricted use (30 pCi/gram total uranium), as stated in the Action Plan to Ensure Timely Cleanup of Site Decommissioning Management Plan Sites (57 FR 13389). One anomaly was found in the unaffected area survey. This area bordered the Stockade Area and resulted in the extension of the Stockade Area to include it; this area was subsequently remediated. Discussions with long-term employees provided additional information concerning the use and possible disposal of licensed material on the site.

Radiological surveys were also conducted inside the buildings where there was a history of use of licensed material. Residual uranium contamination was identified in Buildings 4, 5, and 10. In Building 1, surveys identified a small amount of radium-226. The Commonwealth of Massachusetts has oversight for this material, and it is evaluating possible courses of action. Remediation activities in Buildings 4 and 5 primarily involved scabbling concrete floor surfaces. In a few cases, portions of the concrete slab and some underlying soil were removed. Building 10 required more extensive remediation work to remove contamination because unclad uranium operations had been conducted in portions of this building. Activities included scabbling approximately 75 m^2 (800 ft^2) of the floor and lower wall surfaces. Approximately 1400 m^2 (15,000 ft^2) of the concrete slab were removed to provide access to contaminated drain lines and soil. In most cases, the concrete was not contaminated or was only contaminated on the surface. Approximately 460 meters (1500 feet) of contaminated drain lines were removed from Building 10, and another 180 meters (600 feet) were decontaminated using a high-pressure wash. Approximately 6 m^3 (200 ft^3) of sludge were collected and disposed. All wash water was collected, filtered, and analyzed prior to release. All water released from the site in both the interior and exterior remediation projects, met NRC regulations for release.

The volume of uranium-contaminated waste generated in the interior remediation project was 980 m^3 (34,600 ft^3) of soil and concrete rubble. The exterior remediation projects generated primarily contaminated soil totaling 15,100 m^3 (532,000 ft^3). Initial waste shipments were sent via truck; however, most of the waste was shipped via covered rail cars. Waste was disposed of at the Envirocare facility in Clive, Utah.

NRC Region I staff conducted periodic inspections of the remediation activities during the various phases of the remediation projects. Three representatives from the Region I staff, accompanied and assisted by a representative from the Commonwealth of Massachusetts, conducted confirmatory measurements at the site in February 1997. These surveys confirmed the licensee's survey results.

The licensee's survey results indicated small areas of residual contamination exceeding unrestricted release limits in a few inaccessible locations. These areas are beneath vital structures or utilities and cannot be further remediated without adversely affecting the integrity of buildings and structures on the site. Based on the limited volume and activity of the material and averaging the residual contamination with the volume of other material present, the staff concludes that these areas are acceptable for release for unrestricted use. TI's contractor also performed a series of dose evaluations to estimate the impact of intrusion into any of these areas. The two scenarios that were evaluated were the exposure of a maintenance worker digging and working in a trench in Building 10 and exposure of a resident after conversion of the site to residential use. Using conservative assumptions in both cases, dose equivalents of 1.3 millirem/year and 7.9 millirem/year were calculated for the maintenance worker and residential scenarios, respectively, for maximally exposed individuals. The staff has reviewed the dose assessments and finds them to be conservative and acceptable.

The chemical forms of uranium used at the site were primarily uranium oxides, uranium metal, and uranium metal alloys. These forms of uranium are generally not soluble. Groundwater monitoring data from samples collected from on-site monitoring wells from March 1993 through February 1997 show only occasional values in excess of the gross alpha screening level of 15 pCi/liter. Specific uranium analyses have not exceeded 0.4 pCi/liter. These concentrations are well below the EPA proposed primary drinking water limit of 30 pCi/liter for uranium, and are acceptable for releasing the site for unrestricted use.

CONCLUSIONS:

Based on the actions taken by the licensee, our review of the surveys performed, and the results of the NRC confirmatory survey, the staff concludes that decommissioning has been satisfactorily completed at the TI Attleboro, Massachusetts site and the site now meets the NRC criteria described in the Action Plan for release for unrestricted use.

The staff has notified EPA and the Commonwealth of Massachusetts of its intent to terminate the license. Because the Shpack landfill is a DOE FUSRAP site and TI is a party to the consent order with EPA, the staff believes that there is adequate Federal regulatory oversight of any radioactive material that may remain in the former landfill. The Commonwealth of Massachusetts plans no further action regarding the NRC-licensed materials at the site. Massachusetts is expected to become an Agreement State on March 21, 1997.

The staff previously placed a notice in the *Federal Register* (60 FR 27146, dated May 22, 1995) that acknowledged the receipt of the amended remediation plan and that TI was working toward complete remediation of the site. The staff will place a notice in the *Federal Register* stating that the areas of concern now meet NRC guidelines for release for unrestricted use, and NRC is removing this site from the SDMP and terminating the license.

It is the staff's intention, unless otherwise directed by the Commission, before March 21, 1997, to send a letter to TI (attachment) stating that the Attleboro site meets current NRC requirements for release for unrestricted use, that the license is terminated, and that NRC intends to remove the site from the SDMP.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection.

L. Joseph Callan
Executive Director for Operations

Contact: M. Roberts, RI (610)
337-5094

Attachment: Draft letter to Texas Instruments

ATTACHMENT

OFFICIAL RECORD COPY

DRAFT

Francis J. Veale Jr.
Environmental Safety and Health Department Manager
Texas Instruments, Inc.
34 Forest Street
Attleboro, Massachusetts 02703-0964

SUBJECT: REMOVAL OF THE TEXAS INSTRUMENTS, INC., ATTLEBORO, MASSACHUSETTS FACILITY FROM THE NRC SITE DECOMMISSIONING MANAGEMENT PLAN AND TERMINATION OF NRC LICENSE

Dear Mr. Veale:

I am responding to your letter dated October 29, 1996, requesting that NRC release the Texas Instruments, Inc., Attleboro, Massachusetts, site for unrestricted use, terminate the current NRC license, and remove the site from the Site Decommissioning Management Plan (SDMP). We have reviewed your reports from the radiological surveys and analysis of soil samples and conducted our own confirmatory radiological survey. We conclude that the facility has been remediated to meet the criteria for release for unrestricted use as discussed in the "Action Plan to Ensure Timely Cleanup of Site Decommissioning Management Plan Sites" (the Action Plan) (57 FR 13389-13392) and NRC's current criteria for residual contamination in soil.

In accordance with your request, NRC License No. SNM-23, issued to Texas Instruments, Inc., is hereby terminated, and we are removing your Attleboro, Massachusetts site from the SDMP list.

As noted in the Action Plan, this is the Commission's final action on the referenced license. NRC will not require any additional decommissioning in response to future NRC criteria or standards, unless additional contamination, or noncompliance with your July, 1992 Remediation Plan or the December 1994 Supplement to the Remediation Plan, is found, and there is a significant threat to public health and safety.

If you have any questions concerning our action, please contact Mark Roberts of my staff at (610) 337-5094 or me at (610) 337-5200. Thank you for your cooperation in this matter.

Sincerely,
Ronald R. Bellamy, Ph. D., Chief
Decommissioning & Laboratory Branch
Division of Nuclear Materials Safety

License No.SNM-23

Docket No.070-00033

cc: Commonwealth of Massachusetts
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