



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

SAFETY EVALUATION BY THE
OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 7 TO
FACILITY LICENSE NO. R-83
TEXAS A & M UNIVERSITY
NUCLEAR SCIENCE CENTER REACTOR
DOCKET NO. 50-128

Introduction:

NRC Region IV Inspection and Enforcement Report No. 50-128/78-02 identified an unresolved item concerning Texas A & M University's (the licensee) interpretation of a Technical Specification for the Nuclear Science Center Reactor (NSCR) involving explosive material limitations. By letter dated October 6, 1978, Region IV requested the licensee to terminate the radiography of explosive material that exceeded the 25 milligram limits specified in Technical Specification 3.6.c. until information on the licensee's planned use of explosives within the reactor facility was submitted for review and approved by the Commission.

Discussion:

By letter dated February 6, 1979, as supplemented on May 15, June 13 and August 21, 1979, the licensee proposed an amendment to Facility License No. R-83 for the Nuclear Science Center (TRIGA) Reactor. The amendment would modify the Technical Specifications relating to the radiography of explosive material to: (1) increase the quantity of explosive materials allowed within the reactor building and available for irradiation in experimental facilities to a maximum of five (5) pounds (equivalent TNT); (2) restrict quantities of explosive material exceeding 25 milligrams from areas containing reactor safety related equipment; and (3) restrict the cumulative exposure for explosive materials.

Evaluation:

The structural adequacy of those structures, systems, equipment and components important to the safety of the reactor and the reactor support systems have been evaluated against a postulated inadvertent detonation of the largest proposed mass, five pounds, of explosive materials at any point along the proposed path through the facility, including the final radiography location. The local and gross effects of an explosion, including postulated missiles, electrical shorts, and fire were evaluated. It has been concluded that the safety related structures, systems and components are either capable of withstanding the effects of the blast, or are adequately shielded by the concrete walls and floors. The licensee's Safety Analysis Report Appendix III

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provides a description of the design features along the transportation route. It should be noted that the control room and all critical safety cables are located on the opposite side of the reactor pool from the neutron radiography facility.

The most serious safety concern would involve the detonation of a charge while it is being radiographed since the beam port is exposed at this time and the potential rupture of the beam port could result in the loss of pool water. The consequences of the detonation of a charge while it is being radiographed were determined by evaluating the effects of the associated peak pressure developed on the weakest part of the beam port. The limiting failure strength of the beam port was determined by examination of the weld stresses between the beam tube and end plate. The licensee presented analyses with which we concur, which indicate a wide safety margin between the limiting weld shear, circumferential, and longitudinal stresses, and the peak blast pressures.

The licensee's Standard Operating Procedures governing the use of the neutron radiography facility provide detailed guidelines for the transportation and handling of explosive materials which are designed to preclude an inadvertent detonation. In the event of a detonation, the facility is capable of sustaining the effects of the maximum postulated blast without significant damage to the core, tank, or other critical structures. In addition, because the irradiation facility is open to the environs, the beam port would not rupture and there would be no loss of pool water.

If the beam port end plate were breached or damage to piping occurred, the effects would be less severe than those previously considered due to loss of coolant in Appendix II to the Safety Analysis Report. Therefore, we conclude that no new unreviewed safety considerations are presented.

The adequacy of fire protection in the radiography facility in the event of a fire due to an explosion or any other cause was reviewed. The radiography facility interior structure is constructed in part of some small amounts of wood and paraffin which could burn, but there are no other significant combustible materials on the lower level. Furthermore, the walls, floors, and ceilings are concrete so the fire would most likely burn itself out harmlessly. If, however, a fire is postulated which reaches any part of the mechanical chase area near the cable trays containing the control system and experimental scram system cables, the reactor may be manually scrammed from the control room or by the experiment scram which is operable from the lower research level. In the interest of prudent industrial safety and fire protection procedures, the licensee has committed in a mailgram of August 21, 1979, to install smoke detector systems in the general area of the cable trays directly beneath the reactor control room and in the central exhaust system stack. The licensee expects to have these systems functional within six months of the date of the aforementioned mailgram.

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In summary, there is adequate assurance that the radiography of explosive materials within the conditions specified in the proposed Technical Specifications will not threaten the integrity of the reactor, any vital equipment, or any safety related reactor components.

Therefore we conclude that there will be no significant increase in the probability or consequences of an accident and no significant decrease in the safety margin.

Environmental Consideration:

We have determined that this amendment will not result in any significant environmental impact and that it does not constitute a major Commission action significantly affecting the quality of the human environment. We have also determined that this action is not one of those covered by 10 CFR §51.5(a) or (b). Having made these determinations, we have further concluded that, pursuant to 10 CFR §51.5(d)(4), an environmental impact statement or environmental impact appraisal and negative declaration need not be prepared in connection with issuance of this amendment.

Conclusion:

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: October 31, 1979

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