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REPORT OF RADIATION SURVEY OF THE FCEL REACTOR FACILITY IN SUPPORT OF REQUEST TO TERMINATE FACILITY LICENSE CX-17 AND TO RELEASE THE FACILITY FOR UNRESTRICTED USE

DOCKET NO. 50-147

1.0 INTRODUCTION

Operations under the dismantling plan authorized by previous NRC (USAEC) order dated November 1, 1974, have been completed. This report presents the supporting information indicating that the dismantling effort has been completed so that the facility license may be terminated and the facility released for unrestricted use.

2.0 STATUS OF FACILITY DISMANTLING

The split-table critical machine has been dismantled and removed. Other hardware and parts not necessary for operation of the building have been removed with the exception of an instrument shop. The instrument shop has occupied and will continue to occupy the rooms in the building as indicated in Figure 1.

The building has been cleaned and surveyed for contamination. No covering material such as painting, plating, or wax has been applied to the floor, walls, equipment, or structure remaining in the building. Such covering will not be applied until after NRC approval to release for unrestricted use.

3.0 RESULTS OF SURVEY FOR ACTIVATION PRODUCTS AND TOTAL SURFACE ACTIVITY

The area in and around where the split-table critical machine was located has been checked for evidence of induced radioactivity. This included the pit area below the split table and the floor and wall areas closest to the machine when it was in place.

General radiation background measurements were made with a Ludlum Model 125 Micro R meter and a Technical Associates PUG-1 countrate meter with a thin window pancake GM detector. Residual activity in the critical assembly area was determined to be below 0.1 m rad/hr at 1 cm from the surface with a 7 mg/cm^2 absorber as measured with a Technical Associates Model CP-7M ion chamber dosimeter. Alpha activity was surveyed by use of a Ludlum Model 12 countrate meter equipped with a Ludlum Alpha Scintillation Probe Model 43-5.

4.0 RESULTS OF SURVEY FOR REMOVABLE ACTIVITY

Surfaces were smeared for contamination using standard health physics procedure. In suspect places such as in sumps, traps, filters, etc., samples were collected and counted using standard procedures. The smears were counted with a Nuclear Measurements Corp. Gas Proportional automatic counting system. This system is capable of counting both alpha and beta-gamma activity simultaneously. It will detect 43.5% of all beta activity present, and 26.3% of all alpha activity for radionuclides expected to be present.

The results of these surveys are summarized below. The detailed results are on file in the Radiation and Nuclear Safety Office at the ESG Headquarters on De Soto Avenue. The locations of the areas cited below are given in the attached figure.

- Critical Assembly Room - Floor Area
  Measurements of all smears showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma

- Critical Assembly Room - East Shield Wall
  Measurement of all smears showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma

- Critical Assembly Room - South Shield Wall
  Measurement of all smears showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma

- Critical Assembly Room - West Shield Wall

  Measurement of all smears showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma

- Critical Assembly Room - North Shield Wall

  The average of all the smears showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma.

- Critical Assembly Room - Wire Tray - South Wall

  Measurement of all smears showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma

- Critical Assembly Room - South Air Conditioner - West Wall

  Measurement of all smears showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma

- Critical Assembly Room - North Air Conditioner - West Wall

  Measurement of all smears showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma

- Critical Component Laboratory - Room 114

  Measurements of all smears from the room showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Survey meter readings showed background alpha and beta-gamma, i.e., less than 0.015 mr/hr beta-gamma.

- Chemical Laboratory - Room 130

  Measurements of all smears for the floor and walls showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Survey meter readings showed background alpha and beta-gamma, i.e., less than 0.015 mr/hr beta-gamma.

- Closet (adjacent to Chemistry Lab) - Room 126

  Measurement of all smears from the room showed less than 20 d/m/cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Survey meter readings showed background alpha and beta-gamma, i.e., less than 0.015 mr/hr beta-gamma.

- Change Room - Room 128

  Measurement of all smears for the room showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Survey meter readings showed background alpha and beta-gamma, i.e., less than 0.015 mr/hr beta-gamma.

- Control Passage Way - Room 113

  Measurement of all smears from the room showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Survey meter readings showed background alpha and beta-gamma, i.e., less than 0.015 mr/hr beta-gamma.

- Fuel Vault - Room 112

  Measurement of all smears from the room showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Survey meter readings showed background alpha and beta-gamma, i.e., less than 0.015 mr/hr beta-gamma.

- Subassembly Room - Room 111

  Measurement of all smears from the room showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Survey meter readings showed background alpha and beta-gamma, i.e., less than 0.015 mr/hr beta-gamma.

- Locker Room - Room 127

  Measurement of all smears from the room showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Survey meter readings showed background alpha and beta-gamma readings, i.e., less than 0.015 mr/hr beta-gamma.

- Equipment Storage - Room 131

  Measurement of all smears from the room showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Survey meter readings showed background alpha and beta-gamma, i.e., less than 0.015 mr/hr beta-gamma.

- Material Storage - Room 115

  Measurements of all smears from the room showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Survey meter readings showed background alpha and beta-gamma, i.e., less than 0.015 mr/hr beta-gamma.

- Other Building 100 Rooms (nonoperating areas)

  Smears were taken from the following areas:

  Womens' Lavatory, Room 119
  Mens' Lavatory, Room 120
  Entry Area, Room 102
  Health Physics, Room 123
  Hall Corridor, Room 124
  Office, Room 103
  Office, Room 104
  Office, Room 105
  Hall Corridor, Room 107
  Office, Room 106
  Instrument Service and Lab, Room 108
  Control Room, Room 109

  Measurements all showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Survey meter readings showed background alpha and beta-gamma, i.e., less than 0.015 mr/hr beta-gamma.

- Drain and Cleanout Lines

  Smears were taken from the following locations:

  - Floor Drain, Room 114
  - Floor Drain, Room 130
  - Wall Drain, Room 130
  - Wall Drain, Room 128
  - Floor Drain, Room 128
  - Floor Drain, Room 127
  - Wall Drain, Room 127
  - Drain, Room 120
  - Drain, Room 121
  - Floor Drain, Room 111
  - Cleanout, Room 111
  - Lines to Outside Holdup Tank
    - Outside cleanout line at east wall
    - Outside cleanout line at southeast wall
  - Inside of line at holdup tank

  Measurements all showed less than 20 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Survey meter readings showed background alpha and beta-gamma, i.e., less than 0.015 mr/hr beta-gamma.

- Ventilation System

  Smears were taken at:

  - Exhaust Plenum, 1st Roof Level
  - Exhaust Plenum, 2nd Roof Level

  Measurements all showed less than 5 d/m/100 cm^2 alpha and 50 d/m/100 cm^2 beta-gamma. Direct survey with PUG-1 showed no contamination.

. Liquid Materials - 100 m/volume

	μCi/m/Alpha	μCi/m/Beta
Holdup Tank Pit Motor	None detected	1.7×10^{-8}
Holdup Tank Motor	1.7×10^{-8}	1.7×10^{-8}
North Holdup Tank Motor	1.9×10^{-8}	1.5×10^{-8}

5.0 CONCLUSION

The results of the radiation surveys are all well under the acceptable surface contamination levels (removable) for the nuclides listed in Table 1 of US NRC Regulatory Guide 1.86.

As indicated from Section 3.0, there is no indication of the presence of activation remaining in the most susceptible areas around where the critical machine was located.

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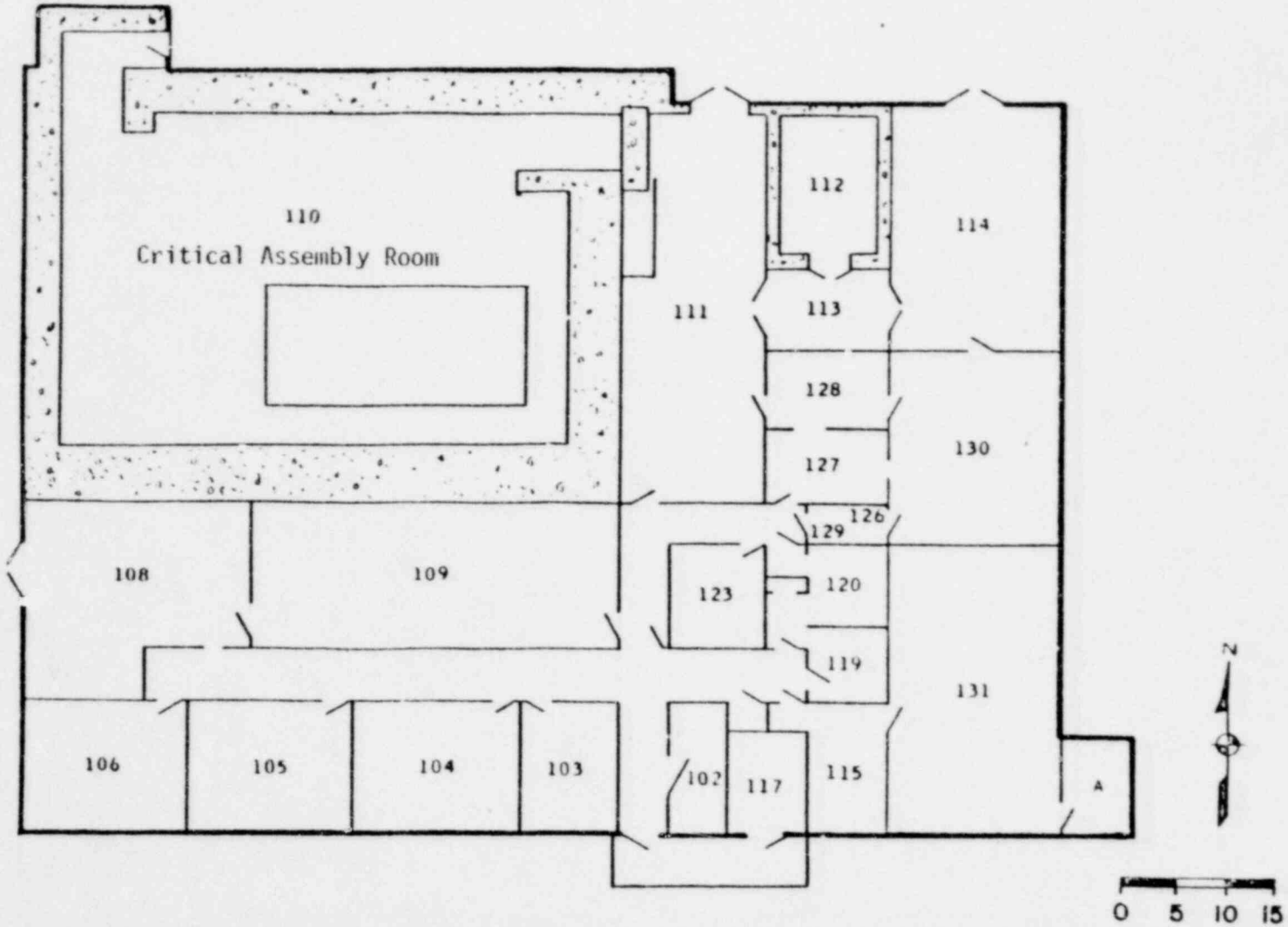

EPITHERMAL CRITICAL EXPERIMENT LABORATORY
BUILDING 100

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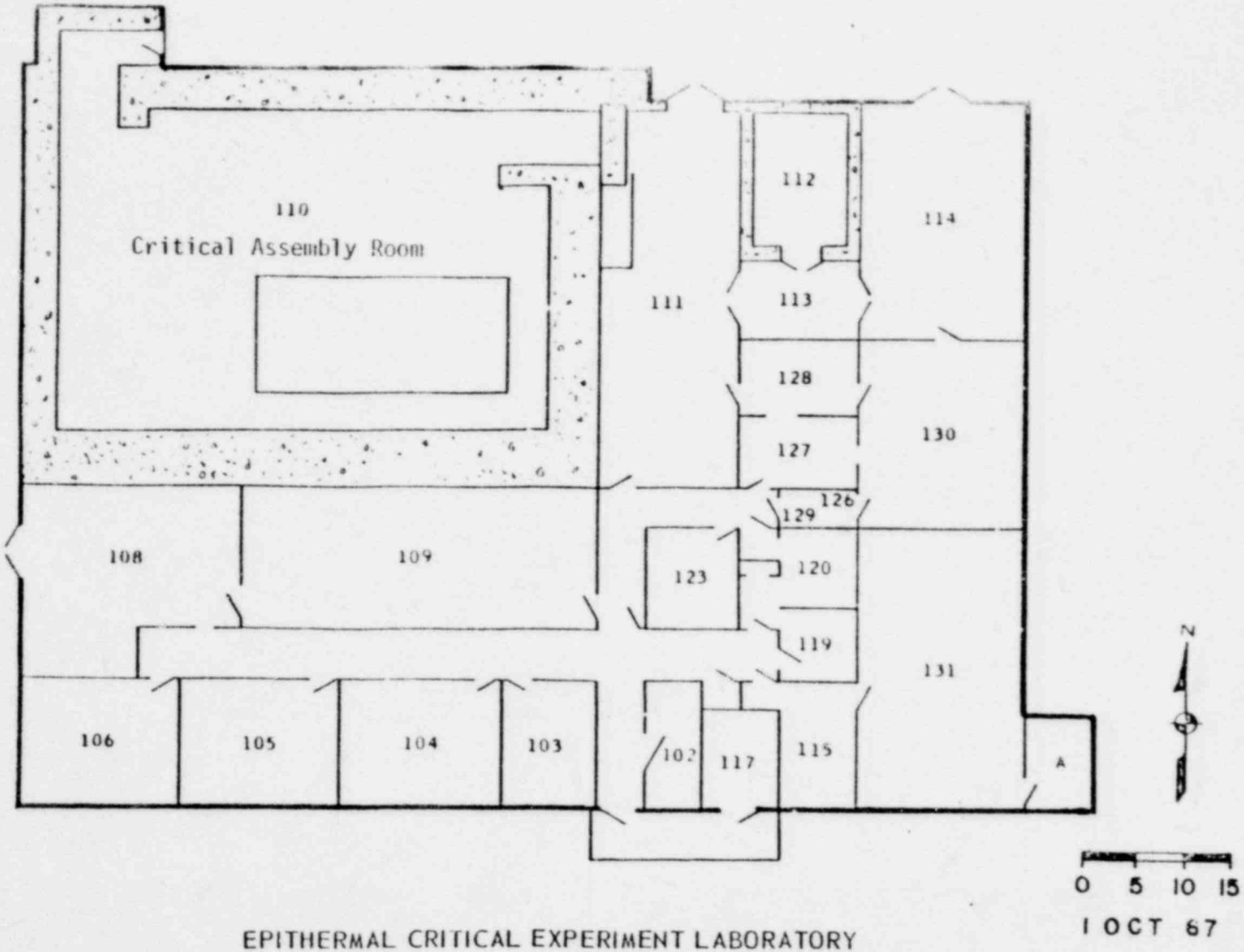

EPITHERMAL CRITICAL EXPERIMENT LABORATORY
BUILDING 100