

Mr. G. H. ...
TPD - 131

13 Jan 1971

AMCOR-XO

13 Jan 1971

U. S. Atomic Energy Commission
Division of Reactor Licensing
Washington, D. C. 20545

Gentlemen:

It is requested that our License No. R-65, USAEC Docket 50-47 be amended to authorize the Army Materials and Mechanics Research Center to possess, but not to operate, its nuclear reactor facility. Inclosed is a Deactivation Report including Technical Specifications for the facility in a deactivated condition.

Operations were ceased on 1 April 1970. It is considered that such deactivation will not endanger the health and safety of the public.

Sincerely yours,

Incl
as (43 copies each)

JOHN W. GILLESPIE
LTC Cml C
Deputy Director/Commanding Officer

Subscribed and sworn to before
me this ___ day of 1971
at Watertown, Middlesex County,
Massachusetts

EGNAS M. SHEBEK
Notary Public

DEACTIVATION REPORT OF THE
ARMY MATERIALS RESEARCH REACTOR

December 8, 1970

Army Materials and Mechanics Research Center
Watertown, Massachusetts 02172

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A. INTRODUCTION

The U.S. Atomic Energy Commission (USAEC) and the Army Reactors Committee on Health and Safety (ARCHS) are requested to authorize the Army Materials and Mechanics Research Center (AMMRC) to possess, but not to operate, the deactivated nuclear reactor facility, located at Watertown, Massachusetts in accordance with the Technical Specifications presented herein.

This report outlines the steps taken to put the nuclear reactor facility in a condition so that:

- a. there is no hazard due to accidental nuclear criticality,
- b. there is a negligible probability of release of radioactive materials, and
- c. there are adequate maintenance and surveillance programs.

AMMRC currently holds the following licenses in addition to the Facility License P-65:

- a. By-product Materials License, No. 20-01010-04
- b. Special Nuclear Material License, No. SNM-244.

B. REMOVAL OF HAZARDOUS MATERIALS

1. Disposition of Nuclear Fuel

To insure no possible nuclear criticality can occur all fuel elements containing special nuclear material have been removed and returned to the U. S. Atomic Energy Commission. Irradiated fuel elements were handled under contract with National Lead Co. The number of elements was 81. Un-irradiated fuel elements and material were packaged and returned through normal transportation means to the National Lead Co. This consisted of three

elements and samples of Al-U alloys.

2. Disposition of Radioactive Material

Item a. BeO Reflector Elements

These elements were disposed of as high activity waste under contract with the Nuclear Engineering Co., Inc.

Item b. Shim-Safety Rods and Armatures

Shim-safety rods and armatures were disposed of as high activity waste.

Item c. Fission Chambers

These chambers contain U-235 and will be transferred to another reactor facility and reported under SNM-244. Total U-235 contained is less than 5 grams and is stored in a locked cabinet.

Item d. Ionization Chambers

These chambers were disposed of as low level radioactive waste.

Item e. Magnets and Guide Tubes

Magnets have been stored in rear of control room. Guide tubes have had the radioactive stainless steel pieces removed and the guide tubes stored. Stainless steel pieces were disposed of as high activity radioactive waste.

Item f. Radioactive Sources

The sources used for calibration and check of survey meters have been transferred to the Radiation and Occupational Safety Branch (ROSB).

Item g. Main Pool

Portions of the stainless steel liner and items such as, the beam tubes, the pedestal, the grid plate, and the instrument rack are radioactive and have been left in the pool. The security of the containment shell and the erection of proper signs at the pool top prevent the exposure of personnel to any hazards. Radiation level on the pool top is less than 20 mr/hr at floor level.

C. DISPOSITION OF NON-HAZARDOUS ITEMS

Item a. Control Rod Drives

These drives have been removed and stored with preservatives on all moving parts in the rear of the control room.

Item b. Instrumentation and Monitoring Equipment

This equipment has been left in place but not operating. All electrical equipment has been defused.

Item c. Primary Coolant System

All water has been drained and disposed of to the MDC sanitary sewage system. Preservatives have been put on all exposed ferrous metal moving parts of pumps and motors. All electrical equipment has been defused. All openings of motors have been taped.

Item d. Secondary Coolant System

All water has been drained to MDC sanitary sewage. Fan motors have been removed, preserved and stored in containment shell.

Item e. Heating and Ventilating System of Containment Shell.

This system will be kept in operation. The automatic butterfly valves on the containment shell intake and exhaust lines have been left in a mechanically fixed open position.

Item f. Air locks

The inflatable rubber gaskets on the doors of the airlocks have been removed. The south airlock doors have been taped to keep out the elements. The west airlock to Building 97 has been left as is without gaskets.

Item g. Experimental Equipment

Experimental equipment not required by the investigators has been left in place. Electrical equipment has been defused.

Item h. Overhead Crane

Annual preventive maintenance by factory representative will be continued.

Item i. Fuel Storage Tank

Water has been drained and disposed of to MDC sanitary sewer.

Item j. Cathodic Protection System

This cathodic protection system of the shell is currently being replaced by the Post Engineer. This work will be completed and system maintained.

Item k. Retention Tank

This 40,000 gallon retention tank located between the shell and Building 97 has been drained and flushed clean to the MDC sanitary sewer.

Item l. Liquid Waste System, Bldg 97.

This system will be maintained to handle any waste from the work conducted in Building 97 authorized by the Byproduct Material License (20-01010-04).

Item m. Pool Make-Up System.

System has been disconnected from servicing containment shell. May be operated for Buildings 97 and 292 as needed.

D. CONTAINMENT SHELL

Areas of the containment shell will be secured in accordance with the requirements of 10 CFR 20. Areas which require posting and control are the primary coolant area and the main pooltop.

E. TECHNICAL SPECIFICATIONS

1. SITE

a. Plant Area

The plant area includes only the reactor containment shell. Personnel access shall be controlled by knowledgeable AMMRC personnel in accordance with written procedure. Personnel access in the immediate future shall be for maintenance and surveillance activities.

b. Principle Activities

The principal activities carried on within the plant area shall be the possession of the reactor facility and the maintenance and surveillance programs. Regulatory authorities will be notified of any other use in advance.

c. Physical Security

The only access to the containment shell is by the two airlocks.

The outer doors of the airlocks will be locked and the key retained by the Intelligence and Security Branch (ISB). The inner doors will be monitored for opening and such opening will alarm at the main office of the ISB. The Facility Supervisor will maintain a list of personnel, who are authorized access, at the ISB. When an authorized person desires to enter the shell he will

- (1) Sign out a key at the ISB
- (2) Just prior to opening inner door, clear entry by telephone with ISB (ISB will log the entry).

When the authorized person is leaving the shell he will, by telephone:

- (1) Notify ISB after outer door has been secured.
- (2) Return key promptly to ISB.

Instructions for entry will be posted at the airlocks by the Facility Supervisor.

Upon receipt of an alarm caused by an unauthorized opening, the Security Police will immediately investigate the case. Persons apprehended will be held and the Facility Supervisor notified.

2. ADMINISTRATIVE AND PROCEDURAL REQUIREMENTS

a. General

Figure 1 depicts the current line organization and the responsibilities as required.

Activities involving access to the plant area and use of any area or in-place equipment shall be conducted under the direction of the designated Facility Supervisor with functional responsibility

SURVEILLANCE
MAINTENANCE & SECURITY

MANAGEMENT

REVIEW AND AUDIT

DIRECTOR

ADMINISTRATIVE
DIVISION

FACILITY
SUPERVISOR

REACTOR SAFEGUARDS
COMMITTEE

RADIATION & OCCUPATIONAL
SAFETY BRANCH

POST ENGINEERING
BRANCH

INTELLIGENCE & SECURITY
BRANCH

and commensurate authority to maintain the facility in a safe and secure condition at all times. The Facility Supervisor shall utilize the resources of other AMPIC personnel as necessary to provide an effective safety program.

b. Review and Audit

(1) Written procedures for control of access to the plant area, use of plant area, facilities and equipment and for periodic inspection of the facility shall be established and approved by the Director.

(2) Written procedures specified in b. (1) above shall be reviewed by technically qualified personnel responsible to a management position other than the Facility Supervisor (the Reactor Safeguards Committee (RSC) in accordance with a written charter for that function.

(3) The RSC shall semi-annually audit activities conducted in the plant area to verify that effective radiological control practices are maintained.

3. HEALTH AND SAFETY

a. Radiation Monitoring

Radiation monitoring instruments and dosimetry devices shall be available and used as appropriate to prevent exposure of personnel to radiation in accordance with the standards of 10 CFR Part 20. A general radiation survey including smears shall be conducted monthly by the ROSR.

b. Removal of Materials and Equipment

As a radiation and contamination control measure, all materials and equipment removed from the shell shall be monitored and

released in accordance with AMERC Procedures and in compliance with the standards of 10 CFR Part 20, by the ROSB.

4. MAINTENANCE

a. Heating and Ventilating System.

The Post Engineering Branch (PEB) will conduct the following activities:

a. A weekly walk through inspection.

b. A monthly check of all equipment in accordance with a written checklist.

b. Cathodic Protection System

The PEB will read, record and evaluate voltage and current readings of the cathodic protection system quarterly. The effectiveness of the system will be checked, using a half-cell, semi-annually.

c. Fire Fighting Equipment

The PEB will check monthly and maintain fire extinguishers in the shell. The PEB will maintain the fire hoses.

d. Crane maintenance

The PEB will have annual maintenance performed on the crane.

5. RECORDS

Sufficient records shall be kept to establish that the facility is being maintained within the limitations of the facility license.

F. SAFETY ANALYSES

a. Radiation Hazards

With the removal of the special nuclear material from the site, there is no potential release of a large inventory of radioactive material, or source of airborne radiological hazards.

Within the main pool there are fixed radiation hazards from the induced radioactivity in the structural members of the reactor, namely, beam tube, pool liner, grid plate, pedestal, instrument rack, hold down mechanisms, etc. At floor level, at the pool top the current dose rate is less than 20 mr/hr constituting a radiation area. Barrier ropes have been placed at the entry to the pool top and signs posted as required. Entry down into the pool would be into a high radiation area. Since the pool top has 1/4" thick plates and the containment shell has limited and controlled access, it has been concluded that there is no undue hazard from the main pool and that the high radiation area in the interior of the pool is an inaccessible area.

There are slightly radioactive (less than 2 mr/hr contact) items such as magnets stored in a locked cabinet in the rear of the control room. It has been concluded that there is no undue hazard from these items.

The only radioactive material left in the primary coolant system are the resins in the two mixed bed demineralizers which have been used for the primary coolant clean-up system. These resins are contained in thick walled steel cylinders and cannot escape. Contact readings on the cylinders are less than 30 mr/hr.

Entry doors to the primary coolant area have been posted in accordance with 10 CFR 20. It has been concluded that there is no undue hazard

from these resins.

b. Fire

Fire detector heads are located throughout the shell which automatically sound an alarm by either temperature or rate of rise of temperature. Fire extinguishers are provided.

The quantities of combustible materials left in the shell are such that a fire resulting in very intense heat is precluded.

G. HEALTH PHYSICS SURVEY

a. Direct Radiation

All readily accessible and/or removable materials which emitted direct beta-gamma radiation in excess of 2.5 mr/hr were removed from the reactor containment shell. Only two areas remain where the direct radiation field exceeds 2.5 mr/hr.

One area is the reactor pool itself, where the radiation field varies from a high of 5000 mr/hr at the base of the interior of the pool to a low of 20 mr/hr at the top of the pool. The top of the pool has been roped off and prescribed radiation warning signs have been posted. The security of the shell and the metal pool cover make the interior of the pool an inaccessible area.

The second area exceeding 2.5 mr/hr is located in the basement, at the two ion exchange resin columns. The maximum contact reading at the resin columns is 60 mr/hr. This area also has been roped off and posted with prescribed radiation warning signs.

b. Contamination

Approximately one hundred swipes of the floors in the shell were taken and demonstrated there was no removable beta-gamma contamination.

c. Airborne Activity

A portable air sampler was lowered into the empty pool and an air sample taken to determine the extent of airborne activity. The air sample was taken from this area because the shell exhaust air is drawn from the pool and also the pool represents the area of highest contamination. The air was sampled at the rate of 28 liters per min. for a period of 100 min. The filter paper was then counted at the times indicated below. The data shows that the particulate air activity indicated was radon and thoron daughter products and that airborne activity (long-lived) above the radon and thoron background was undetectable with the indicated procedures (approximately $\mu\text{Ci/ml}$).
1 cpm represents 2×10^{-12}

Air Sample Data

<u>Time Counted</u>	<u>Gross Counts</u>
1150	755
1152	587
1153	536
1154	577
1155	531
1217	348
1300	182
1302	157
1317	108
1426	43
1500	32
1501	30

Note: Background 32 cpm
Efficiency of counted - 10%
Rate of air sampled 28 l/min.
Time air sampled 100 min.

H. CONCLUSION

It has been concluded that the facility can be possessed in the manner described herein without undue risk to the general public.



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

April 3, 1971

Docket No. 50-47

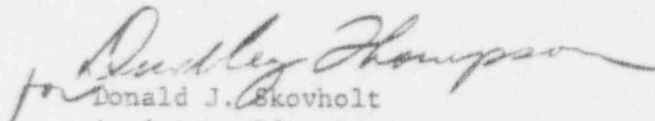
U. S. Department of the Army
Army Materials and Mechanics
Research Center
ATTN: John W. Gillespie, LTC, Cml C
Deputy Director/Commanding Officer
Watertown, Massachusetts 02172

Gentlemen:

In response to your application dated January 13, 1971, Amendment No. 9 to Facility License No. R-65 is enclosed. The amendment authorizes you to possess, but not to operate, your deactivated pool-type research reactor located in Watertown, Massachusetts.

A copy of the Notice of Issuance of Facility License Amendment, which has been submitted to the Office of the Federal Register for publication, and a copy of our related Safety Evaluation are also enclosed.

Sincerely,


Donald J. Skovholt
Assistant Director
for Reactor Operations
Division of Reactor Licensing

Enclosures:

1. Amendment No. 9
2. Federal Register Notice
3. Safety Evaluation

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UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

ARMY MATERIALS AND MECHANICS RESEARCH CENTER

DOCKET NO. 50-47

AMENDED FACILITY LICENSE

License No. R-65
Amendment No. 9

1. The Atomic Energy Commission ("the Commission") has found that:
 - A. The application for license amendment dated January 13, 1971, complies with the requirements of the Atomic Energy Act of 1954, as amended ("the Act"), and the regulations of the Commission set forth in 10 CFR Chapter I;
 - B. The facility will be possessed in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this license can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the regulations of the Commission;
 - D. The applicant is technically and financially qualified to engage in the activities authorized by this license in accordance with the rules and regulations of the Commission;
 - E. The applicant is a Federal Agency which does not have to furnish proof of financial protection and has executed an indemnity agreement which satisfies the requirements of 10 CFR Part 140, and
 - F. The issuance of this license will not be inimical to the common defense and security or to the health and safety of the public.
2. Facility License No. R-65, as amended, is hereby amended in its entirety to read as follows:
 - A. This license applies to the light water-moderated and cooled pool-type nuclear reactor (hereinafter "facility") owned by the Army Materials and Mechanics Research Center (hereinafter "AMMRC")

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or "the licensee") and located in Watertown, Massachusetts, and originally licensed as described in the licensee's application dated December 1, 1956, and subsequent amendments thereto.

B. Subject to the conditions and requirements incorporated herein, the Commission hereby licenses the Army Materials and Mechanics Research Center:

- (1) Pursuant to Section 104c of the Act and 10 CFR Part 50, "Licensing of Production and Utilization Facilities", to possess, but not to operate, the deactivated facility as a utilization facility in accordance with the procedures and limitations described in the application dated January 13, 1971, and in this license; and
- (2) Pursuant to the Act and 10 CFR Part 30, "Rules of General Applicability to Licensing of Byproduct Material", to possess, but not to separate, such byproduct material as may have been produced by operation of the facility.

C. This license shall be deemed to contain and be subject to the conditions specified in Part 20, Section 30.34 of Part 30, and Sections 50.54 and 50.59 of Part 50 of the Commission's regulations; is subject to all applicable provisions of the Act and rules, regulations and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

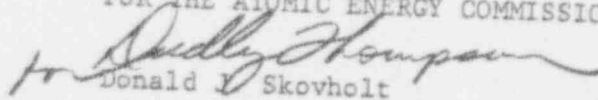
(1) AMMRC shall not operate the facility unless the Commission has authorized such operation by further amendment to this license.

(2) Technical Specifications

The Technical Specifications contained in Appendix A appended as Change No. 1 are hereby incorporated in this license. The AMMRC shall possess the reactor in accordance with these Technical Specifications. No changes shall be made in the Technical Specifications unless authorized by the Commission as provided in Section 50.59 of 10 CFR Part 50.

D. This amended license is effective as of the date of issuance and shall expire at midnight, October 2, 1997.

FOR THE ATOMIC ENERGY COMMISSION


Donald V. Skovholt

Assistant Director for Reactor Operations
Division of Reactor Licensing

Attachment:

Appendix A - Technical Specifications
(Change No. 1)

Date of Issuance: April 3, 1971

APPENDIX A

TO FACILITY LICENSE NO. R-65

TECHNICAL SPECIFICATIONS

CHANGE NO. 1

ARMY MATERIALS AND MECHANICS RESEARCH CENTER

DOCKET NO. 50-47

DATE: April 3, 1971

1. SITE

a. Plant Area

The plant area is defined as the area within the reactor containment shell.

b. Principal Activities

The principal activities to be carried on within the plant area shall be maintenance and surveillance programs. The Atomic Energy Commission's Division of Reactor Licensing shall be notified in advance of any other use.

c. Physical Security

Access to the plant area shall only be via the two airlocks. The outer doors of the airlocks shall be locked and the key retained by the Intelligence and Security Branch (ISB). The inner doors shall be monitored continuously for opening by an alarm at the main office of the ISB. The Facility Supervisor will maintain a list of personnel at the ISB office who are authorized access to the facility. When an authorized person desires to enter the plant area he must:

- (1) Sign out a key at the ISB office; and
- (2) Clear entry by telephone with the ISB (ISB will log the entry) just prior to opening the inner door.

When the authorized person is leaving the plant area, he must:

- (1) Notify the ISB, by telephone, after the outer door has been secured; and

- (2) Return the key promptly to the ISB office.

Instructions for entry shall be posted at the airlocks by the Facility Supervisor.

Upon receipt of an alarm caused by an unauthorized opening, the Security Police shall immediately investigate the facility. Persons apprehended will be held and the Facility Supervisor notified.

2. ADMINISTRATIVE AND PROCEDURAL REQUIREMENTS

a. General

Figure 1 depicts the line organization and the general responsibilities.

Activities involving access to the plant area and use of any area or installed equipment shall be performed under the direction of the designated Facility Supervisor who has the responsibility and commensurate authority to maintain the facility in a safe and secure condition at all times. The Facility Supervisor shall utilize the resources of other AMMRC personnel as necessary to provide an effective safety program.

b. Review and Audit

- (1) Written procedures for control or access to the plant area, use of plant area, facilities and equipment and periodic inspection of the facility shall be established and approved by the Director.
- (2) Written procedures specified in b(1) above shall be reviewed by the Reactor Safeguards Committee (RSC) in accordance with a written charter for that function.
- (3) The RSC shall semiannually audit activities performed in the plant area to verify that effective safety and radiological control practices are maintained.

3. HEALTH AND SAFETY

a. Radiation Monitoring

Radiation monitoring instruments and dosimetry devices shall be available and used in accordance with procedural requirements.

A general radiation survey, including smears, shall be performed monthly by the Radiation and Occupational Safety Branch (ROSB).

b. Removal of Materials and Equipment

As a radiation and contamination control measure, all materials and equipment removed from the plant area shall be monitored and released in accordance with AMMRC procedures and in compliance with the standards of 10 CFR Part 20, by the ROSB.

4. MAINTENANCE

a. Heating and Ventilating System

The Post Engineering Branch (PEB) shall perform the following activities:

- (1) A weekly visual inspection.
- (2) A monthly check of all equipment in accordance with a written checklist.

b. Cathodic Protection System

The PEB shall read, record and evaluate voltage and current readings of the cathodic protection system quarterly. The effectiveness of the system shall be checked, using a half-cell, semiannually.

c. Fire Fighting Equipment

The PEB shall check and maintain fire extinguishers in the plant area monthly. The PEB shall maintain the fire hoses.

d. Fire Alarm System

The PEB shall have an operability check of the fire alarm system performed semiannually.

5. RECORDS

In addition to those records required by applicable AEC regulations, including Section 20.401 of 10 CFR Part 20, the AMMRC shall keep the following records:

- a. Records of principal maintenance activities and equipment surveillance.
- b. Records of inspections of the deactivated facility.
- c. Records showing radioactive releases or discharges to the air or water beyond the effective control of the AMMRC as measured at the point of such release or discharge.

6. REPORTS

In addition to the reporting requirements of applicable AEC regulations, and in no way substituting therefor, reports shall be submitted to the AEC as follows:

A prompt report (by telephone or telegraph to the Director, AEC Region I Compliance Office) and a report within 10 days (in writing to the Director, Division of Reactor Licensing, USAEC, Washington, D. C. 20545) of any indication or occurrence of a possible unsafe condition relating to the facility or to facility personnel or the public.

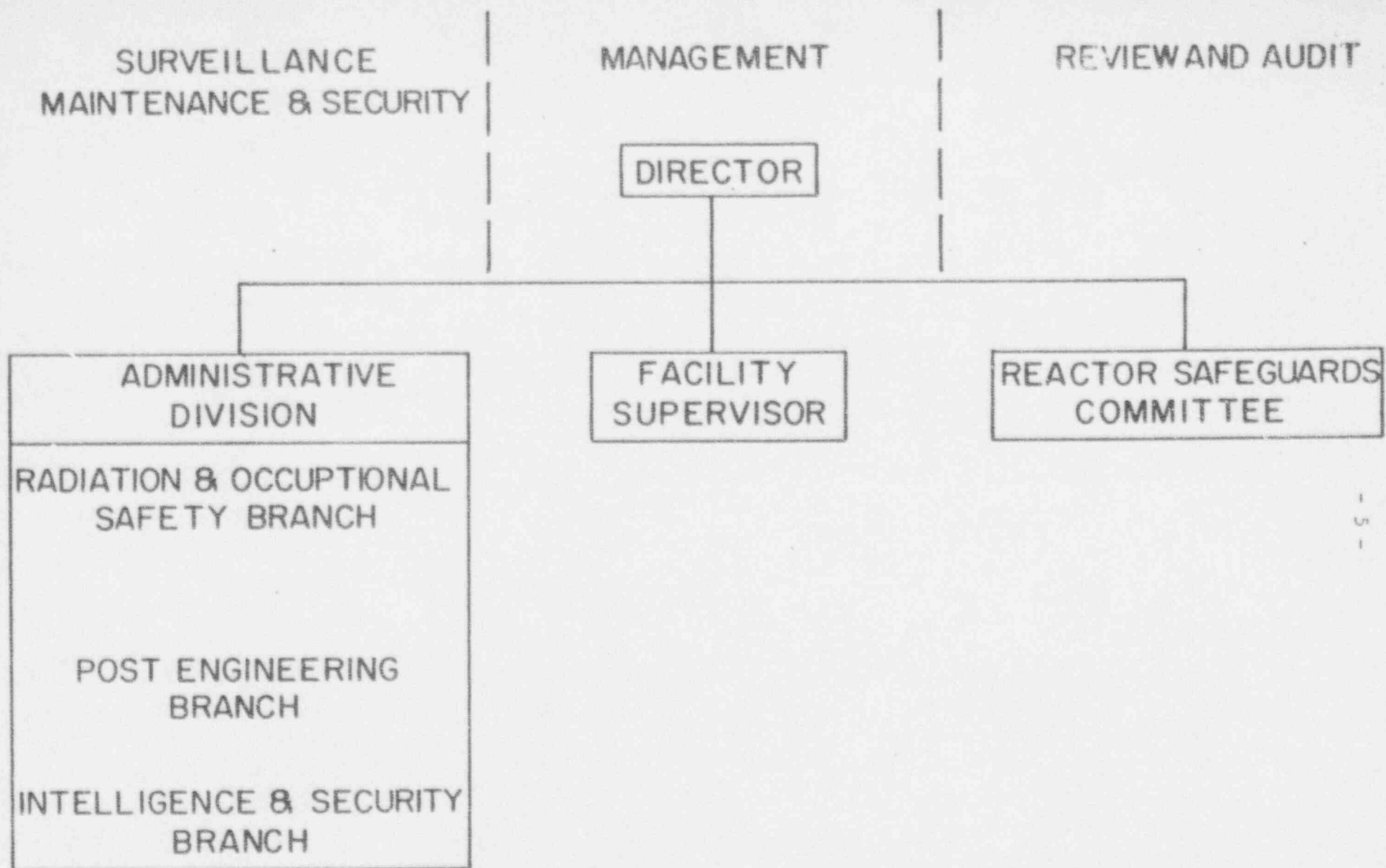


Figure 1

UNITED STATES ATOMIC ENERGY COMMISSION

DOCKET NO. 50-47

ARMY MATERIALS AND MECHANICS RESEARCH CENTER

NOTICE OF ISSUANCE OF FACILITY LICENSE AMENDMENT

The Atomic Energy Commission ("the Commission") has issued, effective as of the date of issuance, Amendment No. 9 to Facility License No. R-65. The license presently authorizes the Army Materials and Mechanics Research Center (AMMRC) of the U. S. Department of the Army to possess, use and operate its pool-type research reactor located in Watertown, Massachusetts, at power levels up to five megawatts (thermal). The amendment authorizes AMMRC to possess, but not to operate, the reactor in accordance with AMMRC's application dated January 13, 1971.

The Commission has found that the application for the amendment complies with the requirements of the Atomic Energy Act of 1954, as amended ("the Act"), and the Commission's regulations published in 10 CFR Chapter I. The Commission has made the findings required by the Act and the Commission's regulations, which are set forth in the amendment, and has concluded that the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. The Commission has also found that prior public notice of proposed issuance of this amended license is not required since the possession of the facility in accordance with the terms

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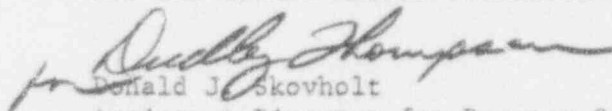
of the amended license does not involve significant hazards considerations different from those previously evaluated.

Within fifteen days from the date of publication of the notice in the FEDERAL REGISTER, the applicant may file a request for a hearing and any person whose interest may be affected by this proceeding may file a petition for leave to intervene. Requests for a hearing and petitions to intervene shall be filed in accordance with the Commission's "Rules of Practice" in 10 CFR Part 2. If a request for a hearing or a petition for leave to intervene is filed within the time prescribed in this notice, the Commission will issue a notice of hearing or an appropriate order.

For further details with respect to this amendment, see (1) AMMRC's application dated January 13, 1971, (2) the amendment to the facility license, including revised Technical Specifications, and (3) a related Safety Evaluation by the Division of Reactor Licensing, all of which are available for public inspection at the Commission's Public Document Room at 1717 H Street, N. W., Washington, D. C. Copies of items (2) and (3) above may be obtained upon request sent to the U. S. Atomic Energy Commission, Washington, D. C. 20545, Attention: Director, Division of Reactor Licensing.

Dated at Bethesda, Maryland, this 3rd day of April, 1971.

FOR THE ATOMIC ENERGY COMMISSION



Donald J. Skovholt
Assistant Director for Reactor Operations
Division of Reactor Licensing

UNITED STATES ATOMIC ENERGY COMMISSION

SAFETY EVALUATION BY THE DIVISION OF REACTOR LICENSING

DOCKET NO. 50-47

ARMY MATERIALS AND MECHANICS RESEARCH

CENTER (AMMRC) REACTOR FACILITY

By application amendment dated January 13, 1971, the Army Materials and Mechanics Research Center submitted a report on the deactivation of the Army Materials Research Reactor (AMRR) and requested authorization to possess, but not to operate, the reactor facility. The submittal included proposed Technical Specifications for the facility in a deactivated condition. Reactor operations ceased on April 1, 1970, and the reactor facility is presently in a deactivated condition.

The deactivation report outlines the steps taken by the licensee to preclude nuclear criticality or the inadvertent release of radioactive materials and assure the establishment of adequate maintenance and surveillance programs.

The licensee stated that all readily accessible and/or removable materials, which emitted direct beta-gamma radiation in excess of 2.5 mR/hr, were removed from the containment shell. Two remaining areas where the direct radiation field exceeds 2.5 mR/hr will be designated radiation areas.

The licensee reported the disposition of hazardous materials as follows. All fuel elements containing special nuclear materials were shipped offsite. The beryllium-oxide elements, shim-safety rods and armatures, ionization chambers, and radioactive sections of the control rod guide tubes were disposed of as radioactive waste. The fission chambers, which contain small amounts of uranium 235, were transferred to another reactor facility and radioactive sources used for calibration and checking of radiation monitoring instruments were transferred to the Radiation and Occupational Safety Branch of AMMRC. Portions of the pool liner, the beam tubes, the core pedestal and grid plate, the instrument rack, and the demineralizer resins, which are radioactive, will remain in place.

The licensee reported the disposition of non-hazardous items as follows. The control rod drives were removed and stored in the control room. Instrumentation and monitoring equipment will remain in place but not operating; the fuses were removed from all electrical equipment. Both the primary and secondary coolant systems were drained into the sanitary sewerage system. The fuel storage pit

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and the retention tank were drained and the water discharged into the sanitary sewerage system.

The reactor pool water makeup system was disconnected, but the liquid waste system will be maintained to handle any radioactive waste that may be generated in an adjacent building. The containment shell heating and ventilating system, the overhead crane and the containment shell cathodic protection system will be maintained.

The two radiation areas within the containment shell are the reactor pool and the primary system piping area. The dose rate at the top of the reactor pool, due to the induced radioactivity in structural members within the pool, is less than 20 millirem per hour. Barrier ropes were placed at the entrance to the top of the pool and signs designating it as a radiation area were posted. The top of the pool was covered with steel plates to prevent access to the interior of the pool. Since access to the containment shell will be limited and controlled, the licensee concludes, and we agree, that the radiation emanating from the interior of the reactor pool will not constitute an undue hazard to personnel.

The resins in the primary system demineralizers constitute the only radioactive material remaining in the primary system piping area. The resins are contained in thick-walled, steel cylinders and, therefore, cannot escape from the primary system. The dose rates at the surface of the demineralizer are less than 60 millirem per hour. The primary system piping area was posted as a radiation area. The licensee concludes, and we agree, that the existence of this controlled radiation area does not constitute an undue radiation hazard.

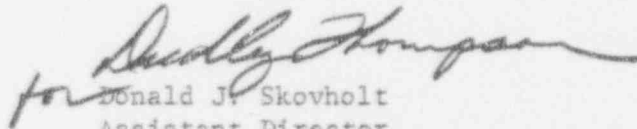
Maintaining radiological safety within the containment shell will be the responsibility of the Radiation and Occupational Safety Branch at AMMRC. A general radiation survey within the containment shell will be performed on a monthly basis. Radiation monitoring instruments and dosimetry devices will be available and utilized in accordance with the requirements of 10 CFR Part 20.

We have reviewed the Technical Specifications proposed for the deactivated facility and have concluded that they include those items important to the safety of the reactor facility in its deactivated condition. The licensee defines the plant area to be controlled as the area within the reactor containment shell. The principal activities to be carried on within this area are identified and physical security measures are outlined. The administrative and procedural requirements identify the organization and its responsibilities to provide an effective safety program. The review and audit function of management and the

written procedures that will be in effect are also specified. There will be written procedures for control of access to the plant area and for control of all activities within the plant area. The radiation monitoring practices and procedures for governing the removal of materials and equipment from the plant area and the requirements for periodic maintenance of remaining systems and equipment are specified.

CONCLUSION

Based on the above considerations, we have concluded that there is reasonable assurance that the health and safety of the public will not be endangered by the existence of the AMMRC reactor facility in the reported deactivated condition.

for 
Donald J. Skovholt
Assistant Director
for Reactor Operations
Division of Reactor Licensing

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