RADIOLOGICAL AFFAIRS SUPPORT OFFICE
REPORT OF TECHNICAL ASSISTANCE VISIT
TO
BLDG 815
SUPERVISOR OF SHIPBUILDING, CONVERSION AND REPAIR
SAN FRANCISCO, CA

NAVAL NUCLEAR POWER UNIT
Port Hueneme, California 93043

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APPENDIX A: RADIATION SURVEY RESULTS, BUILDING 815, SAN FRANCISCO NAVAL SHIPYARD A-1

REFERENCES:

A. SAN FRANCISCO BAY NAVAL SHIPYARD LTR R200-58 5100 DTD 2 JAN 1970 WITH ENCLOSED HEALTH PHYSICS REPORT

B. UNITED STATES ATOMIC ENERGY COMMISSION LTR CO:V:RFF DTD 25 FEB 1970, WITH ENCLOSED MEMO TO FILE

C. FONECON BETWEEN LCDR JOHANNESMEYER, NAVNUPWRU, AND MR. FRED JONES, WESTNAVFACENGCOM REAL ESTATE DIVISION ON 29 JUL 1978.

A. INTRODUCTION

At the request of OP981N, the Radiological Affairs Support Office (RASO) of the Naval Nuclear Power Unit (NAVNUPWRU) conducted a preliminary radiological survey of Building 815 during the period of 27-28 July 1978. The primary purpose of the RASO survey was to evaluate the results of a cursory survey conducted by LFE Environmental Analysis Laboratories during the period 18-21 April 1978. Therefore, attention was centered on the rooms identified by that survey, with other rooms selected randomly to be included in the RASO survey. The RASO Survey Team consisted of HMC Jones and HMC Colbert. Beta-gamma radiation levels were obtained utilizing an Eberline Model RO-2 ionization chamber. An AN/PDR-56 was used to measure alpha radiation and an internal proportional counter was employed to analyze wipe tests for the presence of alpha. Detection of beta-gamma levels at selected points within Building 815 was performed using an Eberline HP-210 probe in connection with a dual counter/timer. Laboratory analysis of wipes for beta-gamma activity was made in an Eberline Model BC-4 beta counter. Samples were taken of the powdery substance from ceiling air conditioning and heating intakes in various locations and will be analyzed for radioisotopic content on a Canbera Lithium drifted Germanium detector system at the earliest possible time. The Canbera system is temporarily non-functional pending receipt of a new power supply module. The results of the analysis will be forwarded as an addendum to this report.

B. DISCUSSION

1. A review of reference (a) indicated that Building 815 at the San Francisco Bay Naval Shipyard was formerly occupied by the Naval Radiological Defense Laboratory (NRDL). At the time of disestablishment of NRDL on 3 November 1969 radioactive materials were used or stored within Building 815 under the authority and conditions of the following Atomic Energy Commission (AEC) licenses (recently reorganized as the Nuclear Regulatory Commission (NRC)):

a. ByProduct Material License No. 04-00487-03 authorizing 5000 curies of Cobalt-60, 2000 curies of Cesium-137, 500 curies of Hydrogen-3 (tritium) and 500 curies of various isotopes of atomic numbers 4 to 82.

b. ByProduct Material License No. 04-00487-09 authorizing 66,000 curies of encapsulated Strontium-90.

c. Special Nuclear Material License No. SNM-35 authorizing 2000 grams of Plutonium, 10 grams of Uranium-233 and 1000 grams of Uranium-235.

2. Building 815 is a six floor windowless concrete structure with each floor being approximately 10 feet in ceiling height. A six floor annex similar in construction was attached to the main building at some date after completion of the main building. A penthouse, located on the 7th floor level, contained a food preparation area, cafeteria dining areas, food storage spaces and limited office spaces. The building was completely air conditioned and appears to have a separate air handling unit for each floor. A basement room contained building mechanical equipment and an emergency generator. The remainder of the area beneath the building housed an area of piping, i.e.: sewage lines, gas, compressed air, fresh water, etc. Building 815, basement and subfloor areas excluded, currently contains approximately 475,000 square feet of floor space.

There are 5 personnel elevators, 2 freight elevators, and one escalator all of which serve the 1st to the 6th floors, inclusive. The elevators and escalator were not operable at the time of the RASO visit, and it was further determined that any elevator to be put into use for personnel movement will require prior testing and certification. It should be further noted that all restrooms and fresh water lines are presently secured.

3. Reference (a) indicated that radioactive materials actually used or stored in Building 815 were limited both in terms of location and composition. The critical areas in terms of use of radioactive materials were:

FIRST FLOOR

Room 1109 - Radioisotope Storage Room. This room was maintained under negative pressure and vented through a filter bank maintained in Room 2153.

SECOND FLOOR

Rooms 218, 222, 255, and 2153 - Occupied by the Health Physics Division.

FOURTH FLOOR

Radioactive sources were primarily sealed gamma emitters.

FIFTH FLOOR

Biological and Medical Sciences Division. Principal radioisotopes were Carbon-14 and Hydrogen-3 (tritium).

SIXTH FLOOR

Nuclear Technology Division - Widespread use of transuranics, particularly plutonium. Many sources were in liquid form.

WASTE TANKS

All laboratory sinks and drains emptied into two radioactive waste tanks located on the west end of the building.

4. Termination of the AEC licenses required the transfer and/or disposal of all licensed sources and the decontamination of all radioactive areas to the existing limits as established by the AEC. The limits in effect at that time were:

a. Beta-gamma dose rate at 1 cm averages less than 0.2 mR/hr and removable activity less than 1,000 disintegrations per minute (dpm) per 100 cm^2.

b. Alpha-fixed activity less than 500 dpm per 100 cm^2 and removable less than 100 dpm/100 cm^2.

5. The decontamination effort was under the auspices of the San Francisco Bay Naval Shipyard NRDL Disestablishment Group. Final AEC clearance of all buildings and termination of all AEC licenses was granted on 25 February 1970 after 22 visits by an AEC survey team during the period 15 September 1969 through 30 January 1970, reference (b) applies.

6. During the period 18-21 April 1978 at the apparent request of the General Services Administration-Region 9, the LFE Environmental Analysis Laboratory conducted a cursory radiologic survey of Building 815. The survey results were unremarkable except for scattered "hot spots" of beta-gamma contamination in Rooms 135, 218, 471, 631, 670, 1109, and 2153; and the possibility of contamination in heating and air conditioning ducting.

7. The present status of Building 815 was determined during reference (c). The building was listed to the General Services Administration (GSA) as excess to the Navy and GSA formally accepted the excess listing on 15 September 1976. GSA assumed protection and maintenance liability on 1 October 1977 according to GSA regulations. However, Buidling 815 remains excess Navy property until formally transferred to an ultimate user. The building is currently in a caretaker status under the custody of the Supervisor of Shipbuilding, Conversion and Repair, San Francisco, CA 94135, an Echelon 4 command under NAVSEASYSCOM. Future planned use according to GSA is as a Department of Labor Job Corp Academy.

C. FINDINGS

1. In that Building 815 remains excess Navy property under NAVSEASYSCOM custody, any required surveys and subsequent decontamination will be Navy responsibility.

2. In addition to the contamination limits contained in paragraph B.4 above, the following published limits exist:

a. Removable Beta-gamma - 1000 dpm/100 cm^2; removable Alpha 100 dpm/100 cm^2. Source, BUMED P-5055.

b. As contained in NRC Regulatory Guide 1.86 "Termination of Operating Licenses for Nuclear Reactors." It is noted that these limits are consistent with NRC draft guidelines for "Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for ByProduct, Source, or Special Nuclear Material" December 1975 and Proposed American National Standard ANSI N328-197 - "Control of Radioactive Surface Contamination on Materials, Equipment, and Facilities to be Released for Uncontrolled Use."

3. Wipes were taken at 247 points in 22 various locations within the building. Survey results and laboratory beta-gamma analysis of wipe tests are presented in tabular form in Appendix A. Utilizing the most restrictive set of limits (200 dpm/100 cm^2 removable and 1000 dpm/100 cm^2 surface) addressed in paragraph 2.b above, the following rooms contained localized "hot spots" exhibiting activity levels exceeding these limits: 1109; 135; 218; 471; 631; 670; and 2153. A total of 27 wipe tests were performed in vent ducting with nine areas revealing measurable activity and three areas exceeding these limits. Only one survey point revealed removable alpha contamination above the paragraph 2.b limit of 20 dpm/100 cm^2. That was found on the wall in Room 218 and measured 24 dpm/100 cm^2.

4. The data from the cursory surveys performed by LFE Environmental Analysis Laboratory and RASO are essentially compatible. With the exception of isolated areas of beta-gamma contamination all survey results generally tend to support the effectiveness of the initial decontamination effort and the AEC clearance and license termination actions, considering the contamination limits in effect at the time. Further the following pertinent conclusions can be made:

a. Building 815 does contain isolated "hot spots".

b. All identified "hot spots" are in areas listed in paragraph B.3 above as isotope use locations with the exception of a moveable desk located in Room 135.

c. Isolated contamination exceeding limits occurred in ducting serving only identified isotope use locations. However, any ducting contamination could be widely dispersed by the operation of the air conditioning, heating, or ventilating systems.

In view of the cursory nature of the survey and the identification of isolated contamination, a more detailed survey is required. However, as the contamination occurred only in rooms or equipment serving rooms identified as isotope use locations, and in view of previous AEC surveys completed in 22 visits, the required detailed survey can reasonably be restricted to areas identified as isotope use locations.

5. The location and use of radioactive materials contained in paragraph B.3 above are based on NRC license data in NAVNUPWRU files and lacks specificity. A verification of uses and locations by NAVSEASYSCOM is required to provide sufficient specificity to determine areas requiring further survey.

D. RECOMMENDATIONS

1. That the locations and uses of radionuclides identified in paragraph B.1 above be verified and refined as to completeness and specificity by NAVSEASYSCOM.

2. Notwithstanding paragraph 1 above, the following surveys are recommended:

a. Perform detailed beta-gamma contamination surveys of all rooms on the sixth, fifth, and fourth floors and Rooms 218, 222, 255, 2153, and 1109.

b. Perform random alpha surveys of all rooms on the sixth floor and detailed alpha surveys in any rooms approaching alpha contamination limits.

c. Evaluate each intake and exhause vent of air conditioning/heating ducts, and fan blades and filter areas of air handling units serving all areas identified for surveys, including Rooms 135 and 139. Positive findings approaching recommended decontamination limits will require a detailed survey of the involved duct system.

3. That survey specifications be developed and the survey conducted by a party independent of the Navy via a NAVSEASYSCOM contract.

4. That NAVNUPWRU provide assistance to NAVSEASYSCOM in the review of contractor developed survey specifications and in the review of survey results.

5. That BUMED be requested to establish decontamination limits compatible with the potential use of Building 815 as noted above.

6. That no air conditioning, heating, or ventilating equipment be operated until appropriate surveys and necessary decontamination of related ducting has been completed.

APPENDIX A

RADIATION SURVEY RESULTS, BUILDING 815, SAN FRANCISCO SHIPYARD

Survey Point(s) (Room - Wipe No.)	Removable beta gamma activity dpm/100 cm^2	Removable beta gamma activity pCi/cm^2	Surface beta gamma activity dpm/100 cm^2	Surface beta gamma activity pCi/cm^2	RO-2 readings in mR/hr beta shield open
1109-1	277	1.2	9242	208	0.2 (1)
*1109-2	27291	123	29260	659	1.3 (1)
1109-3	8325	37.5	9364	211	0.1 (1)
1109-4	772	3.5	20760	468	0.1 (4)
1109-5	2405	10	4771	108	BKGD (4)
1109-6	288	1.3	-	-	- (1)
1109-7	600	2.7	-	-	- (1)
1109-8	MDA	MDA	-	-	(1)
1109-9	246	1.1	-	-	- (1)
1109-10 through 1109-17	MDA	MDA	-	-	-(1)(2)(4)
1109-18	196	0.9	-	-	- (3)
1109-19	MDA	MDA	-	-	- (3)
1109-20	4637	20.9	28592	644	2.0 (1)
** 135-1	MDA	MDA	2863	65	BKGD (4)
135-2 through 135-14	MDA	MDA	-	-	-(1)(2)(3)(4)
139-1	MDA	MDA	358	8.1	0.1 (4)
139-2 through 139-12	MDA	MDA	-	-	-(1)(2)(4)
139-13	158	0.7	-	-	- (3)
203-1 through 203-8	MDA	MDA	-	-	-(1)(2)(3)
***218-1	439	2.0	10216	230	0.1 (4)
218-2 through 218-22	MDA	MDA	-	-	- (1)(2)(3)(4)
283-1 through 283-11	MDA	MDA	-	-	- (1)(2)(3)(4)
352-1 through 352-11	MDA	MDA	-	-	- (1)(2)(3)
+471-1	1029	4.6	3868	87	0.2 (4)
471-2	139	0.6	809	18	BKGD (4)
471-3 through 472-12	MDA	MDA	-	-	- (1)(2)(3)
473-1 through 473-9	MDA	MDA	-	-	- (1)(2)
495A-1 through 495A-3	MDA	MDA	-	-	- (1)(2)(4)
495-1 through 495-13	MDA	MDA	-	-	- (1)(2)(4)
541-1	36	0.2	-	-	- (3)
541-2 through 541-12	MDA	MDA	-	-	-(1)(2)(3)(4)
620-1	MDA	MDA	-	-	-(3)
620-2	MDA	MDA	83	1.9	BKGD(4)
620-3 through 620-16	MDA	MDA	-	-	- (1)(2)(4)
++631-1	121	0.6	29321	660	0.8 (1)
631-2 through 631-14	MDA	MDA	-	-	- (2)(3)(4)

Survey Point(s) (Room - Wipe No.)	Removable beta gamma activity dpm/100 cm^2	pCi/cm^2	Surface beta gamma activity dpm/100 cm^2	pCi/cm^2	RO-2 readings in mR/hr beta shield open
631-15	MDA	MDA	301	6.8	BKGD (4)
631-16 through 631-23	MDA	MDA	-	-	- (1)
667-1	MDA	MDA	-	-	- (1)
670-1&2	MDA	MDA	-	-	- (4)
670-3	MDA	MDA	159	3.6	BKGD (1)
670-4 through 670-18	MDA	MDA	-	-	-(1)(2)(3)(4)
+++670-19	440	2.0	-	-	-(3)
2153-1	59	0.3	-	-	-(3)
2153-2 through 2153-4	MDA	MDA	-	-	-(2)(3)
2153-5	131	0.6	-	-	- (1)
2153-6	65	0.3	-	-	- (3)
++++2153-7	838	3.8	1278	29	0.05 (3)
2153-8	61	0.3	-	-	- (3)
2153-9	48.8	0.2	-	-	- (3)
2153-10 through 2153-14	MDA	MDA	-	-	- (2)
2153-15	72	0.32	-	-	- (2)
2153-16	MDA	MDA	-	-	- (2)
2153-17	62	0.28	-	-	- (1)
2153-18	40	0.18	-	-	- (1)
2153-19	37	0.17	-	-	- (1)
2153-20	41	0.19	-	-	- (1)
Reserved Dining Room 1 through 9	MDA	MDA	-	-	- (1)
General Dining Room 1 through 6	MDA	MDA	-	-	- (1)
Bldg 815 Entry	MDA	MDA	-	-	BKGD (1)

LFE Environmental Analysis Laboratories results keyed to table

* 135 pCi/cm^2 removable beta activity and 1350 pCi/cm^2 fixed beta-gamma activity.

** 90 pCi/cm^2 fixed beta-gamma activity

*** 45 pCi/cm^2 fixed beta-gamma activity

\+ 90 pCi/cm^2 fixed beta gamma activity

++ 2700 pCi/cm^2 beta gamma activity of which 70 pCi/cm^2 was removable.

+++ spots of activity ranging up to 45 pCi/cm^2

++++ spots of 90 pCi/cm^2 fixed beta-gamma activity

NOTE: (1) Floors
(2) Walls
(3) Ducting
(4) Fixtures